ARUP

NSW Department of Education

Bungendore High School

ESD REF Report

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1. Introduction

This 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 Bungendore High School (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 and Addendum October 2024 (Consideration of environmental factors for health services facilities and schools).

The purpose of this report is to describe how the proposal will incorporate the principles of ecologically sustainable development in the design, construction and ongoing operation of the development.

1.1 Site Description

The current street address is part of 18 Harp Avenue, Bungendore, NSW, 2621 (the site), and is legally described as part Lot 125 in Deposited Plan 1297613. As shown at Figure 1, the proposed school site forms part of a larger lot which is the subject of a proposed residential subdivision.

The site is located within the North Bungendore Precinct (Elm Grove Estate) in Bungendore. As a result of precinct wide rezonings, the surrounding locality is currently transitioning from a semi-rural residential area to an urbanised area with new low density residential development.

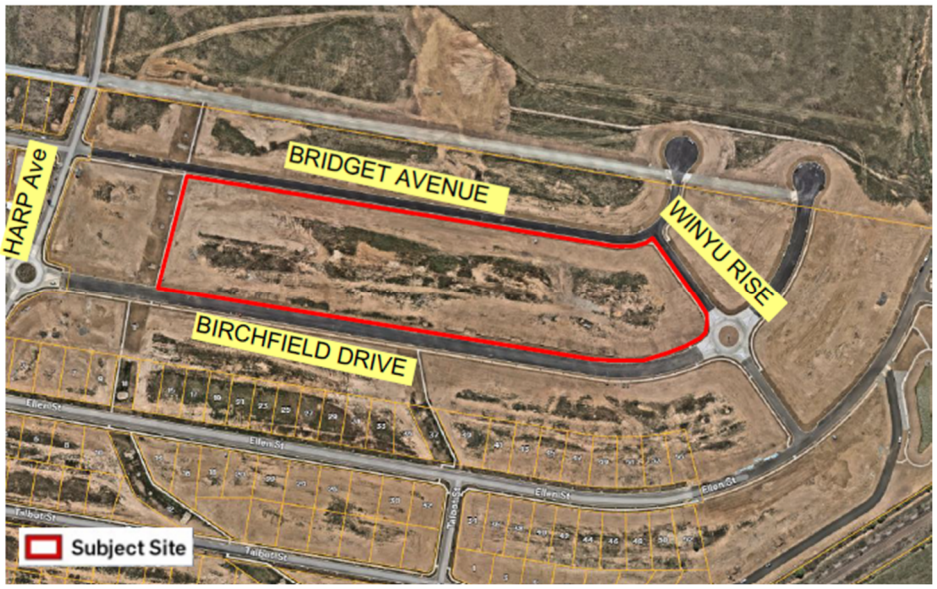
The site is zoned R2 Low Density Residential, with all adjoining land also zoned R2 Low Density Residential.

The site has three frontages:

- Approx 500m southern frontage to Birchfield Drive.
- Approx 500m northern frontage to Bridget Avenue.
- Approx 100m eastern frontage to Winyu Rise.

The site is currently cleared of all vegetation and consists of grassland, having been prepared for the purposes of future low density residential development.

Figure 1 Aerial Photograph of the Site



Source: Urbis, 2024

1.2 Proposed Activity Description

The proposed activity is for the construction and operation of a new high school in Bungendore at part 18 Harp Avenue, Bungendore (the **site**). The new high school will accommodate 600 students and 68 staff. The school will provide 26 general learning spaces, and three support learning spaces across two buildings. The buildings will be predominantly three-storeys in height and will include permanent and support teaching spaces, specialist learning hubs, a library, administrative areas and a staff hub.

Additional core facilities are also proposed including a standalone school hall with covered outdoor learning area (**COLA**), a car park, a kiss and drop zone along Birchfield Drive, sports courts and a sports field. The new school also features a single storey building with associated paddocks in the far western portion of the site designed for livestock management and hands-on agricultural learning.

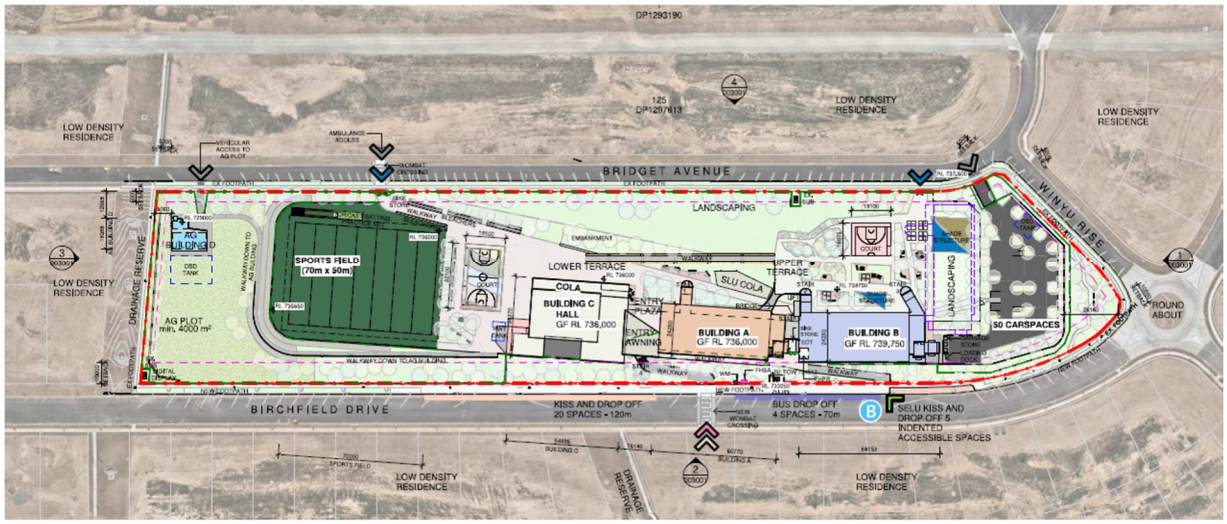
Specifically, the proposal involves the following:

- Building A, a three-storey learning hub accommodating general learning spaces, a special education learning unit (**SELU**), a physical education centre, a performing arts space, and other core facilities including administrative areas, staff hub, library and end of trip facilities.
- Building B, a part three/part four storey learning hub accommodating general learning spaces, specialist workshops for food, textile, wood and metal workshops, as well as visual arts studios, science labs and staff areas.
- Building C, a standalone school hall with COLA.
- Building D, a single-storey agricultural block comprising an animal storage space, a COLA and internal workshop.
- On-site staff car park with 50 spaces with access via Bridget Avenue.
- Kiss and drop zones and bus bays along Birchfield Drive.
- Open play space including a sports courts and sports field.
- Associated utilities and services including a 1000kv padmount substation.
- Main pedestrian entrance to be located off Birchfield Drive.
- Secondary pedestrian access from Bridget Avenue.
- Public domain/off-site works including the removal of street trees.

The design has been masterplanned to allow for an additional future stage. The second stage does not form part of this proposal.

Figure 2 provides an extract of the proposed site plan.

Figure 2 Site Plan



Source: NBRS, 2024

2. Sustainability and ESD Strategy

The activity has developed a comprehensive ESD strategy to address the minimum requirements set out in the following:

- Clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation
- Schools Infrastructure NSW (SINSW) Education Facilities Standard and Guidelines (EFSG)
- Government Architect NSW (GANSW) Design Guide for Schools and Environmental Design in Schools Manual
- NSW Government Resource Efficiency Policy (GREP)
- NSW State Environmental Planning Policy for Sustainable Buildings (Sustainable Buildings SEPP)
- National Construction Code (NCC) 2022 Section J Part J4 and J5

The strategy is reflected in a registration for a Green Star Buildings third-party certification, with a minimum rating target of 4 Stars. This target performance is considered "Best Practice" level by the Green Building Council of Australia (GBCA). The Green Star rating is currently pursued for the proposed activity.

This document outlines the ESD initiatives that are being considered within the building's design to achieve the above aims and targets.

2.1 Sustainable Buildings SEPP Requirements

The following requirements apply to non-residential developments under Section 3.2 of the Sustainable Buildings SEPP:

Table 1 Sustainable Buildings SEPP requirements

Issue and Assessment Requirements		Addressed within section of this ESD report
Consideration of whether the design enables…	The minimisation of waste from associated demolition and construction, including by the choice and reuse of building materials	Section 2.9.
	A reduction in peak demand for electricity, including through the use of energy efficient technology	Section 2.6.
	A reduction in the reliance on artificial lighting and mechanical heating and cooling through passive design	Sections 2.5, 2.6.
	The generation and storage of renewable energy	Section 2.6.
	The metering and monitoring of energy consumption	Section 2.4.
	The minimisation of the consumption of potable water	Section 2.8.
Quantification of the embodied emissions attributable to the development		Quantities of key construction materials reported by separate submission of NABERS Materials reporting template

2.2 NCC 2022 Section J Compliance

The activity is committing to exceed the Deemed-to-Satisfy (DTS) requirements of NCC 2022 Section J. In line with the EFSG requirements, the activity is targeting a 10% reduction in energy consumption, in comparison to a minimum NCC 2022 DTS compliant building, excluding any contribution from renewable energy (e.g. rooftop solar PV). This target is applied for both assessments: Block A and Block B assessed as a united building, and Block C assessed as a single building. A Section J Part J4 minimum DTS compliance assessment was conducted in Schematic Design stage, which sets out the minimum required fabric performance in order to meet a 10% improvement above DTS provisions.

2.3 Green Star Rating

The project is registered with the GBCA under the Green Star Design & As-Built v1.3 rating tool and is being designed to a minimum Green Star 4 Star rating. It is registered as:

- GS-6190DA New High School in Bungendore Block A, B & D
    - It is noted the project name reflects the development at time of registration in 2021. Since this registration, the project address has changed and now includes Blocks A, B, C and D. The updates to the project registration to reflect the new location were approved by the GBCA (R-28912).

The following sections detail best practice sustainability initiatives currently integrated in the design, based on the credits currently targeted within the Green Star Design & As-Built v1.3 framework. As the design is further developed, the targeted credits may be removed or substituted, or new credits added. Green Star framework categories presented in the following sections also encompass the requirements of the EFSG.

2.4 Management

The following initiatives are currently included in the sustainability strategy:

- Green Star accredited professional has been contractually engaged to provide advice, support and information.
- Pre-commissioning, commissioning, and tuning of building systems to ensure systems are operating as intended.
- SINSW Commissioning and Temporary Schools Program reviews process to assist in advising, monitoring, and verifying the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.
- Design to respond to future climate impacts as identified by a climate change risk assessment. A climate adaptation risk register has been developed for the building to address specific climate risks of the design and how they might be mitigated to reduce risk. Adaptation responses to address high and extreme risks have been proposed within the project's Climate Resilience Plan.
- Provision of building information to facilitate operator and user understanding of all building systems, and their specific operation and maintenance requirements and/or environmental targets
- Metering and monitoring of energy and water uses.
- Environmental targets for the development and a system in place to measure results, for reduction of energy and water consumption.
    - 20% reduction in energy use compared to reference building
    - Water efficient fixtures and rainwater collection
    - Airtightness target of 4 $m^3/h.m^2$ (AP50) based on ATTMA TSL2
- Responsible construction practices in place, including development of project-specific best-practice environmental management plan (EMP) and high-quality staff support services. Implementation of a formalized approach to planning, implementing and auditing during construction to ensure Conformance with the EMP.
- Contractor's construction practices to promote diversity and reduce physical and mental health impacts.
- Separation of waste streams and design of facilities to meet best practice access requirements for collection.
- Specialist waste consultant has been engaged to development of an operational waste management plan (OWMP). OWMP principles to be incorporated into the design in future project stages,

including separation of waste streams (e.g. paper, cardboard, glass, plastics, toner cartridges, batteries, organics etc.) to facilitate reuse, recycling, composting, and overall waste reduction.

2.5 Indoor Environment Quality

The following initiatives are currently included in the sustainability strategy:

- Passive design principles have been incorporated in the design, including high-performance building envelope, effective shading and building orientation, and natural ventilation openings to support comfortable and low-energy indoor environment quality.
- Acoustic consultant is engaged to advise design to support the building's function as training, teaching and multi-purpose spaces for students, staff and community use.
- Best-practice lighting will be provided to improve lighting comfort via flicker-free, high-quality lighting that accuracy addresses the perception of colour within the space.
- High levels of daylight are provided to regularly occupied learning and administration areas, to support high levels of visual comfort for building occupants. Detailed daylight modelling will be undertaken in future project stages.
- Internal air pollutants have been reduced via selection of materials with low or no volatile organic compound (VOC) levels and low formaldehyde concentrations.
- Pollutants entering the building are minimised and a high level of outdoor air (50% improvement above AS1668.2) is provided to the regularly occupied spaces.

2.6 Energy

The following initiatives are currently included in the sustainability strategy:

- The project is to align with the SINSW Commitment to Sustainability Goals for 2030 (net zero emissions in operations) and the Sustainable Buildings SEPP requirements (fossil fuel free by 2035). The design team's current inclusions are as follows:
    - 100% electric services including heat pumps for heating and domestic hot water
    - No piped gas connection; only gas bottles provision for science laboratory and 50% of VET kitchen stovetops. Bottled gas use intended to allow future transition away from gas.
    - Refer to ESD-BHS-REP-005 Net Zero Statement prepared to support REF
- Passive design principles, including high-performance building envelope, effective shading and building orientation, and natural ventilation openings to support comfortable and low-energy indoor environment quality.
- Exceeding NCC 2022 Section J minimum DTS requirements. The EFSG Section DG02.03 requires the development to target a 10% reduction in energy consumption, in comparison to a minimum NCC 2019 DTS compliant building, excluding any contribution from renewable energy (e.g. rooftop solar PV). The project proposes to verify this via NCC 2022 Section J DTS calculations. No energy or thermal modelling has been scoped. Potential specific provisions currently include:
    - Improving on the glazing performance requirements of Section J Part J4D6;
    - Exceeding the minimum building envelope R-values of Section J Parts J4D4, J4D6 and J4D7 where feasible;
    - Improving on the maximum illumination power densities of Section J Part J7D3.
- Effective shading devices which reduce solar heat gains to conditioned spaces.
- Energy-efficient lighting (typically LED) will be provided throughout, and high efficiency heating and cooling.

- Roof mounted solar photovoltaic (PV) system in accordance with EFSG requirements.

2.7 Transport

The following initiatives are currently included in the sustainability strategy:

- Traffic engineer has been engaged to carry out a transport assessment in line with the SINSW requirements.
- Provision of bicycle parking and end-of-trip facilities for staff.

2.8 Water

The following initiatives are currently included in the sustainability strategy:

- Enhance the water efficiency of the proposed development and reduce potable water consumption associated with the above major uses:
    - Selection of water-efficient sanitary fittings and fixtures in line the Green Star and EFSG requirements;
    - Rooftop rainwater harvesting and reuse for toilet flushing and landscape irrigation;
    - No water-based heat rejection systems for air conditioning (no cooling towers).

2.9 Materials

The following initiatives are currently included in the sustainability strategy:

- Reduction of Portland cement content and aggregates in all structural concrete used.
- Design for reduction in mass of steel reinforcement compared to standard practice.
- Steel source from Responsible Steel Makers.
- Selection of timber products that are either third-party environmentally certified or sourced from a reused source.
- Procurement of responsible PVC materials.
- Minimum of 90% of waste generated from construction and demolition will be reused or recycled, to limit the amount of waste going to landfill. Waste management plans will be developed for demolition, construction and operation of the site.

2.10 Land Use & Ecology

The following initiatives are currently included in the sustainability strategy:

- Site has no critically endangered, endangered or vulnerable species, or ecological communities.
- Site is not on old growth forest, prime agricultural land, or ‘Matters of National Significance’.

2.11 Emissions

The following initiatives are currently included in the sustainability strategy:

- Landscaping and rainwater harvesting to support Water Sensitive Urban Design and limit stormwater pollutants leaving the site
- Appropriate internal and external lighting design to reduce light pollution. External lighting to be designed such that the Upward Light output Ratio (ULOR) <5%.
- All heat-rejection systems to be waterless to eliminate risk of Legionella

- Rainwater tank to reduce peak discharge to the sewer.
- Management of stormwater pollutants.

2.12 Innovation

The following initiatives are currently included in the sustainability strategy:

- Disclose cost of sustainable building practices of the project including design, construction, and documentation to the GBCA.
- Universal design principles implemented to provide safe, equitable and dignified access for persons with disabilities.
- Through collaboration with the Connecting with Country consultant, incorporate Indigenous design elements into the project design, addressing each of the principles from the Australian Indigenous Design Charter (AIDC). Aboriginal and Torres Strait Islander communities to be engaged throughout.

3. Conclusion

This report identifies the sustainability measures being pursued by the project team, in alignment with the frameworks and requirements applicable to the activity. The sustainability strategy includes holistic design and operational initiatives, to encourage best practice design towards energy, water, and waste reduction; as well as providing improved indoor environmental quality and a positive impact on nature and the community.

3.1 Mitigation Measures

Table 2 Mitigation Measures

Mitigation Number/Name	Aspect/Section	Mitigation Measure	Reason for Mitigation Measure
Green Star strategy	Prior to commencement of any construction work	Finalisation and demonstration of all Green Star strategy targeted credits, through the award of a Green Star Design Review certification.	The credits forming the Green Star strategy aim to enhance sustainability of the project and minimise impact on the locality, community and/or the environment.
Section 2.4 Management – Contractor EMP	Prior to commencement of any construction work	Responsible construction practices to be put in place by the Contractor, including development of project-specific best-practice environmental management plan (EMP).	Construction practices to reduce impacts and promote opportunities for improved environmental and social outcomes.
Section 2.4 Management – OWMP	During design finalisation	Specialist waste consultant to develop an operational waste management plan (OWMP).	Management of operational waste in a safe and efficient manner.
Section 2.4 Management – Contractor inclusive policies	Prior to commencement of any construction work	Demonstration of Contractor policies that promote diversity and reduce physical and mental health impacts.	Construction practices to promote diversity and reduce physical and mental health impacts.
Section 2.9 Materials – Construction and Demolition Waste Management	Prior to commencement of any construction work	Waste management plans to be developed by the Contractor for demolition, construction and operation of the site.	Construction practices to reduce impacts and promote opportunities for improved environmental and social outcomes.

3.2 Evaluation of Environmental Impacts

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