Prepared for
NSW Department of Education

Date 15 November 2021

Environmental Impact Statement

Upgrades to Glenwood High School

architectus™

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B	1 November 2021	Draft for ToA
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D	15 November 2021	Final

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Statement of veracity

Project details	
Project name	Upgrade to Glenwood High School
Application number	SSD-23512960
Address	85 Forman Avenue, Glenwood NSW 2768
Applicant details	
Applicant name	NSW Department of Education
Applicant address	105 Phillip Street, Parramatta NSW 2150
Details of person by whom this EIS was prepared	
Name and professional qualifications	**Boris Santana** Senior Planner *Bachelor of Planning (Honours), University of New South Wales* **Jasmine Bautista** Student Planner
Address	Architectus Australia Pty Ltd Level 18 MLC Centre, 25 Martin Place Sydney NSW 2000
Declaration by registered planner	
Name	Jane Fielding
Organisation registered with	Planning Institute of Australia
Declaration	The undersigned declares that this EIS: – has been prepared in accordance with Schedule 2 of the Environmental Planning and Assessment Regulation 2000; – contains all available information relevant to the environmental assessment of the development, activity or infrastructure to which the EIS relates; – does not contain information that is false or misleading; – addresses the Planning Secretary's environmental assessment requirements for the project; – identifies and addresses the relevant statutory requirements for the project, including any relevant matters for consideration in environmental planning instruments; – has been prepared having regard to the Department's State Significant Development Guidelines - Preparing an Environmental Impact Statement; – contains a simple and easy to understand summary of the project as a whole, having regard to the economic, environmental and social impacts of the project and the principles of ecologically sustainable development; – contains a consolidated description of the project in a single chapter of the EIS; – contains an accurate summary of the findings of any community engagement; and

	– contains an accurate summary of the detailed technical assessment of the impacts of the project as a whole.
Signature	 Jane Fielding, Senior Associate, Urban Planning
Date	15 November 2021

Summary

Proposed development

The proposed development comprises an upgrade to the existing Glenwood High School (GHS). The proposed upgrades at GHS include the formalisation of learning spaces in a new three (3) storey building that will replace nineteen (19) existing demountable buildings on site.

The proposed development will also provide fifty-one (51) new learning spaces, a new purpose-built performance arts pavilion, refurbished wood/metal and food tech units, provision of an additional support learning space, new administration and staff facilities, upgrades to the existing library building, and ancillary utility infrastructure and landscaping works.

Refer to **Section 3** for a detailed description of the proposed development.

Feasible alternatives

GHS belongs to the North West Secondary School Catchment Group which is projected to experience capacity shortfall of 3,107 students by 2036, underpinned by the strong population forecasted in the Central City District and Western Parkland District.

Numerous options were developed to address the service need at GHS. Analyses of several planning options eventually led to the adoption of the current design, which accommodates the current School Infrastructure NSW (SINSW) planning grid and has several advantages, including increased permanent student capacity, Education Facilities Standards and Guidelines (EFSG) Stream 12 core facilities, improved landscaping and open space provision, and site connections.

The site is suitable for the proposed use and would allow for the continued operation and expansion of an existing school, which would provide for projected local population growth. The proposed alterations and additions provide additional teaching spaces, upgraded and enlarged core education facilities and improved street presence and access into the school.

For further detail, refer to **Section 2.7**.

Consultation

As required by the Secretary's Environmental Assessment Requirements (SEARs), the project team has undertaken extensive consultation with relevant state and local Government authorities, agencies and other stakeholders, as well as consultation with the local community. The issues discussed and matters raised during this consultation have been addressed as part of the proposal. An overview of these consultation processes and outcomes is included at **Section 5** of this Environmental Impact Statement (EIS) and the Consultation Report at **Appendix N**.

Planning framework and assessment

The proposed development is classified as SSD on the basis that it satisfies the requirements of clause 15(2) of Schedule 1 of State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP), being development that has a capital investment value of more than $20 million for the purpose of alterations or additions to an existing school.

The proposed development has been assessed against the SEARs issued for the project at **Appendix A** and the applicable planning framework at **Appendix B**.

Statutory and strategic planning context

The proposed development has been assessed against relevant strategic policies and planning controls and is found to be generally consistent with these, as detailed within **Sections 2** and **4** of this EIS. Additionally, the proposal satisfies the SEARs as demonstrated in **Appendix A**.

Assessment Summary

There are no known site conditions which would prevent the development including geotechnical conditions, contamination, flooding, biodiversity, Aboriginal cultural heritage, or other matters.

A comprehensive assessment of impacts has determined that the proposed development will not result in any unacceptable environmental impacts during the operation of the proposed development, either to surrounding properties or the public domain, given the design and mitigation measures to be employed during construction and operation of the development.

The key issues include traffic and transport. The EIS also considered the additional travel demand resulting from the proposed upgrades to GHS. The analysis has shown that traffic impacts as a direct result of the proposed development are considered acceptable in the context of the local network.

While the site can accommodate the travel demand of the proposed upgrades, GHS currently has minimal pedestrian infrastructure which limits use of sustainable modes of transport. Given this, the proposed development seeks to deliver new sustainable transport facilities like new bike parking spaces for students, end-of trip facilities for staff, and an additional pedestrian access point from Glenwood Park Drive to the east. A School Transport Plan (STP) has also been prepared and develops strategies to encourage a greater uptake in active and public transport modes, and a reduction in car-based travel.

Blacktown City Council also identified that the site may be susceptible to flooding. In response, a Flood Report was prepared for the proposed development, appended to this EIS at **Appendix Y**. The site is located within a low flood precinct as the site sits above the 1% AEP and below the rare PMF flood event. The impact of climate change on existing flood levels due to increased rainfall has also been considered. However, this sits above the floodwaters for 0.5% and 0.2% AEP flood events.

The Flood Report concluded that no floodwaters will be adversely impacted by the new building, thereby avoiding impacts on neighbouring properties and impacts to riparian zones. Notwithstanding this, the proposal responds to these constraints through the setting FFLs above PMF so that shelter in place is possible if a flood event eliminates the possibility of evacuation.

The site also has significant ecological value, as an area of Cumberland Plain Woodland is present in the north eastern portion of the site. Protection of this ecological community was considered a key priority from the outset of the design process for the proposed development.

The new building has been carefully sited and designed such that it envelopes the existing remnant Cumberland Plain Woodland forest to the west of the building. This design allows for views of the canopy. The interstitial spaces between the new building and forest will also provide greater connections between these two spaces.

Additionally, new tree planting is proposed, particularly surrounding the new building and within the Cumberland Plain Woodland area, to compensate for the loss of trees required to facilitate the development and to improve the visual amenity within the site and the locality generally. Furthermore, logs and limbs from trees identified for removal are proposed to be salvaged and carefully placed within this area to improve fauna habitat values.

During construction, the various mitigation measures recommended at **Appendix C**, will ensure that the proposal will not result in any unreasonable environmental impacts.

1. Introduction

1.1 Applicant's details, address and ABN

The details of the Applicant are provided below:

- Applicant: NSW Department of Education
- Applicant Address: 105 Phillip Street, Parramatta NSW 2150
- ABN: 40 300 173 822

1.2 The Site

The site is Glenwood High School (GHS) which is located at 85 Forman Avenue, Glenwood. The site is legally described as Lot 5227 in Deposited Plan 868693. It is owned by the Minister for Education and Youth. The site has a total area of 60,790m^2.

GHS was established via a Public Private Partnership (PPP) in 2004. The school is part of a suite of schools delivered under the NSW Government's 'New Schools I' PPP program. Axiom Education 1 Pty Ltd, a private consortium, financed, designed, and constructed the school. It provides ongoing cleaning, maintenance and security services.

Refer to **Section 2** for further detail relating to the site and its surrounding context.

1.3 Project objectives

The objectives for the proposed development include:

- Deliver new permanent, high quality, diverse and adaptive spaces for students and staff to learn, connect, and collaborate. New teaching and learning spaces increase the student capacity at GHS and eliminate the need for the existing demountables on site.
- Upgrade existing core facilities to meet EFSG Stream 12 requirements in line with projected student demands.
- Provide greater and improved support for students with autism spectrum disorder and moderate intellectual disabilities through the delivery of additional dedicated support learning units.
- Define and integrate outdoor spaces for learning, active and passive play, and circulation networks.
- Maximise greenspace and shade through new landscaping and tree planting, to support students, particularly during summer/warmer months. Landscaping works will also increase the urban tree canopy cover on site, providing environmental benefits like mitigating heat island effect and absorbing carbon dioxide emissions.

1.4 Description of the project

The proposed development comprises upgrades to the existing GHS. The proposed upgrades at GHS include the formalisation of learning spaces in a new three (3) storey building that will replace nineteen (19) existing demountable buildings on site.

The proposed development will also provide fifty-one (51) new learning spaces, a new purpose-built performance arts pavilion, refurbished wood/metal and food tech units, provision of an additional support learning space, new administration and staff facilities, upgrades to the existing library building, and ancillary utility infrastructure and landscaping works.

The application seeks approval for the following development:

- Construction of a new three (3) storey building at the north-eastern portion of the site facing Glenwood Park Drive which will accommodate approximately fifty-one (51) learning spaces;

- Construction of a new single storey performance pavilion;
- Refurbishment of existing Building Block A (ground floor only) to provide one (1) new support unit within the space of an existing general learning space;
- Refurbishment of Building Block D (ground floor only) to provide an additional office space and storeroom;
- Refurbishment of Building Block E to re-purpose it on the ground floor for computer learning spaces, staff and administration as well as upgrades to the library on the first floor;
- Refurbishment of Building Block J to re-purpose it from visual arts and performing arts to learning spaces and workshops for food tech and woods/metal unit;
- Demolition of existing botany room and construction of a new single storey pavilion comprising of interview rooms and end-of-trip facilities; and
- Ancillary works at the site associated with the proposed upgrades including landscaping.

Refer to the proposed site plan at **Figure 1** and 3D view at **Figure 2.** For further detail, refer to the Architectural Plans at **Appendix H** and the Architectural Design Statement at **Appendix I**.

Figure 1 Proposed Site Plan
Source: PTW Architects

Figure 2 3D View
Source: PTW Architects

The proposed upgrades to GHS seek to improve the quality of educational outcomes for current students and cater for the future growth demands of the school precinct. The upgrade will increase capacity from the existing 1,410 students to 1,820 students.

1.5 Relevant application history

Blacktown City Council has provided details regarding the relevant application history for the site. Refer to **Table 1**.

Table 1 Relevant application history

Relevant Application	Description	Approval date
DA-03-695	Educational establishment (Glenwood Public High School) and overall master plan for site	29 September 2003
DA-03-4746	Construction of a 90-place childcare centre	29 April 2004
DA-08-02191	Erection of up to 10 demountable refurbished buildings and covered walkways	11 December 2008

1.6 Project background

Although GHS was originally built to cater for approximately 1,190 students (within 60 permanent learning spaces), rapid increases in demand over time have resulted in additional students being accommodated in 19 demountable buildings. The school currently operates at a capacity of approximately 1,410 students.

In its current form, GHS currently has 19 demountables (27% of learning spaces) on the school site. This is well above the Departmental benchmark of having no more than 15% of learning spaces being in temporary accommodation.

In addition, GHS currently lacks diversity in the range of existing learning spaces, whereby many of the learning units operate independently and in an enclosed typology. Generally, this has resulted in limited opportunities for collaborative teaching, flexible grouping of students and integrated learning.

Many of the core facilities also do not meet EFSG requirements for the current student population. These deficiencies create overcrowding issues at the school which serve to diminish the educational outcomes of existing students.

Moreover, existing infrastructure across the North West Secondary School Catchment Group does not provide for adequate capacity to accommodate future student demands in 2036, with major capacity shortfall of 3,107 students across the school catchment by

2036. Catchment projections for GHS is expected to increase, from its current capacity at 1,410 students to 1,537 students in 2036.

The proposed upgrade will replace the 19 demountables on site with future focused, integrated permanent learning spaces and expand teaching capacity with the addition of 51 new permanent learning spaces in the new building. Moreover, the development involves upgrades to core facilities to EFSG Stream 12 standards, to address the current non-ESFG-compliant learning spaces.

This intervention will allow more students within the live-in catchment to travel to the school through more sustainable modes of transport, such as walking and cycling, while simultaneously encouraging a more active lifestyle. It also provides the facilities that will help to address capacity shortfalls at neighbouring high schools or future proofing the School Community Group (SCG) for future changes to projected demand.

A long list of options was developed to address the service need at GHS. Through a series of analyses, it is considered that the current development option that forms the basis of this SSDA best addresses the primary drivers of the service need within the funding envelope.

1.7 Related development

To facilitate the delivery of the school upgrades, early works are being facilitated under separate planning approval pathways. These are discussed below.

Review of Environmental Factors/Part 5 Approval

The existing portable classrooms on site are proposed to be removed (except for their footings) and associated utility services infrastructure demolished under Part 5 of the EP&A Act, documented in a Review of Environmental Factors (REF). The sewer reticulation system is also proposed to be diverted. The extent of the proposed activity is illustrated in the Demolition and Services plan at **Figure 3**.

Figure 3 Part 5 approval/REF works plan
Source: PTW Architects (2021)

The works will be undertaken in two stages. The demountable removal (Phase A) will take place over 2 months from November 2021 to December 2021. The sewer diversion (Phase B) will take place over 3 months from March 2021 to May 2021. Demountable footings will not be removed under this pathway.

Exempt Development

The exempt works include temporarily relocating the existing portable classrooms that are proposed for removal under the REF, to the north western portion of GHS. Refer to **Figure 4** for the layout of demountables within the playing field at the north-western portion of the site.

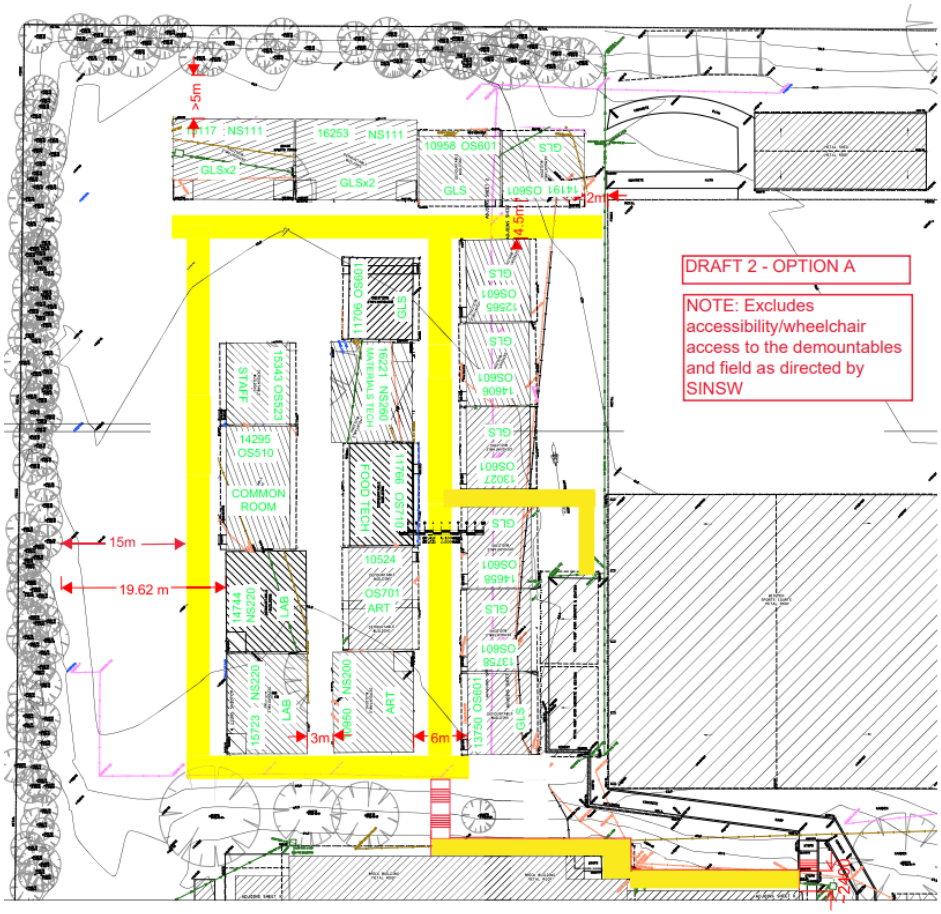

Figure 4 Location of relocated demountable pursuant to exempt pathway
Source: PTW Architects (2021)

These works are expected to occur between November and February 2022. Demountables will be relocated to allow existing students to continue their education at the school whilst construction works are underway to deliver the new facilities. Demountables will be removed following completion of the proposed development documented in this SSDA.

Crown Development Application

A Crown Development Application (DA) was lodged to Blacktown City Council on 26 October 2021 for early works at the site to facilitate future upgrades to the school. Specifically, this DA seeks development consent for the following works:

- Bulk earthworks.
- Removal of any utilities and extant footings within the extent of the earthworks.
- Removal of existing stormwater pipes and new stormwater line.
- Removal of three (3) trees from the site.

It is anticipated that the works will be undertaken over a three (3) month period between March 2022 and May 2022. Note that this DA is currently under assessment.

Any cumulative impacts resulting from these related developments are discussed in **Section 6.20** below.

Section 138 of the Roads Act 1993

Consent is required under Section 138 of the Roads Act 1993 for the following works under the scope of this SSD application:

- Connecting the new on-site detention tank to the existing stormwater infrastructure within Glenwood Park Drive road reserve.

1.8 Restrictions and covenants on the site

The subject site is subject to the following affectations:

- Easement to Drain Water 2.5m wide and variable located along the north-eastern splayed property boundary.

It should be noted that the proposed development does not result in the encroachment of any building into this easement.

Refer to **Appendix G** for a copy of both the Deposited Plan and 88B Instrument for the subject site.

1.9 Project team

The Project team is set out below:

Table 2 Project name

Discipline	Consultant
Applicant	NSW Department of Education
Quantity Surveyor	Rider Levett Bucknall (RLB)
Surveyor	C.M.S. Surveyors Pty Ltd
Architect	PTW Architects
Landscape Architect	McIntosh & Phelps
Urban Planner	Architectus Australia Pty Ltd
Aboriginal Cultural Heritage Consultant	Tocomwall Pty Ltd
European Heritage Consultant	Tocomwall Pty Ltd
Traffic Consultant	Taylor Thomson Whitting (TTW)
Contamination Consultant	Douglas Partners
Geotechnical Engineer	Douglas Partners
Arboricultural Consultant	Eco Logical Australia Pty Ltd
Civil Engineer	enstruct group
Biodiversity Consultant	Kleinfelder
ESD Consultant	AECOM Australia Pty Ltd
Accessibility Consultant	Philip Chun
BCA Consultant	Philip Chun
Structural Engineer	enstruct group
Acoustic Consultant	AECOM Australia Pty Ltd
Waste Management Consultant	EcCell Environmental Management
Building Services Infrastructure Engineer	AECOM Australia Pty Ltd
Construction Management Consultant	Jacobs Group (Australia)
Social Impact Consultant	Elton Consulting as part of WSP Group
Consultation Consultant	School Infrastructure NSW
Lighting Consultant	AECOM Australia Pty Ltd

1.10 Estimated Capital Investment Value (CIV)

The proposed development has an estimated CIV greater than $50 million. A detailed cost estimate has been prepared by Rider Levett Bucknall and is provided at **Appendix F**.

2. Strategic Context

2.1 Justification for the project

The Central City district is projected to experience an increase of 89,360 students by 2036. It is forecasted that approximately 32 per cent of this population group will be living in the Blacktown Local Government Area (LGA).

Locally, the North West Secondary School Community Group (SCG) is experiencing school infrastructure pressures and this trend is forecast to continue due to significant greenfield development and transport infrastructure investment in the North West Growth Centre (NWGC).

There is forecast to be a combined shortfall of 3,107 students within the North West Secondary SCG by 2036. Catchment projections for GHS is expected to increase, from its current capacity at 1,410 students to 1,537 students in 2036.

The upgrade of GHS to accommodate up to 1,820 students will help address the projected shortfall at GHS as well as the shortfall at neighbouring high schools, or future proofing the SCG for future changes to projected demand.

Moreover, there are current deficiencies in the school facilities to support educational outcomes of existing students. In its current form, approximately 27% of learning spaces on the school site are within the existing 19 demountables. Many of the core facilities also do not meet the EFSG requirements for the current student population.

In this regard, the project will address current capacity constraints and functional inadequacies at GHS. It will also deliver education benefits to the GHS student cohort, improve outcomes for the community and provide economic stimulus in an area that is experiencing significant population growth because of other developments, such as the NWGC.

2.2 Regional and local land use planning context

This Section provides an overview of the site's broader and immediate contexts.

State Context

The proposed development is aligned with many of the strategic directions of relevant state policies, as shown in **Table 3**.

Table 3 State Planning Policies

Strategic Planning policy	Response
NSW State Priorities	NSW State Priorities are fourteen (14) priorities unveiled by the NSW Premier, in a commitment to making a significant difference to enhance the quality of life for the people of NSW. Relevant State priorities are: – Bumping up education result for children; – Increasing the number of Aboriginal young people reaching their learning potential; – Greener public spaces; – Greening our city; – Government made easy; and – World class public service. The proposed development seeks to deliver upgrades to an existing public high school to increase educational capacity in north western Sydney. Additionally, it will contribute to an increase in jobs and education, strengthening the local economy.

NSW State Infrastructure Strategy 2018-2038: Building Momentum	NSW State Infrastructure Strategy 2018-2038, released by Infrastructure NSW in February 2018, is a 20-year strategy that outlines the NSW Government's major long-term infrastructure plans across all key sectors – transport, energy, water, health, education, justice, social housing, culture, sport and tourism. The Strategy notes that enrolments in government and non-government schools are expected to increase by about 25 per cent over the next 20 years, with more than 80 per cent of the growth occurring in Sydney. The proposed development seeks to deliver upgrades to an existing secondary school with modern learning environments to increase educational capacity in the school catchment area.
Future Transport Strategy 2056	The Future Transport Strategy 2056 provides a framework for delivery of integrated and modern transport systems. The plan acknowledges the vital role transport plays in the land use, tourism, and economic development of towns and cities. The Future Transport Strategy 2056 addresses Transport's role in moving towards sustainability by achieving reductions in emissions. The proposed development supports more environmentally sustainable travel as it proposes new bicycle storage and end-of-trip facilities.

Metropolitan Context

The Greater Sydney Region Plan – A Metropolis of Three Cities, was released by the Greater Sydney Commission in March 2018 and is the NSW Government's 40-year vision (to 2056) and establishes a 20-year plan of Greater Sydney. The Plan applies to the Greater Sydney Region and sets the planning framework for the five districts which make up the region.

The Central City District covers the Blacktown, Cumberland, Parramatta, and The Hills LGAs. The Central City District Plan was released by the Greater Sydney Commission in March 2018. It is a guide for implementing the Greater Sydney Region Plan, A Metropolis of Three Cities, at a district level and is a bridge between regional and local planning.

The Blacktown Local Strategic Planning Statement (LSPS) 2020 sets out a 20-year vision for the future of Blacktown City as it grows and changes. The LSPS sets out planning priorities that are consistent with the Central City District Plan. The site forms part of the Riverstone Precinct, which is one of the four precincts making up Blacktown LGA.

Table 4 demonstrates how the proposal successfully addresses the key planning directions and planning priorities outlined in each strategic policy document.

Table 4 Metropolitan Planning Policies

Greater Sydney Region Plan	**Central Sydney District Plan**	**Blacktown Local Planning Priorities**	**Response**
D1: A city supported by Infrastructure – Infrastructure supporting new developments	**C1** – Planning for a city supported by infrastructure	**LPP1**: Planning for a city supported by infrastructure	The proposed development will support the Glenwood community with improved educational infrastructure.
D2: A collaborative city – Working together to grow a Greater Sydney	**C2 –** Working through collaboration	**LPP2:** Collaborating, partnering and engaging to implement the LSPS	Extensive collaboration has been undertaken by the project team, to produce good outcomes for the design and function of GHS. Collaboration with government, agencies and the community have also

Greater Sydney Region Plan	Central Sydney District Plan	Blacktown Local Planning Priorities	Response
			assured that the proposed works undertaken will respond to the communities changing needs.
D3: A city for people – Celebrating diversity and putting people at the heart of planning	**C3 –** Providing services and social infrastructure to meet peoples changing needs	**LPP3**: Providing services and social infrastructure to meet people's changing needs	The NSW Department of Education has estimated an extra 89,360 students will need to be accommodated at schools in the Central City District by 2036. It is forecasted that approximately 32 per cent of this population group living in the Blacktown LGA. The GHS upgrades will assist in meeting the growing education needs of the District.
	C4 – Fostering healthy, creative, culturally rich and socially connected communities	**LPP4:** Respecting heritage and fostering healthy, creative, culturally rich and socially connected communities	GHS will deliver new learning spaces where students and teachers can learn together and from each other. As such, the proposed development will support healthy, creative, culturally rich and socially connected communities. In addition, new bicycle storage and end-of-trip facilities are proposed, supporting people to become active and healthy.
D6: A well connected city – Developing a more accessible and walkable city	**C9 –** Delivering integrated land use and transport planning and a 30-minute city	**LPP7:** Delivering integrated land use and transport planning and a 30-minute city	The proposed development supports the 30-minute city concept through providing educational services and jobs to the Glenwood community. The proposed increased student capacity will ensure that there is greater opportunity for students in the North West Secondary SCG to access high school education close to home and within the Central River City.
D7: Jobs and skills for the city – Creating the conditions for a stronger economy	**C10 –** Growing and investing in health and education precincts	N/A	The proposed works will enhance education outcomes of the school via upgraded educational facilities.
D8: A city in its landscape – Valuing green spaces and landscape	**C16 –** Increasing urban tree canopy cover and delivering Green Grid connections	**LPP14:** Increasing urban tree canopy cover and Green Grid connections	The proposal will increase the overall tree canopy coverage of the site from 17.6% to 24.1%.
	C17 – Delivering high quality open space	**LPP15:** Delivering high quality open space	The proposed development seeks to retain existing

Greater Sydney Region Plan	Central Sydney District Plan	Blacktown Local Planning Priorities	Response
			outdoor play space and enhance these spaces via landscaping interventions.

Built and Natural Environment Context

The proposed development has been assessed and found to be generally consistent with several state-wide planning policies and guidelines for better places, well designed schools, healthy communities, and greener spaces. **Table 5** demonstrates how the proposal successfully addresses these policies.

Table 5 Relevant state-wide planning policies and guidelines

Strategic Planning Policy	Response
Better Placed: An integrated design policy of the built environment of New South Wales	Better Placed is an integrated design policy for the built environment of NSW. It seeks to capture our collective aspiration and expectations for the places where we work, live and play. The proposed development aligns with the objectives for good design. The seven principles of Better Placed have shaped and guided the proposed development. Consultation with the Government Architect is further explained in **Section F** of this EIS. Refer to the Architectural Design Statement at **Appendix I** for further detail of how the proposed development aligns with Better Placed.
Design Guide for Schools – Government Architect NSW	The Government Architect NSW Better Places: Design Guide for Schools provides guidance on how to meet the Education SEPP Design Quality Principles. The Design Guide identifies 7 principles from the SEPP to be considered during the design of the school. The proposed development aligns with these principles as discussed in the Architectural Design Statement at **Appendix I**.
Healthy Urban Development Checklist	The Healthy Urban Development Checklist prepared by NSW Health assess the built environment factors that impact on health. As NSW undergoes significant population growth over the next 20-30 years, it is imperative that the proposal is well designed to reduce health risks and improve health conditions, to support this growth. The proposal promotes the checklist's 11 themes through the design and function of the site. The Proposal supports the themes of the Checklist. The Proposal aims to improve the amenity and wellbeing of students and staff, through improved landscape (at **Appendices J** and **K**), architectural design statement (at **Appendices I**) and incorporated CPTED principles (at **Section 6.2**). In addition, new pedestrian, cycling and end-of-trip facilities are proposed to be provided on site, enhancing the health of students, staff and the environment.
Draft Greener Places Design Guide Government Architect NSW 2020	The Draft Greener Places policy provides information on how to design, plan and implement green infrastructure in urban areas throughout NSW. The proposal results in the marginal reduction of play space from 19,056 sqm to 18,970 sqm, which equates to 13.5m^2 per

Strategic Planning Policy	Response
	student for the current scenario and 10.4m^2 per student for the future scenario. Notwithstanding this the quality of existing play spaces will be greatly enhanced so as to improve the student experience. The tree canopy target for Greater Sydney in the Draft Greener Places Policy is 40% by 2056, with indicative place-based targets of 15% in the CBD, 25% in medium to high density areas and 20% in low density areas. The tree canopy on the site is currently 17.6% and would increase to 24.1% with the proposed works. The proposed tree canopy is a significant improvement for the site and targets set in the Guide. Refer to discussion in **Section 6.5** of this EIS for further discussion.

Immediate context

GHS is located within the Blacktown LGA. The site is located approximately 33km north west of the Sydney Central Business District. The surrounding suburbs include Bella Vista, Kings Langley, and Parklea.

The site is located within the Riverstone Precinct *(Blacktown Council, LSPS)* which is bounded to the:

- south by the M7 Motorway;
- west by Eastern Creek; and
- east and north by boundaries with the Hawkesbury and The Hills LGAs.

New housing is being developed in new communities in the North West Growth Area (NWGA), and urban renewal at Tallawong, Schofields, Riverstone, Quakers Hill and Vineyard stations will accommodate a diversity of housing types.

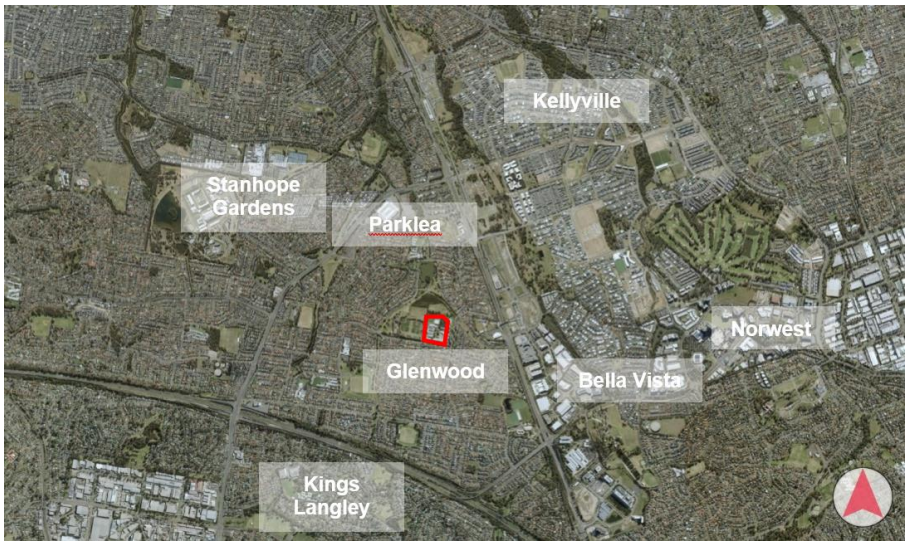

Figure 5 Regional site context
The site is outlined in red.
Source: Metro Map with Architectus edits

The site and its immediate surrounds are largely developed, being within a well-established low-density residential area that is characterised by 1-2 storey dwelling houses.

To the north of the site is Glenwood Reserve (including drainage water course), and low-density residential development beyond.

To the east of the site is low density residential development across Glenwood Park Drive and drainage channel, comprising a mixture of single and double storey dwellings.

To the south is low density residential development across Forman Avenue, comprising a mixture of single and double storey dwellings.

To the west is Glenwood Reserve (playing fields), and low density residential development beyond.

Figure 6 Immediate site context
Source: PTW Architects

Education context

The school is part of the North West Secondary SCG which encompasses five (5) secondary high schools, including:

- Glenwood High School;
- The Ponds High School;
- Quakers Hill High School;
- Riverstone High School; and
- Wyndham College.

There are also other public primary schools within the vicinity, including Parklea Public School and Caddies Creek Public School.

Refer to **Figure 7** for the extent of the North West Secondary SCG and catchment for GHS within the SCG.

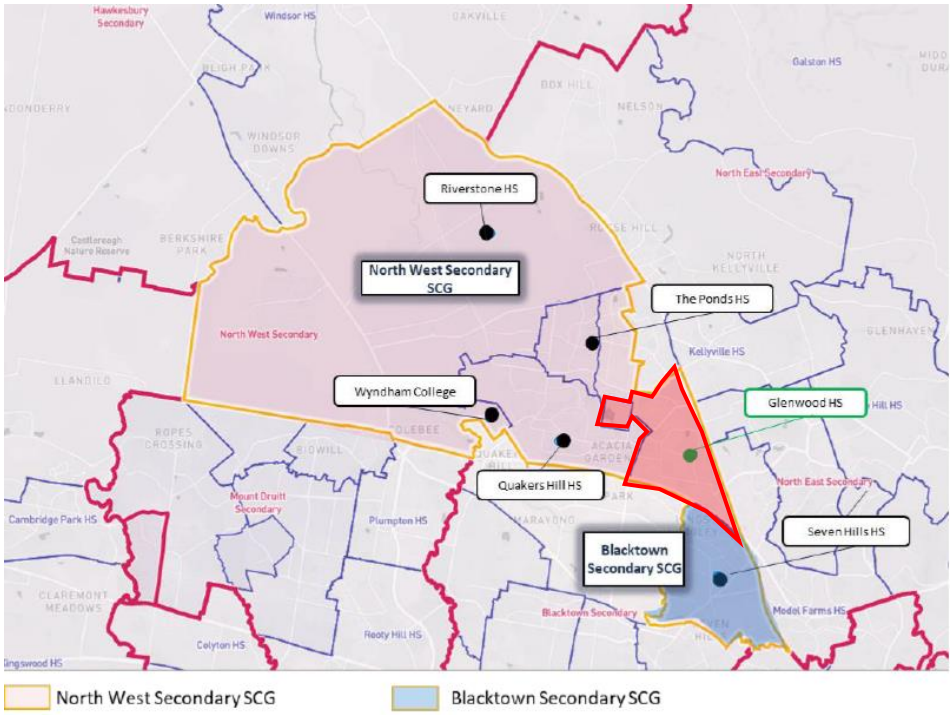

Figure 7 The North West Secondary SCG location map
GHS school catchment is shown in red
Source: SINSW – GHS Final Business Case

2.3 Site and surrounding context

Existing development

Glenwood High School is a co-educational public school and includes the following existing buildings and facilities:

- Ten (10) existing buildings comprising:
    - Building A and B: double storey classroom building;
    - Building C: double storey classroom building with a fitness laboratory on the ground floor;
    - Building D: double storey building with administration and staff facilities on the ground floor and classrooms on the first floor;
    - Building E: double storey building with classrooms and science laboratories on the ground floor and main library on the first floor;
    - Building F: staff building;
    - Building G, H and J: single storey classroom buildings (Block J contains school canteen); and
    - Building K: single storey gymnasium.
- Existing single storey childcare centre (known as Building L) at the south-western corner of the site which has its own car parking.
- Nineteen (19) single-storey demountable buildings, seventeen (17) of which comprise general learning spaces and two (2) which comprise of staff rooms.
- At-grade carpark providing for ninety-three (93) car parking spaces accessed from two separate vehicular access points on Forman Avenue for high school staff.
- Three (3) support learning units.
- Existing on site bicycle parking racks in the south east corner of the school near the staff parking facility.

- Outdoor spaces comprising:
    - Quadrangle space between Buildings C, B and E;
    - Playing Field at the north-western corner of the site;
    - Games Court to the east of the playing field;
    - Covered outdoor space adjacent to the canteen, and
    - Grassed open play area in the centre of the site.

Refer to **Figure 8** for an aerial view showing the existing elements of the GHS, and to **Figure 9** to **Figure 14** for photographs of the site.

Figure 8 Aerial view of existing GHS site
The site is outlined in red dashed line
Source: PTW Architects

Figure 9 Pedestrian and vehicle access point at Glenwood Park Drive
Source: Google maps (2021)

Figure 10 view of demountable buildings to be removed (facing east from within the site)
Source: Architectus (2021)

Figure 11 School bus pull-in loop road on Glenwood Park Drive
Source: Google Maps (2020)

Figure 12 View of demountable classrooms (facing north from within the site)
Source: Architectus (2021)

Figure 13 View of Block Building H
Source: Architectus (2021)

Figure 14 View of the school and drainage channel (facing south-west from Shaun Street)
Source: Architectus (2021)

Access

GHS is currently serviced by three (3) student access gates:

- A pedestrian entrance on the eastern side of the site, adjacent to the off-street bus bay on Glenwood Park Drive;
- A pedestrian access point at the southern side of the site on Forman Avenue. This provides access to the main school buildings via stairs and an accessible ramp; and
- A smaller pedestrian gate is located on Forman Avenue in the south-west corner of the site.

There is a vehicle access gateway at the eastern side of the site on Glenwood Park Drive. This gated driveway joins an internal road leading to the main school buildings.

A vehicle access point is located on Forman Avenue at the southern side of the site. This point leads to the staff car park and access is restricted to permitted staff and service vehicles. The driveway provides a two-way entry and exit.

There is a vehicle access driveway in the south-west corner of the campus on Forman Avenue, providing the secondary staff car parking access. This driveway provides two-way vehicle access. The driveway is shared with Goodstart Early Learning Child Care.

Figure 15 Transport access points at GHS
Source: TTW (2021)

The school currently operates with one indented kiss and ride zone along Forman Avenue, allowing parents to pick up and drop off their children in front of the school. The overall length of this zone is around 60 metres.

Additionally, there are further on-street kiss and ride (No Parking) zones along Forman Avenue, both east and west of the indented bay

Topography

The site topography generally slopes down to the north-east at gradients estimated to be less than 3° with the maximum elevation at about RL 70 (m AHD) in the south-west corner and the minimum elevation at about RL 59 (m AHD) in the north-east corner. Caddies Creek is located about 240 m north-west of the site and Glenwood Lake is located about 320 m north of the site. An open drainage reserve associated with Caddies Creek lies about 40 m to the north-east of the site boundary.

Vegetation and ecology

There are 321 established trees located within the GHS site. Refer to the Arboricultural Impact Assessment prepared by Eco Logical Australia Pty Ltd at **Appendix T**.

A Biodiversity Development Assessment Report (BDAR) was prepared by Kleinfelder to assess the significance of vegetation and ecology at the site and is provided at **Appendix S.** The BDAR indicates that vegetation at Glenwood High School can be classified into five (5) vegetation zones based on floristic composition and vegetation condition. Vegetation Zones at the site comprise the following:

- Vegetation Zone 1: PCT 849 - *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion,* (Critically Endangered Ecological Community - CEEC) (Moderate Condition)
- Vegetation Zone 2: PCT 849 - *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* (Low Condition)
- Vegetation Zone 3: PCT 849 - *Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion* (Planted)
- Vegetation Zone 4: Planted Native/Exotic Vegetation
- Vegetation Zone 5: Exotic Grassland (Managed)

Refer to **Figure 16** for the location of each vegetation zone on site.

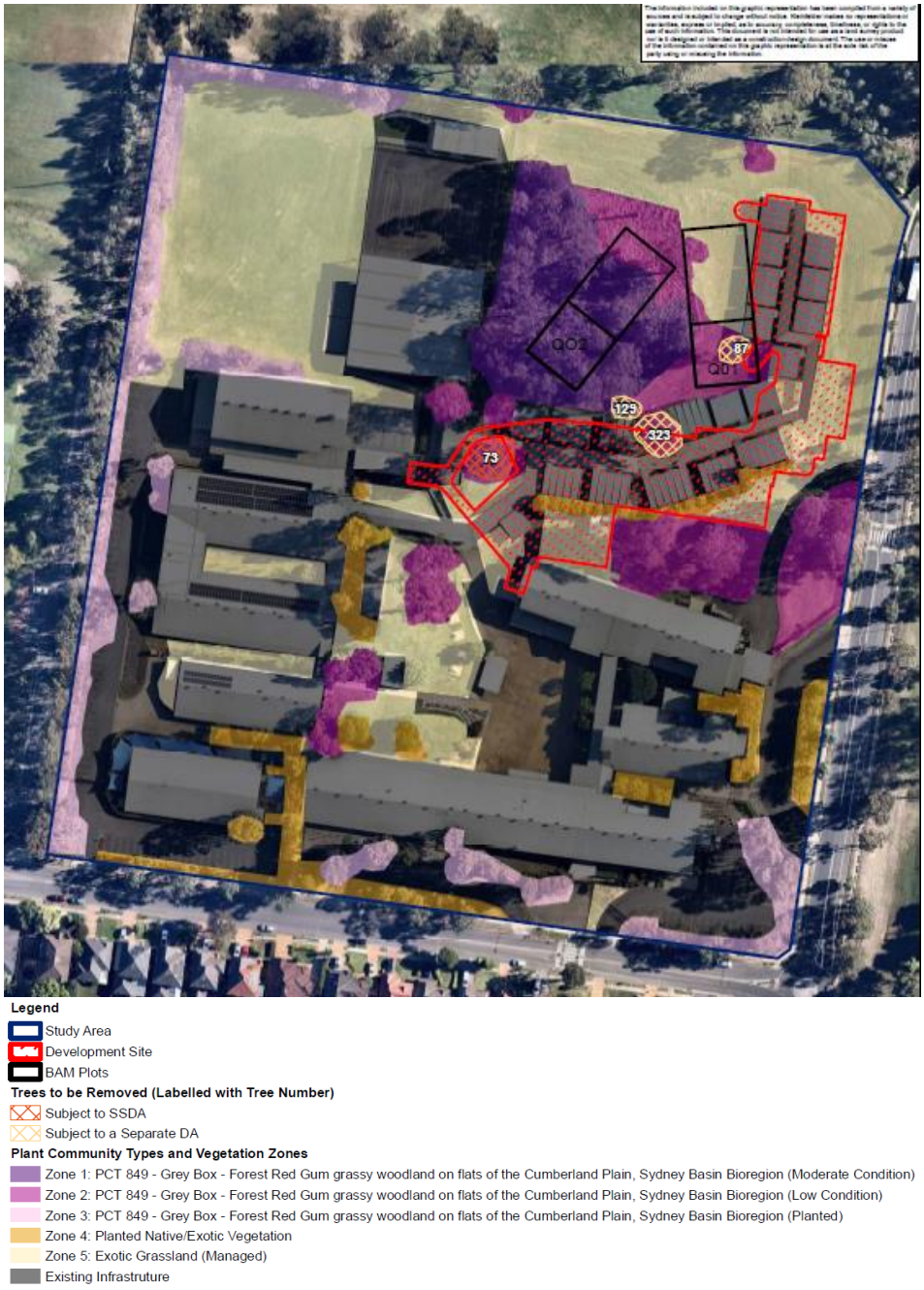

Figure 16 Vegetation zones at Glenwood High School
Source: Kleinfelder

Acid sulfate soils

Review of published mapping indicates that the site is in an area of 'no known occurrence of acid sulfate soils'. The NSW Acid Sulfate Soils Manual 1998 published by the Acid Sulfate Soils Management Advisory Committee (ASSMAC) indicates that ASS (and Potential Acid Sulfate Soils – PASS) normally occur in alluvial or estuarine soils below RL 5 m AHD although occasionally are encountered up to RL 12 m AHD.

Considering the ASS mapping and given that the site soils are at site elevations above RL 50 m AHD, the Geotechnical Report at **Appendix Q** considers that ASS is unlikely to be present on-site.

Salinity

The Department of Infrastructure, Planning and Natural Resources (DIPNR) "Map of Salinity Potential in Western Sydney 2002" suggests that the site is in an area of "moderate to high salinity potential" with a higher potential in the lower elevations areas in close proximity to the Caddies Creek system. The Geotechnical Report at **Appendix Q** considers the implications of the sites salinity potential and provides recommendations to be implemented for the development during construction.

Flooding

The Section 10.7(2)&(5) planning certificate for the site indicates that there are no flood related development controls that apply to the land. However, Blacktown City Council has noted that 'there is the possibility that the lot is subject to currently un-mapped overland flooding'. Refer to Council's Flood Advice Letter at **Appendix Z**.

A Flood report has been prepared by enstruct which can be found at **Appendix Y**. To confirm the site's susceptibility to flooding and assess the potential for flooding impacts affecting the early works site area, a TUFLOW flood model was developed.

The TUFLOW model indicates that the proposed development location in the north east corner of the school site is unaffected by flood water in the 1% AEP, 0.5% AEP and 0.2% AEP storm events. However, the new development location is susceptible to PMF storm event flood heights of up to RL 60.20m AHD.

In this regard, the proposed development is considered to be in a Low Flood Risk Precinct, which is defined as a precinct in which land is above the 1% AEP and below the PMF flood event.

Heritage

The site is not listed as a local heritage item and is not located within a heritage conservation area under Schedule 5 'Environmental Heritage' of the Blacktown LEP 2015. Furthermore, the school is not listed on the State Heritage Inventory and on the Department of Education S170 heritage register under the Heritage Act 1977. The site is not identified on Department of Education Draft S170 Heritage and Conservation Register for schools.

The closest heritage items to the site, namely House—Glenwood (item no. I25) and House (item no. I27) are more than 460m from the site. Similarly, the closest state heritage item (Exeter Farm) is located over 900m from the site. Refer to below Figures for an extract of the Blacktown LEP 2015 heritage map and results of State Heritage Inventory. Accordingly, there are unlikely to be any heritage impacts as a result given the distance of the site from these items of heritage significance.

Refer to **Figure 17** and **Figure 18** below.

Figure 17 Heritage Map extract
The site is outlined in red.
Source: Blacktown LEP 2015

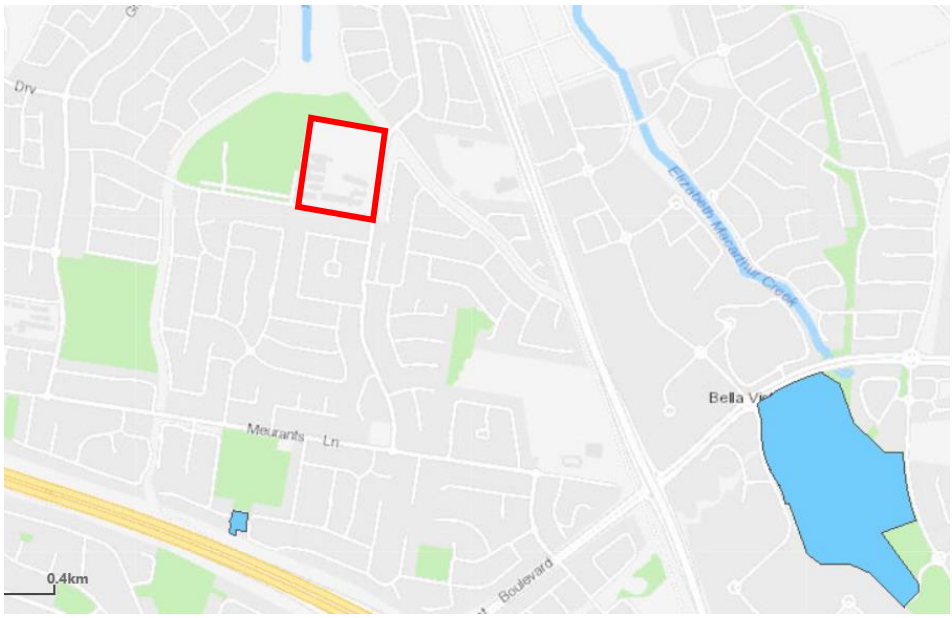

Figure 18 State heritage inventory extract
The site is outlined in red.
Source: NSW Government

Bushfire

A review of the Section 10.7 (2)&(5) Planning Certificate applying to the site (issue date 19/03/2020) revealed the site does not contain bushfire prone land.

2.4 Transport context

The site has two existing street frontages including Forman Avenue to the south and Glenwood Park Drive to the east. Refer to **Figure 19**.

Figure 19 Local road network and intersection controls
Source: Nearmap with TTW edits (2021)

Forman Avenue is a local street running east-west along the southern boundary of the school. There is a single travel lane in each direction with various parking restrictions in the westbound direction. The general speed limit along Forman Avenue is 50 km/hr, however, is also located within a 40 km/hr School Zone.

Glenwood Park Drive is a local street running north-south along the eastern boundary of the site. There is a single travel lane in each direction, with some parking spaces, a general speed limit of 50 km/hr and signage for 40 km/hr School Zone.

Both local roads provide pedestrian access for people walking, cycling, or driving to the GHS.

Figure 20 Extent of school zones
Source: Nearmap with TTW edits (2021)

Bus

GHS is accessible by bus services, with a dedicated school bus pull-in loop road provided at the school's frontage to Glenwood Park Drive. Another public bus stop is located at Forman Avenue. These bus stops service public bus routes 745 and 730. Refer to **Figure 21**.

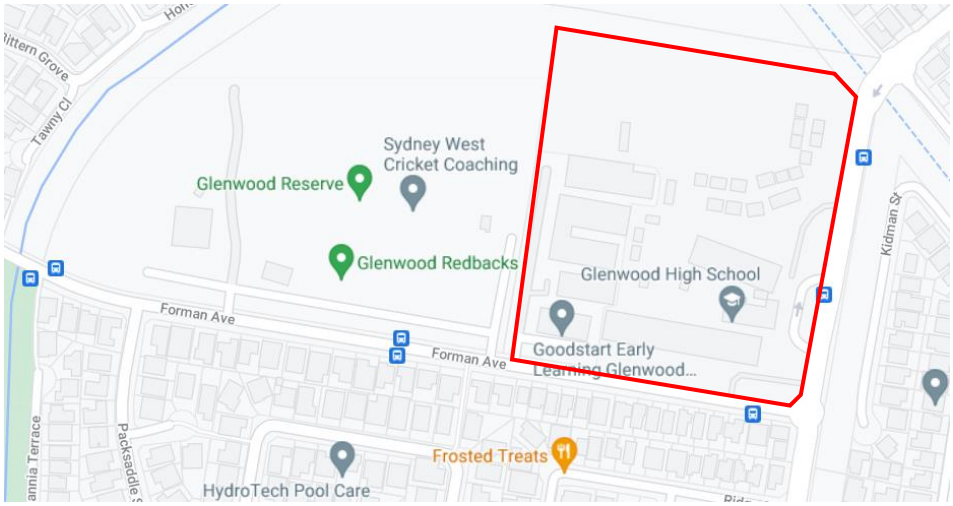

Figure 21 Bus stops servicing Glenwood High School
The site is outlined in red.
Source: Google Maps

Furthermore, two other bus services 616X and 663 service the existing school catchment boundary. All local routes are shown in **Figure 22** in the context of the school and the existing catchment boundary.

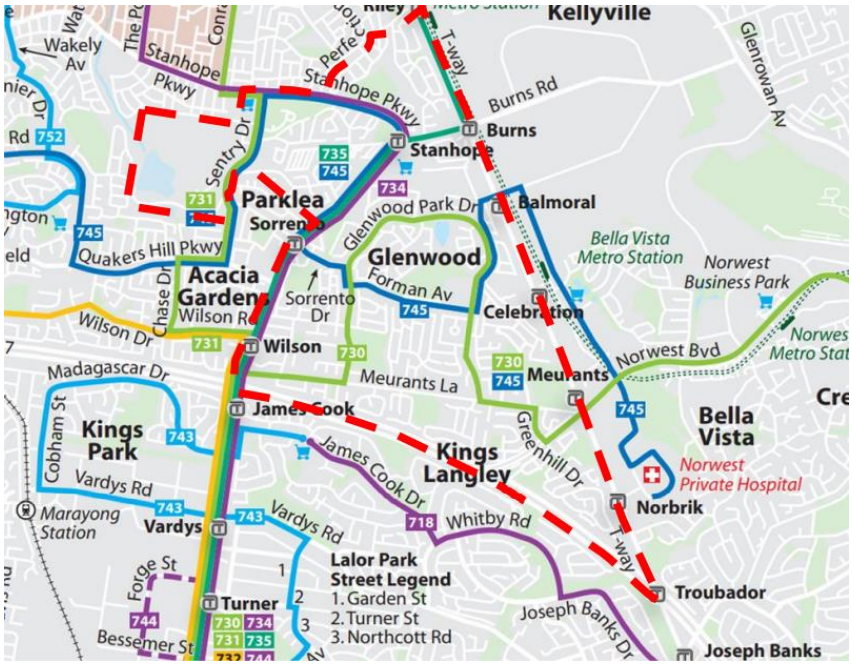

Figure 22 Local bus routes servicing GHS
The site location is shown with a red star.
Source: Greater Western Sydney Bus Network Map (Transport for NSW) (2021)

Busways and Hillsbus provide several school bus routes servicing GHS. All school buses use the bus bay on Glenwood Park Drive.

Train

The closest train station to the school is Blacktown train station, accessible via a bus ride of upwards of 25 minutes.

Sydney Metro

The closest Sydney Metro North West Station to the site is at Bella Vista Sydney Metro station. This is approximately a 25 minutes' walk from Glenwood High School. Bella Vista Sydney Metro Station can be reached via bus route 663, 730 and 745.

Pedestrian

Pedestrian zebra crossings are provided on Forman Avenue and Glenwood Park Drive which provide concrete footpaths on both sides of the road. The majority of the minor roads within the residential areas have a footpath on at least one side of the road, but some are missing footpaths on both sides. Refer to **Figure 23**.

Figure 23 Pedestrian facilities in the local road network
Source: Nearmap with TTW edits (2021)

Cycling

There are currently no bicycle paths connecting directly to the site.

There is a nearby cycleway on Moulmein Terrace, consisting of both on-road and off-road bike paths. This route has a proposed off-road cycleway connecting into the existing cycleway adjacent to the M7 motorway.

Another cycleway close to the school site exists along Teawa Crescent, connecting into Glenwood Park Drive and leading to Windsor Road. There is a proposed on-road cycleway connecting these two existing cycleways together via Honnyeater Terrace.

These cycleways will connect into larger network routes that connect to Blacktown train station, Seven Hills train station and Quakers Hill Train Station.

Refer to **Figure 24** for a map detailing existing and future cycling networks in the locality.

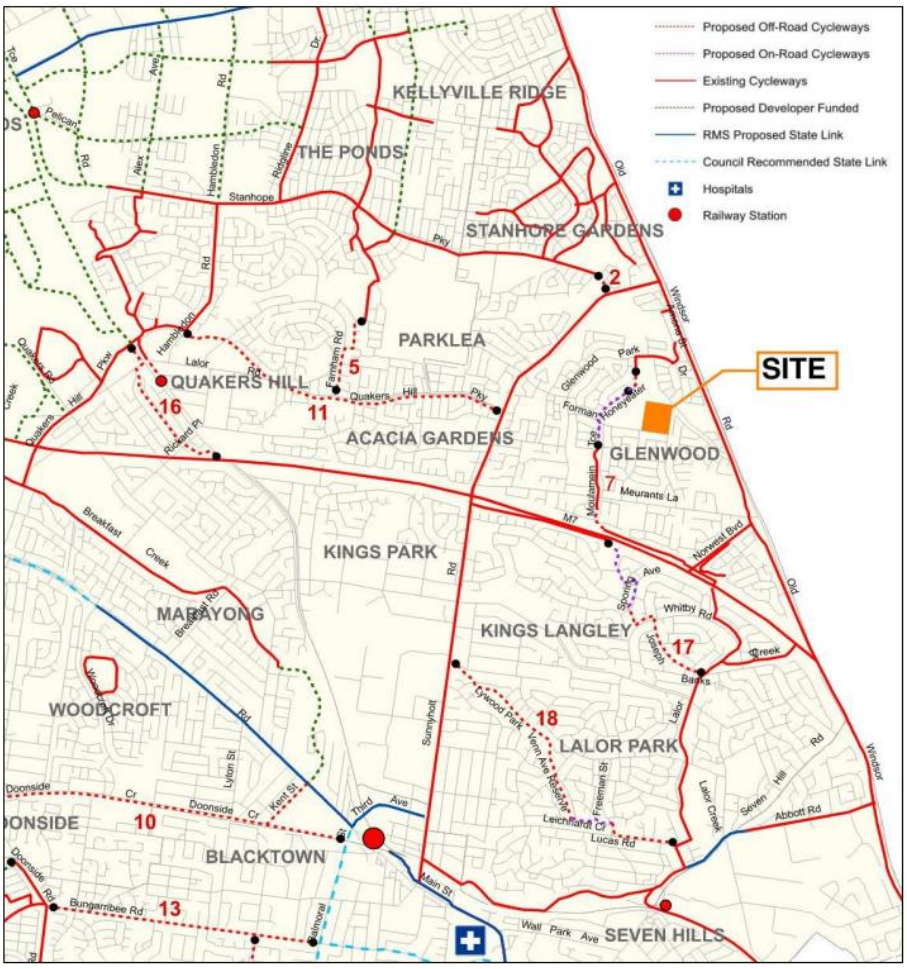

Figure 24 Existing and future cycling network
Source: Blacktown City Council, 2016 Bike Plan

The school site currently contains 56 bicycle parking spaces, located near the south-east car park. The existing staff facilities have limited provision of end-of-trip facilities. One shower is available, and some unassigned lockers are in the staffroom.

2.5 First Nations context

Traditional Owners and Custodians of the land and water in Glenwood are the Darug people. The Aboriginal Cultural Heritage Assessment Report (ACHAR) prepared by Tocomwall at **Appendix L** determined it is likely the traditional lands of the Bediagal Clan.

Although the consultant (Tocomwall) has confirmed no Aboriginal objects, sites or places were located within the development footprint, Tocomwall has consulted with Registered Aboriginal Parties, Land Councils and Aboriginal Community Members during the development of the design to interpret Aboriginal cultural heritage significance into the development.

Refer to **Section 6.15** of this EIS for discussion regarding Aboriginal cultural heritage.

2.6 Agreements

The site is not subject of any voluntary planning agreements and negotiated agreements with any landowners.

2.7 Analysis of feasible alternatives

A Final Business Case has been prepared to consider and assess several options for investing and upgrading GHS. Six options were developed to address the service need at GHS—four of these options (Options 2A, 2B, 2C and 4) progressed to design and masterplanning for detailed consideration and costing. Refer to **Table 6**.

Table 6 Master plan options
Source: SINSW – Final Business Case for GHS

Option	Scope	Analysis
Option 2A 	– Replace existing demountable classrooms with permanent classrooms – Upgrade core facilities to EFSG Stream 9 requirements – Add 2 new support learning spaces – Operate at 1,340 student capacity	This option was not selected as it does not include a capacity increase that may alleviate the experience of overcrowding at the school or need to travel to other SCGs.
Option 2B 	– Replace existing demountable classrooms with permanent classrooms – Upgrade core facilities to EFSG Stream 9 requirements – Add 2 new support learning spaces – Operate at 1,540 student capacity	Despite providing sufficient learning spaces to address the live-in catchment shortfall at GHS, it was not selected as the North West Secondary SCG as a whole would still experience significant demand pressures.
Option 2C 	– Replace existing demountable classrooms with permanent classrooms – Upgrade core facilities to EFSG Stream 12 requirements – Add 2 new support learning spaces – Operate at 1,980 student capacity	Option 2C was not selected because it significantly exceeds the capital funding allocation, given that it intends to address some of the residual demands across the SCG.
Option 4 	– Replace existing demountable classrooms with permanent classrooms – Upgrade core facilities to EFSG Stream 12 requirements – Include 1 new support learning spaces and 5 new technical learning spaces (e.g. workshops) – Operate at 1,820 student capacity	Option 4 was selected because it replaces the existing demountables being used to provide temporary teaching space, and provides new teaching spaces and upgraded core facilities, to address student demand in the live-in catchment but also alleviate further demand within the SCG.

A mix of interventions were explored in the shortlisted options, including the replacement of demountables/temporary learning spaces, the addition of learning spaces to increase student capacity, upgrades to core facilities, catchment boundary changes and the addition of support learning spaces.

Option 4 was selected as the preferred option and was recommended for funding. However, this option was later developed to utilise the new SINSW planning grid. This led to a revised masterplan Option 1_Rev B (refer to **Figure 25**).

Figure 25 GHS masterplan Option 1_Rev B site plan
Source: PTW Architects

It should be noted that the northern wing of the new building has been reduced in length by 7.5m over three storeys since masterplan Option 1_Rev B was endorsed.

2.8 Consequences of not carrying out the development

The consequence of not carrying out the development will be lack of educational infrastructure to support the existing and future community of the North West Secondary SCG. It will also force students to travel to schools which are further away and risks DoE not meeting its legislative requirements.

3. Project description

3.1 Project overview

An overview of the main elements of the project is provided in **Table 7**.

Table 7 Numerical Overview

Component	Existing	Proposed development
Site area	60,790m^2	60,790m^2
Permanent Learning Spaces	49	100 (+51)
Temporary Learning Spaces	17 (in 19 demountables)	Nil (being removed under exempt development)
Support unit classes	3	4 (+1)
Maximum building height (RL)	RL 73.775m	RL 77.868m
Gross floor area (GFA)	9,523m^2	15,258m^2 (+5,735m^2)
Car parking spaces	93	93
Bike parking	56	84 (+28)
End of trip facilities	1 x shower for staff	2 x female showers 2 x male showers 1 unisex accessible water closets 18 lockers
Trees	321	413 (+ 92)
Urban tree canopy cover	10,693m^2 (17.6%)	14,655m^2 (24.1%)
Play space	19,056m^2	18,970 m^2
Play space per student	13.5m^2 per student based on 1410 students	10.4m^2 per student based on 1820 students
Construction hours	N/A	Monday to Friday: 7am to 6pm Saturday: 8am to 1pm Sundays or Public Holidays: no work
Construction jobs	N/A	211
Staff	106	133 (+27)
Student capacity	1,410 students	1,820 students

3.2 Project description

The application seeks approval for the following development:

- Construction of a new three (3) storey building at the north-eastern portion of the site facing Glenwood Park Drive which will accommodate approximately fifty-one (51) learning spaces;
- Construction of a new single storey performance pavilion;
- Refurbishment of existing Building Block A (ground floor only) to provide one (1) new support unit within the space of an existing general learning space;
- Refurbishment of Building Block D (ground floor only) to provide an additional office space and storeroom;
- Refurbishment of Building Block E to re-purpose it on the ground floor for computer learning spaces, staff and administration as well as upgrades to the library on the first floor;
- Refurbishment of Building Block J to re-purpose it from visual arts and performing arts to learning spaces and workshops for food tech and woods/metal unit;
- Demolition of existing botany room and construction of a new single storey pavilion comprising of interview rooms and end-of-trip facilities; and

– Ancillary works at the site associated with the proposed upgrades including landscaping.

3.3 Project area

The proposed development seeks to deliver a new 3 storey building and single storey performance pavilion within the north-eastern portion of the site, with remnant Cumberland Plain Woodland forest to the west, a reserve to the north, Glenwood Park Drive to the east, and the existing Buildings A and C to the south.

This area is currently occupied by demountable buildings. Demountables will be removed under an REF and temporarily relocated to the north-western portion of the site under exempt development pathway. Following the removal of demountable buildings at the completion of these works, the development retains the existing large, consolidated play fields for students in the north-western corner on the site.

This area is otherwise underutilised by students in its present form for outdoor activities. The replacement of demountables with a new high-quality building will provide for the physical and visual renewal of an otherwise dilapidated streetscape along Glenwood Park Drive. A new performance centre will be located adjacent the new building.

The development also provides internal refurbishments to Building Blocks A, D, E, and J. There are no other changes to buildings on the site. Existing services areas will remain largely unchanged from that proposed. No additional parking is provided other than parking for active travel modes along Forman Avenue.

Refer to the proposed land and play space diagram at **Figure 26** and to the Architectural Design Statement at **Appendix I**.

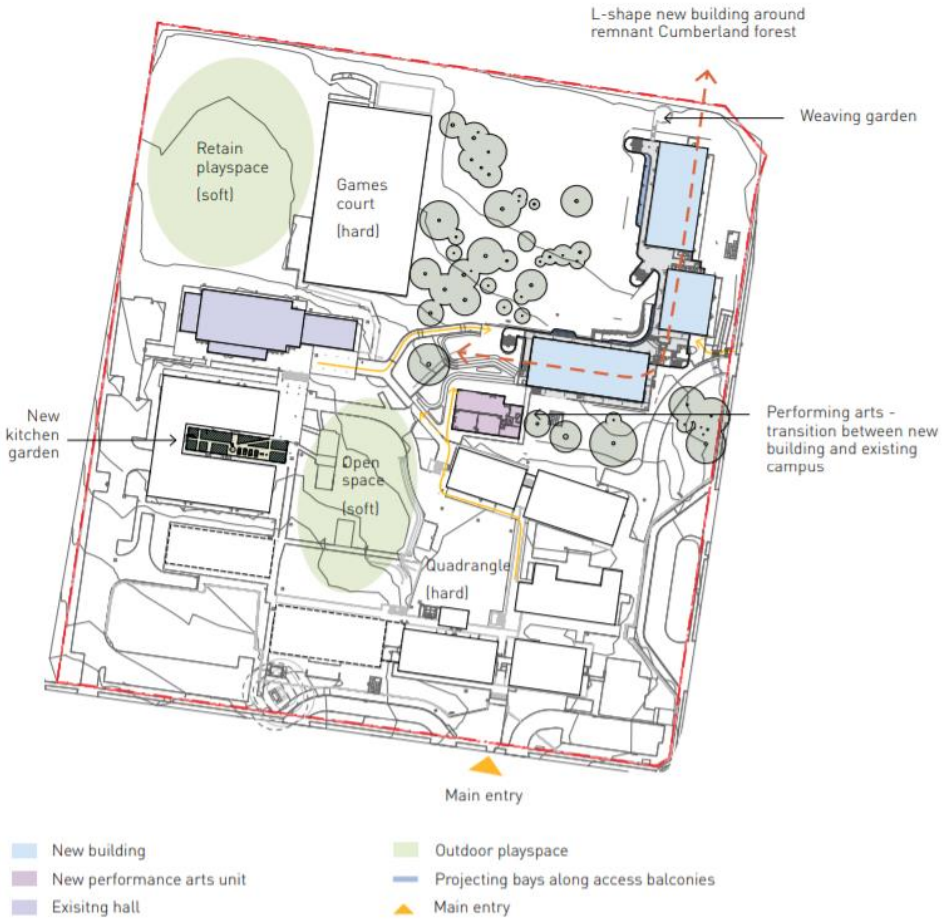

Figure 26 Land and play space diagram
Source: PTW Architects

Regard has also been given to the design of interstitial spaces. Refer to **Figure 27**.

Although the proposal will result in the removal of some trees to facilitate the development, it largely respects the existing ecological values on the site, particularly that of the existing woodland area that the new building embraces.

Interstitial spaces which provide a natural buffer to the existing woodland will be revitalised as outdoor learning and performance areas, providing visual and physical connections centred around this unique element of the school site.

Figure 27 Interstitial spaces for outdoor learning and recreation
Source: PTW Architects

3.4 Physical layout and design

The detailed design can be separated into two main components, being the new buildings and refurbished facilities. These components are discussed in further detail below.

New buildings

- Construction of a new three (3) storey building located in the north eastern corner of the site oriented to Glenwood Park Drive, which will accommodate 51 Permanent Learning Spaces and 1 new staff room. This development will replace all existing demountable classrooms.

Figure 28 Ground floor plan of the new building
Source: PTW Architects

The built form of the new building is a L-shaped perimeter block, which presents a strong urban street wall height to Glenwood Park Drive (east of the site). It is composed of three main wings of learning spaces, one in an east-west orientation and two in a north-south direction.

The new building has been carefully sited and designed such that it envelopes the existing remnant Cumberland Plain Woodland forest to the west of the building. This design allows for views of the canopy. The interstitial spaces between the new building and forest will provide greater connections between these two spaces. Refer to **Figure 29** below for a visualisation.

Figure 29 Rendered image of the new building, viewing south east from the remnant Cumberland Plain Woodland forest
Source: PTW Architects

The node between the two parts of the north-south wing will have a geometrically striking form, as will the chimney for the kiln at the northernmost point of the building. Refer to **Figure 30**. The roof is pitched to create a clerestory and sheathed with sheet metal.

Figure 30 View looking south west towards the new building from Glenwood Park Drive (Trees removed for view)
Source: PTW Architects

– Construction of a new single storey performance pavilion located directly south-west of the new building. The performance pavilion will be used as a workshop for students and no performances will be held within this structure.

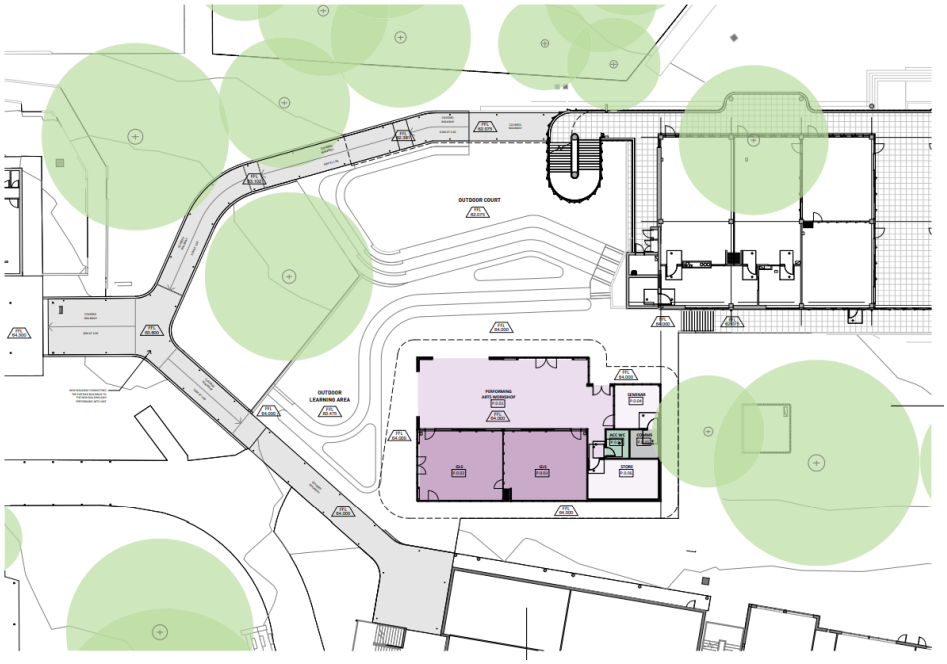

Figure 31 Ground floor plan for Performance Pavilion
Source: PTW Architects

An outdoor court is located just north of the main entrance which can be used as an extension of the performance space or for outdoor seating connected to the external active play and performance space.

Figure 32 Perspective of the performance pavilion
Source: PTW Architects

Repurposed facilities

- Building Block A (ground floor only) will be refurbished to provide one (1) new support unit within the space of an existing general learning space, limited to finishes and new furniture, and the removal of a set of doors in the adjacent corridor

Figure 33 Ground floor plan for Building A
Source: PTW Architects

- Refurbishment of Building Block E will include converting the existing science learning units on ground floor to computer labs and staff facilities. Partition walls will be removed to create connected staff spaces. Administration executive office will be moved from building D to building E. Original office will be refurbished and separated into a deputy principal space and a storeroom. The north 'botany' block will be demolished and rebuilt for interview rooms and end-of-trip facilities.

  The existing library computer lab on the first floor will be converted to a senior study space with new operable walls. The existing comms room will be extended, and new operable walls will be installed in the existing senior study on the first floor.

  Refer to **Figure 34** and **Figure 35** for floor plan extracts.

Figure 34 Ground floor plan for Building E
Source: PTW Architects

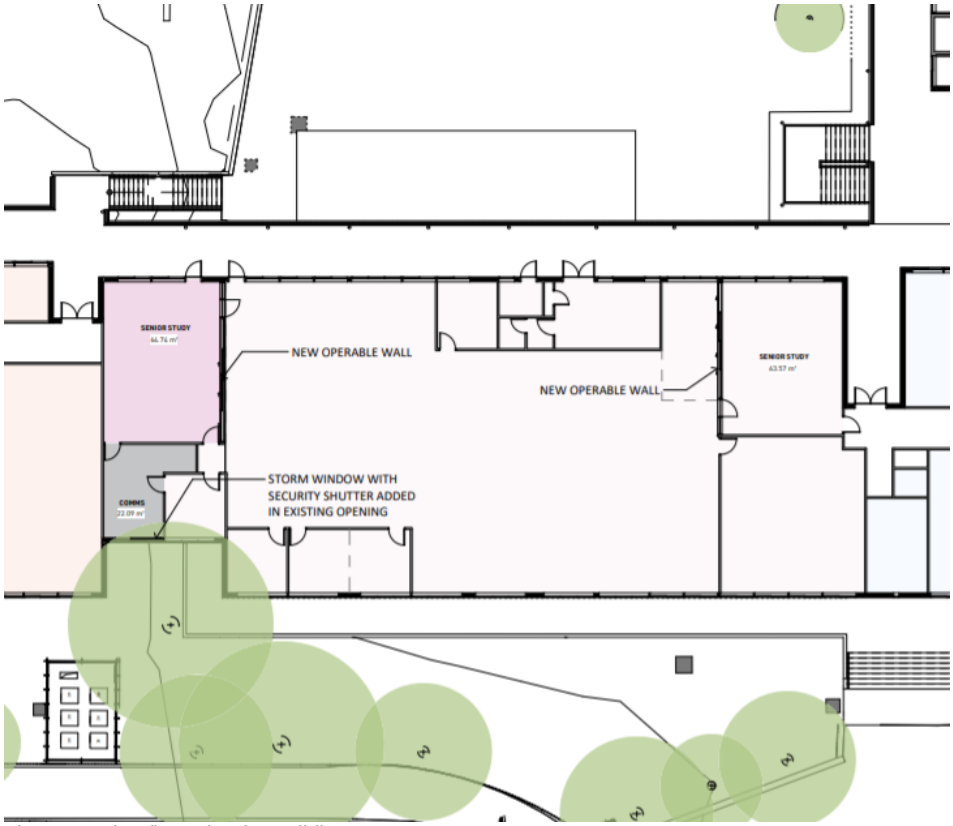

Figure 35 First floor plan for Building E
Source: PTW Architects

- Building Block J will be refurbished by converting the existing visual art learning spaces to metal/wood materials learning spaces, and existing GLS and performing arts spaces to food tech learning spaces. Refer to **Figure 36**.

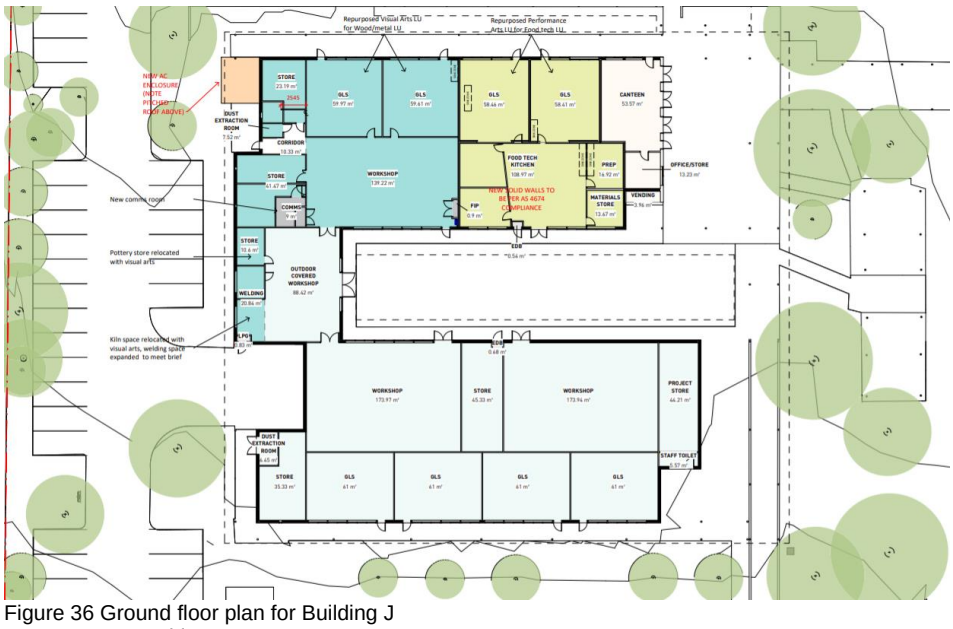

Figure 36 Ground floor plan for Building J
Source: PTW Architects

3.5 External materials and finishes

The external materials shown at **Figure 37** have been selected to create a play of light and shadow across the building façade, as well as for robustness and conformance with EFSG requirements.

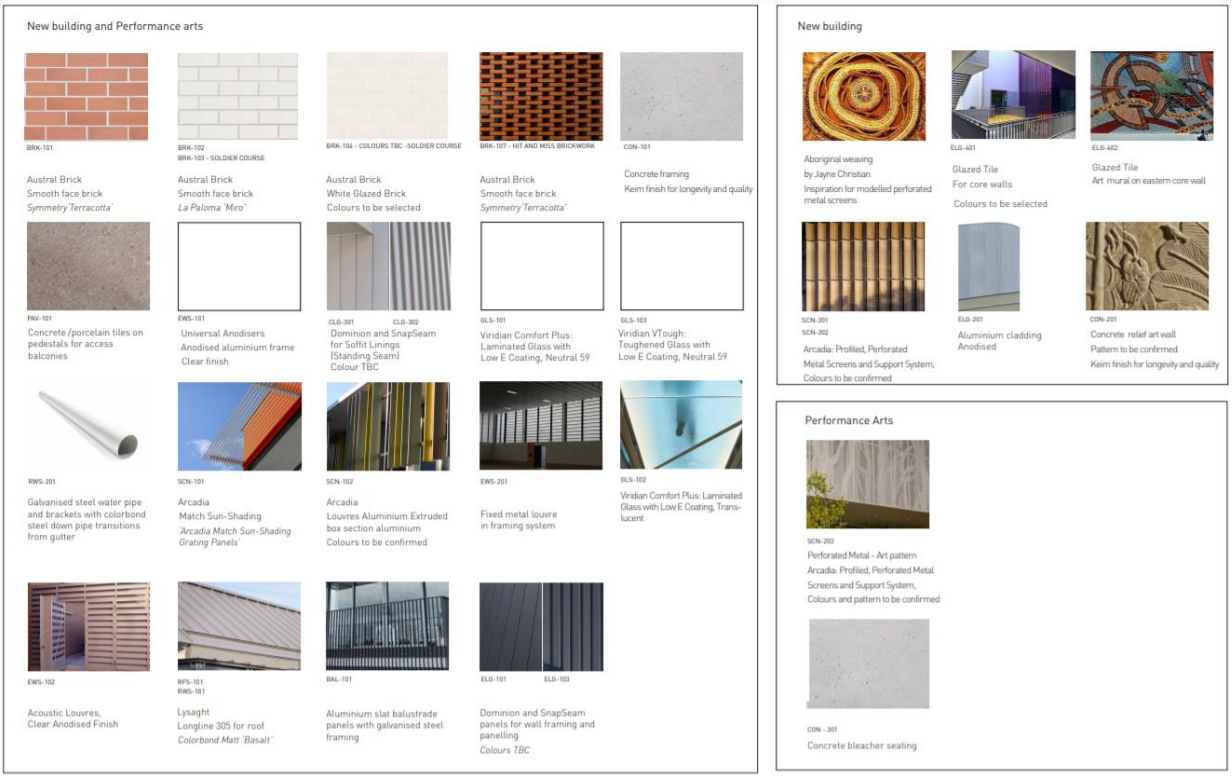

Figure 37 External materials board for the proposed development
Source: PTW Architects

External materials and finishes as they relate to the new building and performance arts pavilion are discussed below:

- Panels of terracotta coloured brick reflect the existing buildings on the school campus and bands of a white/cream brick above.
- The main fin wall visible along the eastern façade, facing Glenwood Park Drive (which is the primary public domain presentation of the school) presents perforated

metal leaves. This was developed in association with the wider school community to express both their connection to Country and to their rich multi-cultural community.

- The new one-storey performance pavilion has a steel frame in contrast to the concrete framework of the three (3) storey building. Its elevation is clad with perforated metal with art pattern and concrete bleacher seating.
- The wall which defines the eastern edge of the stepped outdoor courtyard and between the performance pavilion and the new building, will house a large-scale ceramic tiled mural.
- The external stairs will be shrouded in modelled perforated metal to give a degree of protection from wind and rain. Similarly, perforated metal screening will delineate the projecting bays along the access balconies so that they can function as the places of incidental learning, which is very important to teenagers.

Figure 38 Indicative eastern façade
Source: PTW Architects

3.6 Tree planting, landscaping and open space

Trees and Landscaping

As identified in the Arboricultural Impact Assessment Report prepared by Eco Logical Australia at **Appendix T**, the total existing Canopy Cover of the site is estimated at 17.6% of the site (10,693 sqm). A total of one (1) tree is proposed to be removed as part of the proposed development as well as one other tree for priority removal. Three (3) trees are proposed for removal under the early works DA to Council.

The total tree canopy cover as a result of the proposed development (including retained and proposed trees) is 24.1% (14,655m^2). The tree planting is proposed surrounding the new building and within the Cumberland Plain Woodland area. Landscaping is to increase tree canopy thereby providing shading and improving the overall visual amenity within the streetscape.

Refer to an extract of the landscape plan at **Figure 39** and **Table 8** for existing trees (and canopy), trees to be removed as well as proposed trees to be planted (and canopy).

Figure 39 Landscape Plan of the proposed development illustrating supplementary proposed planting
Source: PTW Architects

Table 8 Tree Data

	Trees	**Tree canopy (sqm)**	**Tree canopy (% of the site)**
Total existing trees:	321	10,693m^2	17.6%
– Existing low retention value trees	161	-	-
– Existing medium retention value trees	122	-	-
– Existing high retention value trees	37	-	-
– Priority for removal	1		
Trees retained:	316	-	-
Trees removed:	5	-	-
Trees removed as part of the proposed development:	2	-	-
– High retention value trees	1	-	-
– Medium retention value trees	0	-	-
– Low retention value trees	0	-	-
– Priority for removal	1		
Trees removed under separate planning approvals:	3	-	-
– High retention value trees	3	-	-
– Medium retention value trees	0	-	-
– Low retention value trees	0	-	-
Proposed tree planting as part of the proposed development	97	-	-

Total trees after proposed development	413	14,655m^2	24.1%

It should be noted that the proposed low retention value tree to be removed as part of the proposed development is due to the condition of the tree rather than any impact as a result of the proposed development.

The proposed development seeks to deliver a new kitchen garden with a mix of native edible plant growing plots and raised planter beds. This will provide a new social element at GHS, which enhances a sense of community and promotes healthy eating behaviours in staff and students.

The design has sought to protect the existing Cumberland Plain Woodland community species located in the north eastern portion of GHS, west of the new building. A new walkway is proposed adjacent the south-eastern perimeter of the existing Cumberland Plain Woodland patch, providing informal connections between the new building and the school more broadly.

Within the Cumberland Plain Woodland Area on site, the proposed landscape design has also incorporated twenty-three (23) new tree planting of species from the Cumberland Plain Woodland community. Also, logs and limbs from trees identified for removal are proposed to be salvaged and carefully placed within this area to improve fauna habitat values.

The tree species of new plantings can be found within the Landscape Plans and a Landscape Design Statement which have been prepared by McIntosh & Phelps at **Appendix J** and **Appendix K**, respectively.

Open space / play space

The proposed development seeks a marginal reduction in the existing play space at GHS from 19,056sqm (31.4% of the site area) to 18,970sqm (31.2% of the site area) play area. This would allow for 10.4sqm per student based on 1820 students (currently 13.5sqm per student at a capacity of 1410 students), delivered across a series of open spaces within the site.

The performance space and outdoor learning zones surrounding the building will consist of coloured concrete. External play areas will be turfed. A yarning circle for small to medium sized groups is located to the north of the new building adjacent to the northern property boundary.

Play areas are within the north-western and south-western corner site, with additional tree plantings. However, the landscape design also proposes several improvements by providing interstitial spaces on site. Refer to the location and distribution of these spaces within the extract of the landscape plan at **Figure 40**.

Figure 40 Landscape Plan showing improvements to play spaces
Source: McIntosh & Phelps

Landscape Plans and a Landscape Design Statement have been prepared by McIntosh & Phelps at **Appendix J** and **Appendix K**, respectively.

3.7 Transport, parking, and access

The proposed development seeks to deliver the following transport strategy:

Pedestrian access

A new pedestrian access to the campus is proposed to be provided at Glenwood Park Drive adjacent to the new building. The new entry will improve the pedestrian accessibility of the site, particularly to the northeast part of the catchment, and will connect to the existing footpath network.

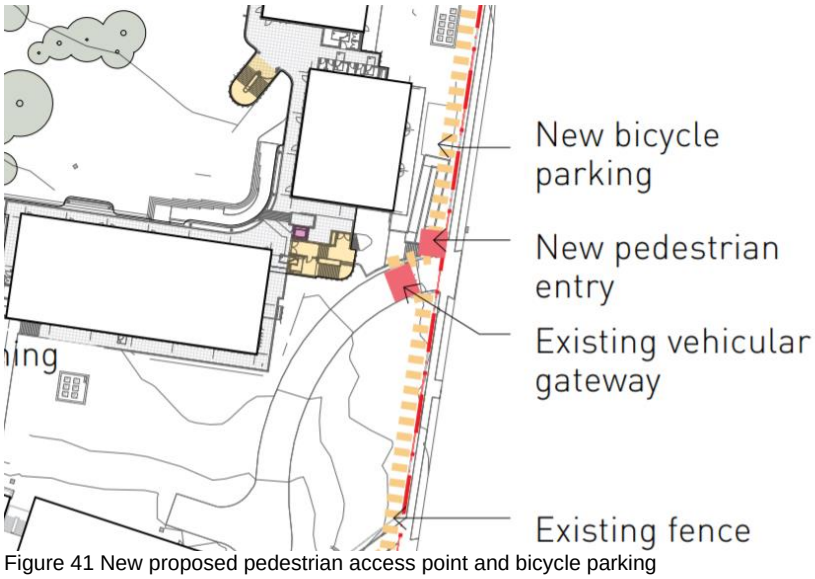

Figure 41 New proposed pedestrian access point and bicycle parking
Source: PTW Architects

Cycling facilities

A total of 84 bicycle parking spaces for students will be provided at the eastern boundary of the site near to the new pedestrian entry along Glenwood Park Drive (up from 56 existing). Refer to **Figure 41**Error! Reference source not found. for location of new b icycle parking spaces.

Additional end-of-trip (EOT) facilities for staff are proposed as follows:

- 2 female showers and 2 male showers;
- 1 unisex accessible water closets; and
- 18 lockers.

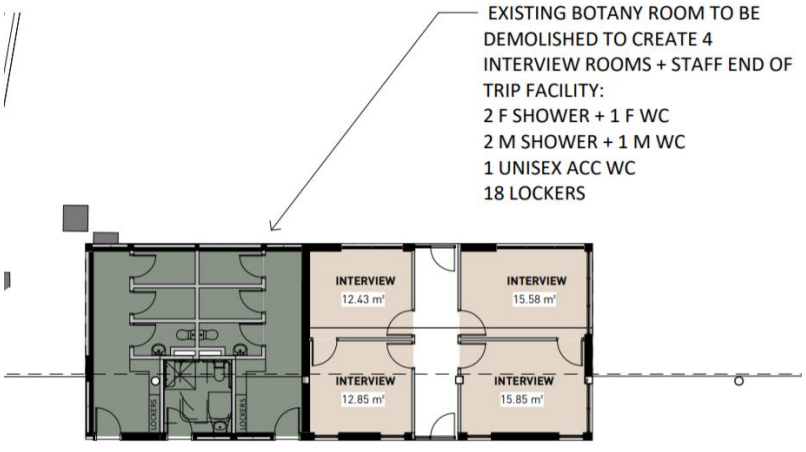

Figure 42 Plan detailing the proposed EOT facilities
Source: PTW Architects

3.8 Services

The major services requirements for the redevelopment of the school campus include:

- New substation adjacent to existing off Forman Avenue;
- New fire hydrant pump room at Eastern parking lot;
- Extension of existing main comms room (MCR) in the library;
- New comms room in Building E L00 refurbishment;
- New rainwater harvesting tank located below the Northern end of the new building;
- New OSD tank located at the North of the site between Glenwood Park Drive and the new building; and
- New air-conditioning plant enclosures in various locations around the site.

Figure 43 Proposed services and infrastructure for GHS
Source: PTW Architects

3.9 Uses and activities

The proposed development will largely retain the existing operation except for an increase in student enrolment capacity. Implication of the proposed development on existing elements of the school operation is discussed below.

Hours of operations

The proposed hours of operation for GHS during the school term is not anticipated to change from the current operational school hours.

Currently, the school operation hours start at 8:40am and finish at 2:10pm on Mondays, 3:00pm on Tuesdays, Thursdays and Fridays and 5:50pm on Wednesdays.

Out of hours school care

GHS has a new license agreement with an operator for after school care at the site as well as vacation care. This is a new arrangement that the school has initiated but has not yet implemented. The licence agreement allows for after school care during the school term from Monday to Friday at the following hours:

- Afternoon session from 3:00pm to 6:00pm

The maximum number of children allowed at the site is 104 at any one time. Care is undertaken in Building B, the Quadrangle and school oval. It should be noted that care

has not commenced at the site in accordance with this licence and there is no anticipated commencement date.

Community use of school facilities

There is currently no community use of school facilities and there are no changes proposed to existing arrangement as part of this SSDA.

3.10 Construction duration, staging and hours

Construction duration

The indicative duration for the proposed development will be approximately 21 months.

Construction staging

The Glenwood High School upgrade will be constructed in four (4) stages with the potential of combining the bulk earthworks, in ground services relocations (subject of separate planning applications) and civil works concurrently as one early works package. The stages are defined in **Table 9**.

Table 9 Construction staging

Stage	Duration	Construction works
1	Approximately 3 months	– Installation of foundations for the new building and performance centre to take place. – The foundations to the performance centre are expected to be prioritised to enable the next stage for this building to progress ahead of the new building to enable an earlier handover – Foundations for a tower crane, depending on Contractor's methodology, will also be installed at this stage.
2	Approximately 12 months	– The single storey construction of the performance centre will commence after the installation of the foundations. It is likely that the completion of the remaining foundations for the new building will still be ongoing and access to the performance centre is to be maintained – On completion of the foundations the ground floor slabs will be constructed for the new building – At this stage the tower crane installation will take place to facilitate the construction of the new building – Construction of the performance centre will continue including internal fit out, service connections and commissioning to enable handover. – Handover of Performance Centre after 6 months. – On completion and handover of the performance centre the hoarding will be adapted so that access and use of the building can commence while the construction of the new building continues. The refurbishment of Block J will commence. – The construction of the new building to roof level will continue with the formation of slabs and columns to roof level – Handover of Block J after 4 months.
3	Approximately 3 months	– Handover of Block J once refurbishment completes. – External works to the new building including roof, cladding, external staircases and walkways

Stage	Duration	Construction works
		– On completion of the external works to the building the tower crane will be demobilised and removed from site. – Internal fit-out, service connections and completion of the new building – External to the building the detention storage is to be installed and drainage connections from the new building will be completed. – The final earthworks are to take place to form design levels from the new building to the existing ground levels. This will also include the landscaping of the area. – Handover of the new building.
4	Approximately 3 months	– On completion and handover of the new building the commencement of blocks A, E and D can commence – This will involve decanting to the new building and establishing a site boundary around Blocks D, E and A – Refurbishment of Blocks D, E and A to take place – Site access will be from Glenwood Park Drive along the service road and vehicular access by non-construction personnel to this area is to be restricted to for safety reasons and to avoid congestion. – Handover of Blocks D, E and A and removal of all site fences once refurbishment completes.

Construction Hours

The hours of construction are:

- Monday to Friday – 7am to 6pm;
- Saturday – 8am to 1pm; and
- No work on Sundays or Public Holidays.

A variation to these hours may be required for out of hours work or where there are special circumstances e.g., for oversized deliveries or works which may need to be carried out. It is noted that a separate application will be made by the Contractor to seek approval for any out of hours work.

4. Statutory context

4.1 Power to grant approval

Section 4.36 of the EP&A Act provides that the Minister, or a State Environmental Planning Policy may declare development to be State Significant Development.

Clause 15(2) of Schedule 1 of the *State Environmental Planning Policy (State and Regional Development) 2011* (SEPP SRD) specifies alterations or additions to an existing school with a CIV of more than $20 million is to be assessed as State Significant Development.

The proposed development involves alterations and additions to the existing GHS, and has a CIV of more than $20 million; hence, it qualifies for SSD and the Minister for Planning and Public Spaces is the consent authority.

4.2 Permissibility

The site is zoned SP2 Infrastructure for the purpose of 'Educational Establishment' under the Blacktown LEP 2015. Educational establishments are permitted with consent in this zone under the Blacktown LEP 2015. The SP2 zone is also a prescribed zone under Part 4 of the Education SEPP. Refer to **Figure 44** for zoning map.

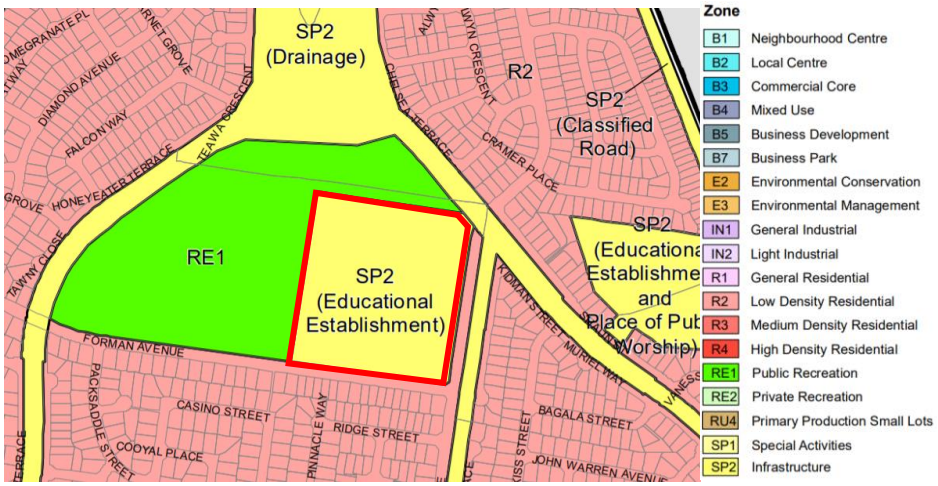

Figure 44 Land Zoning Map (site outlined in red)
Source: BLEP 2015 Land Zoning Map Sheet LZN_013 with Architectus edits (2021)

4.3 Other approvals

The provisions of section 4.42 of the EP&A Act 1979 lists approvals under other legislation that must be applied consistently for the proposal.

Separate consent under section 138 the Roads Act 1993 will be required in order for the proposed development to occur, mainly for stormwater connection to Council infrastructure within the road reserve of Glenwood Park Drive.

4.4 Pre-conditions

<u>State Environmental Planning Policy No 55 – Remediation of Land</u>

Pursuant to Clause 7 of the SEPP, a consent authority must be satisfied that the land is suitable in its contaminated state - or will be suitable, after remediation - for the purpose for which the development is proposed to be carried out. This is addressed in **Section 6.12** of the EIS.

4.5 Mandatory matters for consideration

A detailed assessment of the proposed development against the mandatory matters for consideration is provided in **Appendix B**. In summary the assessment finds the application is consistent with the relevant matters

5. Community engagement

5.1 Consultation overview

A Community Consultation Report has been prepared by SINSW summarising the engagement undertaken for the proposed development. Refer to **Appendix N**.

In accordance with the SEARs issued for the project, consultation was undertaken with relevant public authorities, Council, and the community, including:

- Blacktown City Council;
- Transport for NSW (TfNSW);
- Local Aboriginal Land Council; and
- Government Architect NSW.

Engagement of government agencies and the community will continue throughout the public exhibition of the EIS.

5.2 Blacktown City Council

Blacktown City Council was consulted to discuss matters relating to the proposed development on the following occasions:

- 22 July 2021 – social impact assessment interview with the social impact consultant for the proposed development i.e. Elton Consulting;
- 5 August 2021 – as part of the Transport Working Group;
- 18 August 2021 – to discuss the specifications for rainwater harvesting tank, request for flood impacts, and acoustic impacts;
- 2 September 2021 – as part of the Transport Working Group; and
- 30 September 2021 – as part of the Transport Working Group.

The feedback topics and project development outcomes from meetings with Blacktown City Council are detailed in **Table 10**. Note, the feedback topics and project development outcomes from Transport Working Group meetings are discussed in **Table 11**.

Table 10 Blacktown City Council consultation

Feedback topics	Project development outcomes
Meeting held on 18 August 2021	
– Specifications for rainwater harvesting tank to be confirmed. – Request for flood water to discharge directly into the site adjacent the watercourse to alleviate flooding impact on Glenwood Park Drive. – Acoustic impact on adjacent residential buildings. – Request for building finishes and colours.	– Rainwater harvesting tank specifications provided in ESD Report. A 50Kl rainwater tank is to be provided which services toilets, water efficient appliances. – Project team rebuttal to watercourse discharge provided – the channel required to address this request would impact mature trees and the substation. Blacktown Council subsequently withdrew this request. – Noise and vibration assessment report provided including mitigation measures for noise impact on adjacent residential buildings. – Building finishes and colour palette included in Architectural design package.

5.3 Transport for NSW

Consultation with TfNSW is nominated as a requirement of the SEARs. Extensive consultation has been undertaken with TfNSW as part of the Transport Working Group.

The Transport Working Group was assembled for the project to discuss transport related issues and concerns relating to the proposed development. The group included project team and client representatives, TfNSW and Blacktown City Council. The Transport Working Group met on three (3) occasions on 5 August 2021, 2 September 2021, and 30 September 2021.

Refer to an overview of issues raised and responses in **Table 11**.

Table 11 Transport for NSW consultation

Feedback topics	Project development outcomes
Meeting held on 5 August 2021	
– Inaccurate traffic count data during COVID.	– Traffic engineer submitted request for information to Blacktown Council for historical traffic count data.
Meeting held on 2 September 2021	
– Consider public transport strategy actions including travel access guide, school bus pass, and school transport scheme. – Consider kiss and ride strategy to reduce kiss and ride usage by 10%. – Consider car parking strategy including a school travel coordinator. – Consider timing of the use of Glenwood Reserve sports fields in the Traffic Management Plan.	– Public transport strategy, kiss and ride strategy, car parking strategy and use of Glenwood Reserve sports fields detailed in the Transport and Accessibility Impact Assessment Report and Traffic Management Report.
Meeting held on 30 September 2021	
– Council expressed concerns with the on-site car-parking provisions, noting that this may put additional pressure on on-street parking.	– Traffic and Accessibility Impact Assessment suggests that there is sufficient spare capacity to service any additional parking demand associated with the proposed development. Notwithstanding this, Traffic and Accessibility Impact Assessment includes a STP which will promote active transport modes.

5.4 Local Aboriginal Land Council

An ACHAR has been prepared for the proposed development at **Appendix L**. The assessment process was undertaken in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH 2011), the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales (DECCW 2010) and the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010).

Consultation with the Local Aboriginal Land Council and Registered Aboriginal Party stakeholders (RAPs) was conducted in December 2020-May 2021.

For further detail, refer to **Section 6.15** below and **Appendix L**.

5.5 Government Architect NSW / State Design Review Panel

SINSW and PTW Architects consulted with the Government Architect NSW Office (GANSW) on two (2) occasions on 25 September 2021 and 13 October 2021.

A full schedule of State Design Review Panel (**SDRP**) feedback and the architect's response is provided in the Architectural Design Statement at **Appendix I**.

5.6 Community engagement

Community engagement and feedback has been integral to the proposed development.

Consultation was undertaken with the GHS school community to hear their concerns about GHS, as part of the *Glenwood Public School Education Rationale*. Refer to **Table 12** for a summary of the key concerns and challenges that resulted from consultation process.

Table 12 Current Challenges at GHS

Current challenges	Description
Land of diversity in the range of learning spaces	Most learning units are comprised of a number of like/exact spaces. There is an opportunity to combine groups of two or three spaces together to suit a modern pedagogy/collaborative approach to learning.
Traditional typology (individual classroom for one teacher and up to 30 students) that inhibits certain pedagogies	This typology (individual classroom for one teacher and up to 30 students) precludes and inhibits collaborative teaching, flexible grouping of students across classes and integrated learning.
Lack of variety of spaces	Limited variety inhibits students to regulate whether they work independently or with others and inhibits access to a variety of resources and activities that allows students to engage with learning in different ways, which improves knowledge and understanding.

A Project Reference Group (**PRG**) was also established for the project, which comprises school principals, Parent and Citizen (**P&C**) community representatives, and project team members. The PRG provides an opportunity to receive feedback on critical design elements and the overall project direction. PRG meetings commenced on 13 May 2021 and have occurred on six (6) occasions to date.

The Community Consultation Report prepared by SINSW outlines the key themes and community views that have emerged from community engagement undertaken as part of the PRG. Refer to **Appendix N** for further detail.

It is noted that since June 2019 we have had no enquiries direct to SINSW about the GHS upgrade.

<u>Community engagement for social impact assessment</u>

A Social Impact Assessment (SIA) has been prepared for the proposed development by Elton Consulting, and is appended at **Appendix O**. Stakeholder engagement is an important aspect of SIA.

The engagement plan prepared for this SIA intended to communicate with the community and provide opportunities for feedback. Engagement methods included:

- One-on-one interviews with:
    - Glenwood HS Principal;
    - Glenwood HS P&C representative;
    - Goodstart Early Learning Glenwood Forman Avenue staff representatives;

- Blacktown City Council Representative; and
- SINSW representative.

- A community flyer, including a link to the online survey, was distributed in the local community by SINSW and within the school networks by the School's principal.

  A total of 13 responses were received from 15 September to 5 October 2021. This comprised of 7 who had 'one or more of their dependents attended GHS', 1 who is a current student at GHS, and 5 who lived in the Glenwood suburb. Most respondents (10) stated that they lived in the Glenwood, Parklea, Stanhope Gardens postcode area.

  Key findings are summarised in Section 3.2.1 of the SIA at **Appendix O**.

  Findings of engagement have been used to develop enhancement and mitigation measures to maximise benefits and mitigate negative social impacts, respectively.

5.7 Engagement to be carried out

Continued engagement will take place with stakeholders and communities during the statutory public exhibition stage of the SSD application, as well as during future stages of the planning and development process.

The stakeholder list below summarises who will be consulted if the project is approved during the design and construction phase via ongoing face to face meetings, communications collateral and digital engagement methods.

- Local members;
- Government agencies and peak bodies;
- Local Aboriginal Community;
- Blacktown City Council;
- School community;
- Potential joint use partners;
- Community and advocacy groups;
- Local community.
- Future parents within the catchment area
- Nearby public schools in the catchment area;
- Adjoining affected landowners and businesses;
- Technical Stakeholder Group;
- Project Control Group;
- Project Reference Group; and
- Executive Steering Committee.

For more information communications and engagement activities that will be carried out to inform, consult and engage with these stakeholders during the implementation of the project at major milestones, please refer to **Appendix N**.

6. Assessment of Impacts

6.1 Design quality and built form

The proposed development has been carefully designed in response to surrounding built form context and locality. The new building is an L-shaped perimeter block, with three main component wings:

- An east-west wing;
- An intermediate north-south wing; and
- The main north-south wing.

The wings of the building have been carefully designed so that it envelopes the remnant Cumberland Woodland forest to the west and creates interstitial spaces that can be used for outdoor learning and informal student and staff interactions. These spaces between the new building and forest will provide greater appreciation of this unique element of the site.

The wings have been organised to respond to the sloping topography. The east-west wing is located at RL 62.075 (m AHD) and steps down to the intermediate north-south wing and main north-south wing which has been set at a reduced RL 60.9 (m AHD). As a result, the maximum height of the building also steps down in height from RL 76.845 (m AHD) to 75.670 (m AHD) at the roof of the main north-south wing.

The intermediate north-south wing allows for a strong urban street wall to Glenwood Park Drive (east of the site). Here, a minimum setback of 10m is provided. The north-south wing is setback further from the Glenwood Park Drive. As a result, this helps to reduce the visual bulk of the north-south wings within the streetscape.

These setbacks also allow for planting of mature tree species to act as screening, helping to soften the bulk and appearance of the new building. The east elevation facing Glenwood Park Drive utilises different materials and textures to break up the building form and minimise bulk. Refer to **Figure 45**.

Figure 45 View looking southeast towards the central core of the new L-shaped building from the remnant Cumberland Woodland forest
Source: PTW Architects

Figure 46 Eastern elevation of the new building facing Glenwood Park Drive
Source: PTW Architects

Figure 47 East elevation from Glenwood Park Drive
Source: PTW Architects

Figure 48 South elevation from Forman Avenue
Source: PTW Architects

Furthermore, the proposed development has been designed such that it is consistent with the design principles in Schedule 4 of the Education SEPP (Refer to **Appendix B** of the EIS and Architectural Design Statement at **Appendix I)**). Given the above, its distance is considered that the design and spatial organisation of the new building as well as distance from neighboring residences ensures that the development does not have adverse impact on the surrounding development and is visually compatible with its surrounds.

Refer to the Architectural Design Statement prepared by PTW Architects at **Appendix I** for further discussion of design quality and built form, including scale and relationship of the building to context, as well as **Sections 3.3** and **3.4** of the EIS.

6.2 Environmental amenity

Solar access and overshadowing

The siting and orientation of the new building allows for optimum solar access and natural light within classrooms. There will be some impact to solar access into the proposed new performing arts workshop, located south west of the new building; although, this is only for a short period of time (from 9am to 12 noon during the winter solstice on 21 June.

Glenwood Reserve is located north of the site but by virtue of the new building location, it is not anticipated that there will be any overshadowing to this open space. The building location is not adjacent any formal open spaces or play spaces within GHS.

There are to be no additional overshadowing impacts to any adjacent residential dwellings because of significant setbacks, and the physical separation afforded by the width of Forman Avenue to the south, and Glenwood Park Drive and the grassed drainage channel/watercourse to the east. Refer to the solar access study at **Appendix H**.

Overall, it is considered that the proposal is satisfactory from both a solar access and overshadowing perspective.

Privacy

The closest residential dwellings to GHS are those adjacent the school to the south along Forman Avenue and to the far east along Kidman Street. The proposed development is appropriate in terms of privacy as the school is sufficiently separated to adjacent to these dwellings, minimising instances of overlooking.

Is it noted that there are existing trees located at the school's southern and eastern boundaries that already provide screening to adjacent dwellings. New landscaping and trees will be planted along the school boundary, providing further screening and privacy.

Wind impacts

Given the proposed low-scale built form of the new 3 storey building, it is not anticipated to cause any unreasonable wind impacts on adjacent open spaces in the school. Hence, it is considered that adjacent open spaces will maintain suitable comfort levels for standing and sitting.

Light spill

A Lighting Statement has been prepared by AECOM at **Appendix W**. External lighting has been designed with consideration of lighting spillage to adjacent properties and sensitive receivers.

All outdoor lighting will comply with AS/NZS4282:2019 Control of the obtrusive effects of outdoor lighting. As such, the proposed development is not anticipated to result in any significant light spill impacts, which is anticipated to be a condition of consent.

Safety

A Crime Prevention through Environmental Design (CPTED) Assessment has been included in the Architectural Design Statement prepared by PTW Architects and is attached at **Appendix I**. The Architectural Design statement outlines the design elements and CPTED principles included in this proposal that will deter unsocial and criminal behaviour from the site.

Refer to **Table 13** which highlights the consistency of the proposed development with CPTED principles.

Table 13 CPTED principles

Principle	Proposed development
Natural access control	The existing campus is surrounded by a high palisade fence which will be maintained.
Natural surveillance	The proposed layout and location of the new building provides natural surveillance both outwards to the street and inwards to the campus. In addition, there will be technical surveillance through CCTV.
Territorial reinforcement	The new buildings have been located on the site so that the sequence of movement from the existing campus to the new portion of the campus is clear, at accessible grades and with open sightlines. Students can move in either sheltered and accessible paths from the existing or upper campus down to the new campus or via a more direct uncovered route with steps. The performance space acts both as a physical connector with the existing campus, the hall and the new campus and as an emblem of the school's evolution. Performance is an important way for the school community to share their different cultural backgrounds.

Principle	Proposed development
	There is a new student entry from Glenwood Park Drive with direct access into the 'knuckle' of the new learning building. The proposed design improves the existing non-descript presentation to Glenwood Park Drive and thus enhances the school identity within the wider community
Maintenance	The school operations allow for controlled entry and exit of students, parents and visitors

6.3 Visual impact

A visual impact assessment of the proposed development has been undertaken by PTW Architects and is included in the Architectural Design Statement at **Appendix I**. Views for assessment have been identified from the key vantage point along Glenwood Park Drive. It is only anticipated that one boundary of the school will be impacted by the proposed development – the eastern school boundary to Glenwood Park Drive. As such, a view looking south west towards the new building from Glenwood Park Drive has been provided.

View analysis

Figure 49 View looking south west towards the new building from Glenwood Park Drive
Source: PTW Architects

As shown in **Figure 49**, it is evident that the new building will have a strong interface to Glenwood Park Drive. A substantial landscape setback of 10m has been provided to Glenwood Park Drive, to enable greater landscaping and tree planting. In turn, this will soften the appearance of the proposed development and minimise visual impacts.

It is also worth noting that the closest residential dwellings to the east of the site are at Kidman Street, which is a significant distance away (approximately 40m) due to the street width of Glenwood Park Drive and the width of the grassed drainage channel/watercourse.

Hence, the visual impact from this is deemed appropriate, and not out of character for the built context of the locality.

6.4 Play space

The provision of adequate play space and open space at school is essential to the physical and mental wellbeing of students, and of benefit to the environment, and the local community. Recognising the importance of play space, the NSW Department of Education's EFSG provides that a minimum of 10m^2 usable onsite play space per student be provided at each school.

Currently, 13.5m^2 per student is provided for 1410 students and this will be reduced to 10.4m^2 per student (1820 students). This aligns with the NSW Department of Education guidelines. The proposed development will improve the quality of play space per student.

6.5 Trees and landscaping

The Draft Greener Places Design Guide sets an overall target for the Greater Sydney Region of 40% tree canopy cover by 2056, with indicative place-based targets of 15% in the CBD, 25% in medium to high density areas and 40% in low density areas.

An Arboricultural Impact Assessment was prepared by Eco Logical Australia (**Appendix T**) for the proposed upgrades at GHS (including related works under separate planning approvals). A total of 321 trees were assessed as part of the site – 161 low retention value trees, 122 medium retention value trees, 37 high retention value trees and 1 Priority for removal. This equates to an urban tree canopy of 17.6% of the site area (10,693 sqm).

Under this development application, 1 tree (tree no. 73 of high retention value) is identified for removal to accommodate the proposed development. Also, 1 tree is identified as a priority for removal despite not being impacted by the proposal. Note, the other trees to be removed at GHS under separate planning approvals are summarised above in **Section 1.7** of this EIS The Arboricultural Impact Assessment also includes a Tree Protection Plan for the remaining trees to be retained as part of the proposed development, to ensure their longevity during construction works and operation.

Notwithstanding, it is noted that the proposed development will provide new landscaping, delivering 92 new trees, resulting in a total tree canopy of 14,655 sqm (equating to 24.1% of the site area). The proposed development substantially increases the existing amount of tree canopy cover at the site to an extent that is considered suitable for its urban conditions.

The landscape design proposes several improvements to the Cumberland Plain Woodland area. Logs and limbs from trees identified for removal are proposed to be salvaged and carefully placed within this area to improve fauna habitat values. Furthermore, 23 new trees will be planted within this area of species of from the Cumberland Plain Woodland community. The BDAR at **Appendix S** provides interim management measures for new tree plantings.

Considering adequate landscaping is being provided, and tree protection measures are to be implemented, it is deemed that the proposed development has appropriately managed any significant impacts to existing trees while enhancing existing canopy cover.

Refer to the Landscape Plans and a Landscape Design Statement prepared by McIntosh & Phelps at **Appendix J** and **Appendix K**, respectively.

6.6 Ecologically Sustainable Development

An ESD Report has been prepared by AECOM Australia Pty Ltd for the proposed development, at **Appendix U**.

The development proposes ESD initiatives and sustainability measures, including:

- passive cooling and heating design principles to reduce the school's reliance on artificial lighting and heating, ventilation and air conditioning systems, including external shading, operable windows and clerestory windows.
- artificial lighting will optimise energy efficiency through LED type lighting, use of timed or sensor feedback functionality.
- heating, ventilation and air conditioning will have timed or sensor feedback functionality for energy conservation. Selection of energy efficient appliances and equipment
- responsible procurement of products, materials and services reduce resource consumption by encouraging the selection of lower-impact materials, as well as reduction and recycling of generated waste.

- implementation of 99.5kW solar photovoltaics (PV) system on the roof of the new 3 storey building (this is estimated to reduce energy to 50.9% of a building without PV).
- adopting efficient hydraulic services to assist water efficient design, including, but not limited to rainwater reuse via a 50Kl rainwater tank which services toilets, water efficient appliances and recycled water supply to toilets where demand is not met by rainwater tanks (this is estimated to achieve a 78% reduction in potable water).

The ESD report details how the ESD principles would be addressed in the development. The proposed development is seeking to achieve a 5-Star Green Star rating, through formal certification with the Green Building Council of Australia, as required by EFSG.

In addition, the ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) have been incorporated into the proposed development, as outlined in **Table 14**.

Table 14 ESD principles and proposed development response

ESD Principles	Response
Precautionary principle	The project will be designed to avoid damage to the environment, through the use of efficient fixtures, rainwater harvesting, and recycled water to toilets to reduce freshwater use. This project will minimise the effect on climate change with reduced reliance on grid electricity with the use of photovoltaic panels, high performing façade, and efficient services. A climate adaptation and operations resilience plan has been developed to assess the risk of potential impacts of climate change and potential shocks and stresses to the project. Any high or important risks identified will be mitigated in design.
Intergenerational equity	The project will use waste management strategies, sustainable materials, and employ low carbon materials to limit further damage to the health, diversity and productivity of the environment for future generations. In order to achieve a goal of maintaining or enhancing our environment, the project must at the very least procure carbon offsets and renewable energy to achieve a net zero carbon position. While this will enable this projects contribution to eliminate (as much as practical) its climate-change contribution, opportunities to enhance within the scope of the site boundary are limited.
Conservation of biological diversity and ecological integrity	This project design is to preserve as much existing natural soil, hydrological flows and vegetation. This project will consider the local biological diversity and integrity of the site by retaining as much of the existing flora and fauna habitats at the site and provide for planting of native tree species to offset any removal due to the project.
Improved valuation, pricing and incentive mechanisms	Whole of life costs will be evaluated in accordance with the best outcome for the user. This costing exercise of services and assets includes the planning, design, construction and acquisition, operation, maintenance, renewal and rehabilitation, depreciation and cost of finance, and replacement or disposal. Onsite waste is to be diverted from landfill and a waste management plan has been developed to address operational waste. A net zero carbon action plan is in development to establish the best cost-effective pathways to meeting a net zero carbon target by 2050.

Overall, the proposal is consistent with ESD principles and the proposed suite of sustainability initiatives would encourage ESD, in accordance with the objects of the EP&A Act.

6.7 Traffic, transport and accessibility

A Transport and Accessibility Impact Assessment (TAIA) has been prepared by TTW and is appended at **Appendix P**. The TAIA assesses the traffic and transport impacts and design elements of the proposed development.

School catchment analysis

Analysis of the catchment coverage within walking and cycling catchment has been undertaken. These are roughly equivalent to the 5-minute,10-minute, 15-minute and 30-minute walking catchment and a 5-minute and 10-minute cycling catchment. The results of the analysis are provided in **Figure 50**.

Walking Distance (m)	Number of current students	Portion of current students (%)	Cumulative #	Cumulative %
0 – 400 (5-min walk)	37	2.6%	37	2.6%
400 – 800 (10-min walk)	226	15.9%	263	18.5%
800 – 1200 (15-min walk)	192	13.5%	455	32.1%
1200 – 2400 (10-min cycle)	548	38.6%	1003	70.7%
> 2400	416	29.3%	1419	100%
Total	**1419**	**100%**		

Figure 50 School catchment and walking catchment student coverage
Source: TTW

To understand the current modal split for the journey to and from the school for both students and staff, a travel mode questionnaire was completed by the Glenwood High School Principal.

From the principal's responses, it is clear that the two most common travel modes for students are walking and kiss & ride. Public transport is somewhat utilised. A considerable proportion of year 12 students also choose to drive to school. Along with the train, other insignificant travel modes include cycling and driving as a passenger to park nearby.

The travel mode of the GHS staff is almost exclusively private vehicle. In comparison to available journey-to-work data from the Australian Census for those who work in Glenwood, it is apparent that the private vehicle journeys of staff are slightly higher than the private vehicle trips (89.9%) for those who work more broadly in Glenwood.

Modal split for students and staff is shown in **Figure 51** and **Figure 52,** respectively.

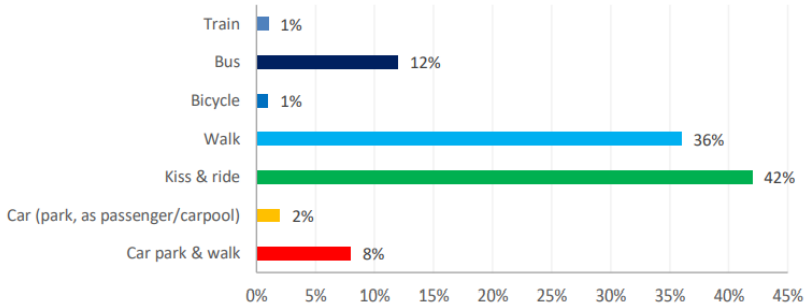

Figure 51 Student travel modes
Source: TTW

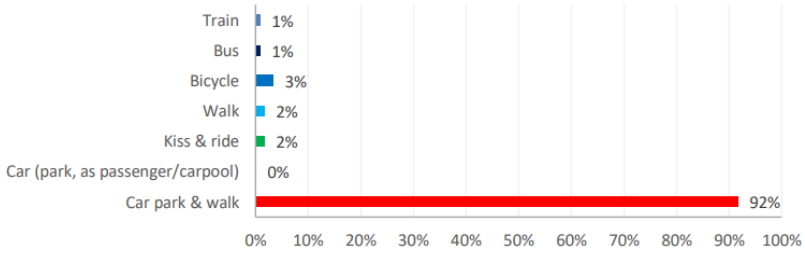

Figure 52 Staff travel modes
Source: TTW

Existing Traffic Conditions

To analyse the existing traffic conditions around the site, the intersection of Glenwood Park Drive/Forman Avenue located east and west of the school has been modelled.

The intersection movement counts were extracted from Sydney Coordinated Adaptive Traffic System (SCATS) data as a traffic survey is not possible since COVID-19 lockdown restrictions have affected traffic demands.

According to the SCATS data, AM peak hour is between 7:30 am and 9 am, which is compatible with the school start time; however, the PM peak hour of the intersection starts after school hours.

The TAIA considers two PM peak hours for modelling the intersection to investigate GHS development impact on the intersection traffic operation.

Traffic modelling of the existing conditions has been undertaken to accurately determine and demonstrate the current performance of the road network nearby GHS. The summary results of the intersection modelling are shown in **Figure 53**.

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
East intersection of Glenwood Park Dr/Forman Ave	AM	0.279	5.9	3.5	A
	PM	0.193	5.7	2.5	A
	School PM	0.227	5.9	2.9	A
West intersection of Glenwood Park Dr/Forman Ave	AM	0.397	10.0	5.8	A
	PM	0.662	17.8	21.5	B
	School PM	0.447	11.4	7.5	A

Figure 53 SIDRA modelling results at the intersection of Glenwood Park Drive/Forman Avenue
Source: TTW

Existing Parking Conditions

The existing on-site car parking capacity provides 93 parking spaces, including one accessible parking space. Thirty (30) of these spaces are available in the south-eastern car park and the remaining sixty-three (63) on the western side of the site.

Car parking associated with the Goodstart Early Learning Centre is within the legal property boundary of the site, but is not counted towards the school's provisions in this assessment.

Historical aerial imagery available from Nearmap has been assessed to determine the long-term trends in occupancy, including comparing school days and non-school days.

Based on the historical data, the car park occupancy on school days is fairly steady, and some informal parking occurs on a rare basis beyond the marked capacity of 93 spaces. The average occupancy reaches the marked capacity.

On-street parking in the vicinity of the site is generally unrestricted and is used by some staff for parking. Similarly to the off-street parking, on-street parking in the vicinity of the site has been reviewed to assess long-term usage trends.

The extent and description of on-street zones used for the detailed analysis is shown below in **Figure 54**.

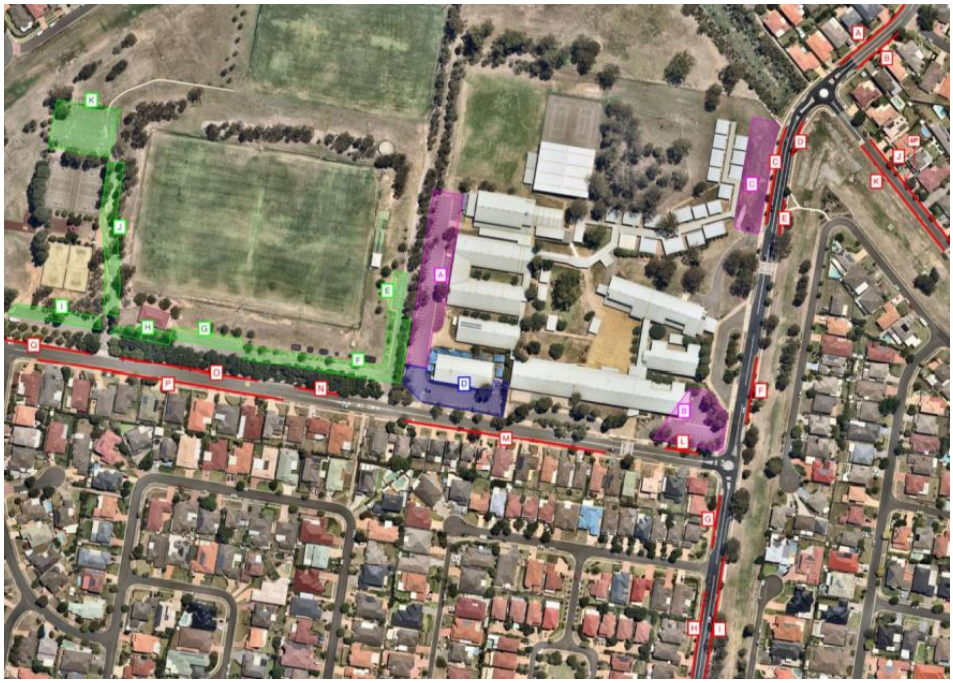

Figure 54 On-street and off-street parking areas for analysis
Purple and blue sections denote areas of on-site parking, green sections denote Glenwood reserve parking and red lines along the road reserve indicate areas of on-street parking
Source: TTW

The analysis shows that there is generally good availability of parking in the vicinity of the site and within the assessed zones.

Noting the overall capacity in the assessed zones of 148 spaces, there is an average occupancy rate of around 36%, or a maximum rate of 51%, suggesting that on-street parking usage could increase by approximately double within the fixed capacity.

Looking at the reserve on school days, there is an average occupancy rate of around 14% or a maximum rate of 20%, showing substantial spare capacity for community usage. On the busiest school days, another 85 or so vehicles could be accommodated to bring the precinct occupancy to 85%.

Traffic Impacts

The student capacity is proposed to increase to 1,820 students, which is an increase of approximately 29% from current student population. As a result of this growth, the anticipated staffing allowance would increase from approximately 106 staff to 133 staff, or an increase of approximately 25%.

Accordingly, the anticipated increases in travel demands can be estimated as shown in **Figure 55**. Modal splits are based on the existing travel habits as estimated and advised by GHS.

	Students				Staff			
Travel Mode	Mode Split	Existing Volumes	Forecast Volumes	Growth	Mode Split	Existing Volumes	Forecast Volumes	Growth
Car (park, as driver)	8%	113	146	33	92%	97	122	25
Car (park, as passenger/carpool)	2%	28	36	8	0%	0	0	0
Car (drop-off)	40%	564	728	164	2%	2	2	0
Walk only	36%	508	655	148	2%	2	2	0
Scooter / skateboard	0%	0	0	0	0%	0	0	0
Bicycle	1%	14	18	4	3%	4	4	1
Motorbike	0%	0	0	0	0%	0	0	0
Bus	12%	169	218	49	1%	1	1	0
Train	1%	14	18	4	1%	1	1	0
Total	**100%**	**1,410**	**1,820**	**410**	**100%**	**106**	**133**	**27**

Figure 55 Travel mode forecasts – overall travel demands
Source: TTW

As detailed in **Figure 55**, a growth of approximately 58 additional vehicles (33 students and 25 staff) could be expected to generate parking demand. Additionally, approximately 164 additional drop-off and pick-up users (164 students and 0 staff) could be expected, or approximately 134 vehicles at a rate of 1.5 students per vehicle.

For the purposes of traffic modelling of future conditions (with planning horizons of 5 and 10 years, through to 2026 and 2031 respectively), a background growth rate of 1.5% per annum is applied to external traffic. The results of the modelling factoring background growth without the development are shown in **Figure 56.**

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	AM	0.302	6.0	3.9	A
	PM	0.209	5.7	2.8	A
	School PM	0.247	6.0	3.2	A
The west intersection of Glenwood Park Dr/Forman Ave	AM	0.440	10.8	6.6	A
	PM	0.755	22.4	31.1	B
	School PM	0.499	13.1	10.9	A

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	AM	0.327	6.0	4.3	A
	PM	0.225	5.8	3.1	A
	School PM	0.267	6.0	3.5	A
The west intersection of Glenwood Park Dr/Forman Ave	AM	0.490	12.3	9.4	A
	PM	0.866	32.1	51.7	C
	School PM	0.561	15.4	15.5	B

Figure 56 SIDRA modelling results for 2026 (top) and 2031 (bottom) without development
Source: TTW

With the addition of the development traffic as described above, the results of the traffic modelling at western and eastern intersections of Glenwood Park Drive and Forman Avenue are shown in **Figure 57**.

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	AM	0.386	6.2	4.7	A
	PM	0.209	5.7	2.8	A
	School PM	0.323	6.2	4.0	A
The west intersection of Glenwood Park Dr/Forman Ave	AM	0.564	14.3	15.8	A
	PM	0.755	22.4	31.1	B
	School PM	0.638	17.6	22.2	B

Intersection	Period	Degree of Saturation	Average Delay (sec)	95% Back of Queue (m)	Level of Service
The east intersection of Glenwood Park Dr/Forman Ave	AM	0.414	6.3	5.2	A
	PM	0.225	5.8	3.1	A
	School PM	0.346	6.3	4.4	A
The west intersection of Glenwood Park Dr/Forman Ave	AM	0.623	16.7	21.7	B
	PM	0.866	32.1	51.7	C
	School PM	0.712	21.4	31.0	B

Figure 57 SIDRA modelling results for 2026 (top) and 2031 (bottom) with development
Source: TTW

The modelling of background traffic growth through to 2026 and 2031 demonstrates that there is an expected deterioration of traffic conditions over time. As expected, the proposed development has slightly changed the traffic operation of the modelled intersection in AM and School PM peak hours.

Overall, the modelling results demonstrate that both intersections operate at an acceptable level of service after the development. Furthermore, it is considered that the kiss and ride zone within Forman Avenue has the functional capacity to cater for the forecasted usage levels.

Notwithstanding this, the School Transport Plan (STP) seeks to change this modal split to reduce car-based travel and achieve a shift towards active and public transport modes.

Public Transport

A growth of approximately 49 additional bus passengers (49 students and 0 staff) could be expected as a result of the development.

The additional demand is roughly equal to 1 bus worth of students. Noting the gradual rate at which the student population would grow, and the likelihood that this would grow into areas with existing bus services available, this is considered a reasonable growth which could be addressed by TfNSW and the local operator as part of normal procedure.

Pedestrian Access

A growth of approximately 148 additional pedestrians (148 students and 0 staff) could be expected because of the development.

In general, this growth in pedestrian activity is expected to be able to be accommodated on the local pedestrian network. There is good provision of existing pedestrian infrastructure in the form of pedestrian zebra crossings on both Forman Avenue and Glenwood Park Drive, plus pedestrian refuge islands at various locations.

The additional pedestrian entry to the northeast on Glenwood Park Drive will assist in distributing pedestrian load around the site, including for existing pedestrian volumes. This will improve the pedestrian amenity and volumes along the pedestrian links immediately adjacent to the site.

Car Parking

Blacktown DCP 2015 notes the following recommended rates for provision of parking at primary and secondary schools:

- 1 space per staff member; plus
- 1 space per 5 students in Year 12; plus
- 1 space per 100 students; plus
- 1 space for delivery vehicles, drop-off area and buses as appropriate.

Based on the capacity of 1,820 students, an estimated 133 staff, and an estimated 300 Year 12 students, the total on-site parking requirement based on the DCP rates would be 181 spaces. No parking for students is to be provided on any Department of Education site; the parking requirement considering staff only would be 133 spaces.

On completion of the proposed works, the development would accommodate 93 on-site staff car parking spaces for the high school (plus separate provisions for the ELC). This would be equivalent to a rate of 0.7 spaces per staff member, with no provision for visitor parking on-site, which is lower than the DCP rate.

The increase in size of the development relative to today's existing conditions will be gradual allowing users to adjust their behaviour over time as the size of the development increases. As the type of development is for a school, it is critical to increase the amount of available on-site open play space and reduced levels of on-site car parking assist in achieving this.

However, given the significant levels of available capacity in the surrounding street network, this additional demand could be accommodated and would not create unreasonable impacts to local residents. The usage of on-street parking by residents is currently low (as shown by non-school day occupancy of on-street parking).

The school also only operates during school hours, with staff generally arriving from around 8am and departing by around 4pm, meaning that all on-street parking remains available for residents and their visitors outside these hours and during weekends and school holidays

Notwithstanding this, the STP seeks to change this mode split to reduce car-based travel for staff and achieve a shift towards active transport modes, thereby reducing parking demand otherwise generated by the increase in staff.

School Transport Plan

A preliminary STP has been prepared and included as part of the TAIA. The STP seeks to change this mode split to reduce car-based travel and achieve a shift towards active and public transport modes. Targets are provided in the **Figure 58**.

Travel Mode	Existing Mode Split	Mode Split Target	Volume Change	Existing Mode Split	Mode Split Target	Volume Change
Walk	36%	40%	+73	2%	5%	+5
Bicycle	<1%	10%	+164	3%	10%	+12
Scooter	0%	<1%	+9	0%	0%	-
Bus/Train	12%	12%	-	<2%	3%	+3
Drop-off & pick-up	42%	32.5%	-164	2%	2%	-
Park & walk (passenger)	<2%	1%	-9	0%	0%	-
Car (driver)	8%	4%	-73	92%	80%	-21
Total	**100%**	**100%**	-	**100%**	**100%**	-

Figure 58 Travel mode forecasts – mode share targets
Source: TTW

These mode share targets are considered reasonable and achievable as:

- Approximately 32% of the student catchment population is within a 1200-metre walking distance of the site.

- On-site bike storage for 10% of staff and 10% of students could be provided, plus end of trip facilities for staff.
- On-site car parking is deliberately restricted and will be allocated and managed, encouraging staff to use alternative means of transport.

The operation of the School will include a strong communications platform in the School Transport Plan, of which a preliminary version has been included in this TAIA. Messages to staff and parents will include identifying safe routes to school, identifying available facilities (such as bicycle storage), discussing relevant events or road safety courses, and important messages relating to operation of on-site facilities (such as the kiss & ride zones).

In this regard, achieving a modal shift as shown in the table above would have the effect of offsetting the growth rates for private vehicle usage, including drop-off/pick-up that would otherwise be generated by the additional student population based on the current, unimproved modal split.

Service and Loading

The existing service vehicle area can accommodate vehicles up to and including Heavy Rigid Vehicles (HRVs), which can enter and exit the site in a forward direction. It should be noted the most expected size would be Medium Rigid Vehicles (MRVs). Refer to swept path analysis in the TAIA.

Construction Traffic

A Preliminary Construction Traffic and Pedestrian Management Plan (CTPMP) has been incorporated into the TAIA prepared by TTW. It discusses the management of construction vehicles and activities, and an investigation of the local traffic and safety conditions throughout the construction process.

- **Access** - it was determined that Glenwood Park Drive was the best access overall and construction staging is based on this access. A secondary construction access point may be established adjacent the pick-up/drop-off area on Forman Avenue for Building E refurbishment works. Construction access may also be provided via the western car park for Building J refurbishment works.
- **Construction vehicle routes** – the potential construction vehicle routes include:
    - To/from the north – via Old Windsor Road > Miami Street > Tarwin Ave > Glenwood Park Drive
    - To/from the west – via M7 > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive
    - To/from the south – via Old Windsor Road > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive
    - To/from the east – via M2 > Old Windsor Road > Norwest Boulevard > Greenhill Drive > Meurants Lane > Glenwood Park Drive

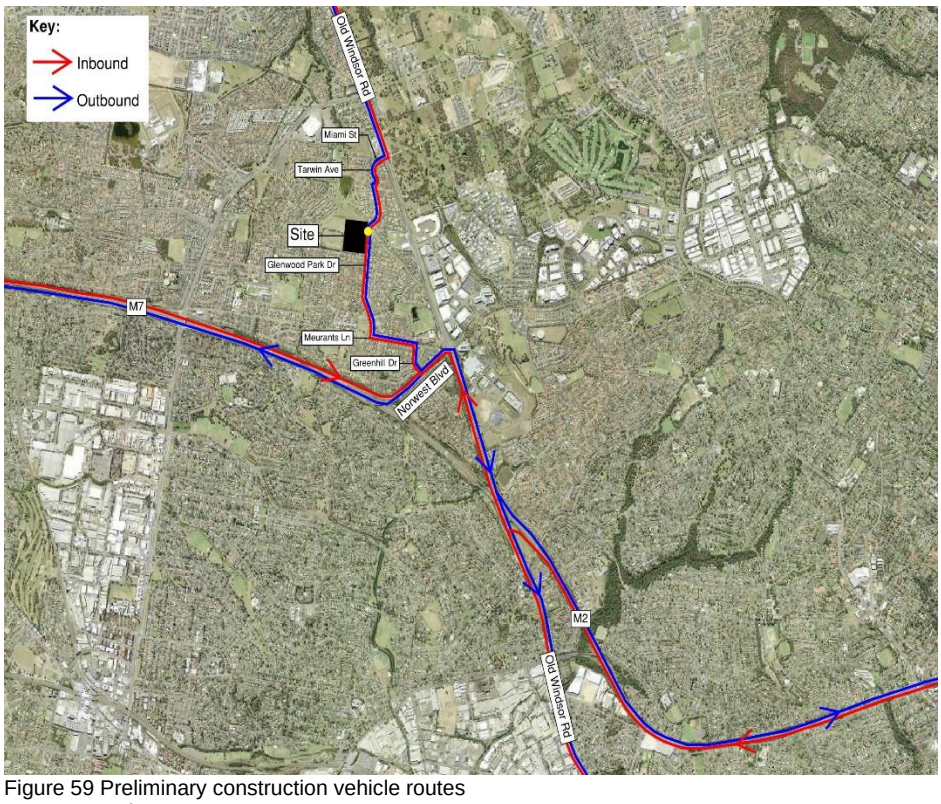

Figure 59 Preliminary construction vehicle routes
Source: Jacobs

- **Parking** – there are several options for the provision of construction worker parking:
    - Option 1 On-street worker parking – the capacity study undertaken by TTW indicates suitable provision to support worker parking, subject to management measures that ensure conflicts with traffic and pedestrian movements are mitigated.
    - Option 2 Establish an on-site worker car park – There is potential to establish a temporary carpark in the large area of open space adjacent to the proposed new building. This would help reduce the impact on surrounding roads and improve safety for road users.
    - Option 3 Glenwood reserve - Glenwood Reserve has large numbers of vacant car parking spaces. The last five years has shown an average of 110 vacant car parking spaces each day at the reserve. Subject to Council consultation, designating a number of parking spaces at the reserve may be an option to support the construction workers.
- **Vehicle Management** - Vehicle volumes for a development of this scale are likely to be on the order of no more than 10 vehicles per day (equivalent to 2 vehicles per hour), subject to confirmation by an appointed contractor. At these volumes, the local road network could easily accommodate the proposed standard construction vehicle movements subject to appropriate management.

A detailed CTPMP will be prepared by the builder with consideration of all final design selections. This preliminary CTPMP is intended to provide a framework within which a future CTPMP can be developed and implemented, and to demonstrate the potential operation of the construction site.

6.8 Biodiversity

A Biodiversity Development Assessment Report (BDAR) was prepared by Kleinfelder Australia Pty Ltd and is appended at **Appendix S**.

The proposed development will impact 0.03 ha of planted native/exotic vegetation, and 0.13 ha of exotic grassland (managed). None of the abovementioned vegetation zones are considered to represent threatened ecological communities, or habitat for threatened species.

An area of woodland within the Study Area was identified as representative of the Cumberland Plain Woodland CEEC, however this area exists outside of the development site and therefore there will be no direct impacts to the CEEC as part of the proposed development. Nevertheless, the BDAR provides mitigation measures to protect the Cumberland Plain Woodland on site during the clearing of surrounding native vegetation from adjacent communities and planting of new trees species from the woodland community.

Additionally, the ecologist recommends a Biodiversity Management Plan (BMP) to be prepared for the restoration and ongoing management of the Cumberland Plain Woodland on site; although, this is to be developed and implemented by the school operator at an appropriate time separate to this SSDA.

It is concluded that the proposed development is highly unlikely to have significant impacts upon defined biodiversity values. In addition, no species at risk of Serious and Irreversible Impacts (SAIIs) are to be impacted as a result of the proposed development.

Potential direct and indirect impacts associated with the proposed development would be avoided and/or minimised through the implementation of mitigation and management measures outlined in Section 5.3 of **Appendix S**.

6.9 Noise and vibration

A Noise and Vibration Impact Assessment (NVIA) has been prepared by AECOM at **Appendix V**. This Assessment considers noise impacts to surrounds during both construction and operation of the proposed development.

Method

The NVIA identifies the following sites in **Figure 60** as surrounding sensitive receivers.

Figure 60 Assessment receiver locations
Source: AECOM

Due to the COVID-19 lockdown occurring in Sydney, the amount of road traffic, school activities and pedestrian traffic which would normally contribute to the local noise environment are currently absent to a large extent. Given this, it was not considered

reasonable to conduct noise monitoring in order to establish ambient noise levels, as they would not be considered indicative of 'normal' activity in the area.

As a result, the following methods were considered in order to establish reasonable background noise levels for the purpose of determining construction and operational noise criteria:

- Recommended minimum background noise levels presented in the EPA's Noise Policy for Industry;
- Estimated average background noise levels as presented in AS1055.2-1997 Acoustics – Description and measurement of environmental noise Part 2: Application to specific situations; and
- Noise and vibration impact assessments completed for any other developments in the vicinity of the schools which may include recent ambient background noise measurements.

From review of these three methods, it is deemed that the recommended minimum rating background levels (RBL) identified in the NEPA's Noise Policy for Industry's (NPfI) would be too conservative for the surrounding noise environment for the site; these minimum RBLs would be more typical of a rural environment.

Therefore, a slightly higher RBL for the daytime period has been adopted as an appropriately conservative measure. This level is still less than the RBL in AS 1055.2:1997 and the RBL for a childcare centre located at 174 Glenwood Park Drive, Glenwood.

Operational Noise and Vibration

After establishing background noise levels, noise emission criteria for both construction and operation were determined and likely noise emissions from the proposed development modelled to discern its impact, having regard to the applicable criteria.

Table 15 Assessment against relevant operational noise and vibration policies and guidelines

Application	**Comment**
NSW EPA Noise Policy for Industry (NPI)	
The NPI has been applied in consideration of the following matters: – Detail project noise trigger levels for the project – Assess noise levels from the operation of major plant items. Operational noise contours for building services noise emission are presented in Appendix B of the Noise and Vibration Impact Assessment at **Appendix V.** – Noise emission assessment from the use of outdoor areas for the purpose of OOSHC. Operational noise contours for OOSHC are presented in Appendix B of the Noise and Vibration Impact Assessment at **Appendix V** – Noise emission assessment from the use of new teaching spaces.	The proposed development meets the required project noise levels – subject to: – Internally lined ductwork comprising minimum 0.5 metres straight duct to be applied to each outdoor condenser unit discharge. Internal lining to be minimum 50 mm thick. – Noise barriers of 2.5m height surrounding outdoor condenser units located on the eastern and northern side of the outdoor condenser units located on the east of Building N east. The barrier may be formed by acoustic louvres with an insertion loss equivalent to that shown in Table 25 of the Noise and Vibration Impact Assessment at **Appendix V**. – A maximum of 104 OOSCH students located in the north-western portion of the site and COLA during the daytime period only (7am to 6pm).

Application	Comment
NSW EPS Road Noise Policy (RNP)	
The RNP has been applied in consideration of the following matters: – Road traffic noise assessment criteria for existing residences affected by additional traffic To assess noise impacts from additional traffic generated by the project, an initial screening test is undertaken to determine if existing road traffic noise levels would increase by more than 2 dB(A). Where the predicted noise increase is 2 dB(A) or less, then no further assessment is required.	The increase in traffic to the site because of the increase in student and staff numbers is expected to be less than 1 dB, which is considered insignificant. Therefore, the traffic impact on access roads from the project would be acceptable.
Development near rail corridors and busy roads – Interim guideline	
Have been applied in consideration of the following matters: – Provides maximum noise levels for classrooms.	Meets the maximum noise levels – subject to: – Minimum acoustic performance as provided in Section 7.7 of the Noise and Vibration Impact Assessment at **Appendix V**, for glazed elements, ventilation louvres and opaque elements of the proposed classroom building.

It is noted that the NPfI is not applicable to noise emission from the use of outdoor play areas and sports fields and therefore compliance with these criteria is not mandatory. Notwithstanding, the proposed increase of 1,410 students to 1,820 students results in a predicted increase of less than 1 dB(A) from existing capacity to the proposed new capacity, which is imperceptible and is therefore considered acceptable.

Regarding cumulative emissions from the school grounds, it is noted that most noise sources will not be in operation simultaneously (use of classrooms will occur at different times to outdoor play). Combined noise emission of building services during the same periods as one of the outdoor area usages is not likely to result in exceedances of the NPfI criteria either, given the locations and orientations of the activities and plant.

In relation to the school bell/public address system, these selections have been not made; therefore, it is not possible to undertake a detailed assessment of the public address and school bell noise emissions. Recommendations have been provided to minimise the impact of external noise emissions associated with the public address and school bell systems of the proposed development to the nearest sensitive receivers. Refer to Section 7.5 of the Noise and Vibration Impact Assessment at **Appendix V.**

Construction Noise and Vibration

In addition to operational noise, the following noise standards and guidelines have been applied to determine relevant noise criteria for construction activities associated with the development and measure its impact to the sensitive receivers:

Table 16 Assessment against relevant construction noise and vibration policies and guidelines

Application	Comment
NSW EPA Interim Construction Noise Guideline	
Have been applied in consideration of the following matters: – Establish Noise Management Levels (NML) for construction activities.	It should be noted that the most affected residences are located north in Wheendon Street

Application	Comment
– Preliminary assessment of potential noise emissions likely to be generated during construction of the development – based on a worst case scenario of all equipment operating concurrently. – Construction noise contours are presented in Appendix C of the Noise and Vibration Impact Assessment at **Appendix V**.	No receivers are anticipated to be highly noise affected (i.e., exceed an LAeq,15min of 75 dB(A)). School buildings within the site are predicted to be highly noise affected, except for the childcare centre which will not be highly noise affected, It is recommended that a construction noise and vibration management plan (CNVMP) be prepared in accordance with Section 6. The CNVMP is to incorporate a complaint handling procedure as Section 6.1 of the Noise and Vibration Impact Assessment at **Appendix V**.
NSW EPS Road Noise Policy	
The RNP has been applied in consideration of the following matters: – Road traffic noise assessment criteria for existing residences affected by additional traffic during construction.	Based on the peak number of truck movements per day that typically occur at similar development, the peak number of trucks visiting the site per day would be 10 trucks resulting in 20 vehicle movements. Given the volumes of existing traffic, construction traffic would have a negligible impact, increasing road traffic noise levels by significantly less than 1 dB(A).
Construction Noise and Vibration Strategy	
Have been applied consideration of the following matters: – Establish minimum working distances for vibration intensive plant such as a plate compactor.	If these minimum working distances are complied with no adverse impacts from vibration intensive works are likely in terms of human response or structural damage. Standards/guidelines used for assessing construction vibration is provided below: – Structural damage criteria for heritage items have been taken from DIN 4150, whilst criteria for commercial/residential items have been taken from BS 7385. – Human comfort criteria are taken from NSW EPA guideline *Assessing Vibration: A Technical Guideline (AVTG)*

Accordingly, it is considered that the proposed development can operate satisfactorily from an acoustic perspective, subject to the recommendations of the of the NVIA at **Appendix V**.

6.10 Ground and water conditions

A Geotechnical Investigation Report has been prepared for the proposed development by Douglas Partners Pty Ltd, at **Appendix Q**.

Reference to the Penrith 1:100 000 scale Geological Series Sheet indicates that the site is underlain by Ashfield Shale of Triassic Age. Ashfield Shale typically comprises dark grey to black shale, siltstone and laminite which weathers to a residual clay profile of medium to high plasticity.

Intrusive sub-surface investigations were carried out (drilling of boreholes) and testing to determine sub-surface conditions and make recommendations for construction methodology for the proposed building. Certain boreholes were converted to groundwater wells to determine the ground surface levels.

The site is underlain generally by up to about 0.1 m of topsoil fill or up to about 0.9 m of fill, overlying stiff natural clays, with siltstone bedrock at depths of between 1.8 m and 4.6 m (decreasing in depth as distance from the Caddies Creek system increases). The siltstone bedrock typically increased in strength from very low to high strength with increasing depth. The clays on site are typically reactive and of high plasticity.

Free groundwater was observed at depths of 1.6m and 3.3m. Groundwater was not observed during the drilling of the remaining boreholes. Based on the local topography, groundwater is anticipated to flow to the north-east towards the open stormwater channel associated with Caddies Creek.

The report then makes recommendations for construction methodologies for the proposed building based on testing, relating to site preparation and earthworks, excavation support, retaining walls, foundations, floor slabs, seismic design, pavements, site maintenance, drainage, and salinity. Refer to the report for details.

In relation to salinity, the site ranges from non-saline to moderately saline with near-surface soils (within 0.5 m of the existing ground surface) generally non-saline. In addition, shallow soils ranged from non-sodic to highly sodic. As a result, the report outlines management strategies for the development.

6.11 Stormwater and Flooding

A Civil Report has been prepared by AECOM at **Appendix X**. This Report considers matters pertaining to stormwater management and erosion and sediment control.

Stormwater

Stormwater Management

Existing stormwater throughout the site is drained via downpipes that connect to stormwater lines for most of the buildings, and surface pits to collect stormwater overland flow in impervious areas. Council stormwater infrastructure is in Glenwood Park Drive and Forman Avenue.

In general, all new roof stormwater will be collected in roof gutters and downpipes to an in-ground piped system which will connect into existing pipe system. Surface stormwater will be collected in pits. The in-ground piped drainage system will be designed to convey, at least, the 5% Annual Exceedance Probability (AEP) flows.

Where pipe capacity is exceeded or there are system fails, stormwater up to the 1% AEP will be conveyed as overland flow in accordance with NSW Floodplain Management Manual (2005). The OSD will discharge to existing stormwater infrastructure within Glenwood Park Drive. This arrangement is accepted by Council.

There are no existing detention systems on the current school. However, as per the Blacktown City Council Engineering Guide for Development, the High School is in a Hawkesbury River sub-catchment area which requires permanent OSD. Accordingly, an underground OSD tank system has been included in the proposed development.

OSD calculations indicate that a total OSD storage area of 210 sqm is required to adequately manage the stormwater runoff from the site. An underground OSD system has been located at the lowest point of the site to ensure all surface flows are directed to the OSD, without being inundated by any flood events up to the 1% AEP.

For further detail, refer to the Stormwater Management Plans at Appendix C of the Civil Report at **Appendix X**.

Water Quality

Stormwater quality will be managed through the use of various Water Sensitive Urban Design (WSUD) strategies which will treat the water to meet pollutant reduction targets set out in the Blacktown City Council's Stormwater Management report.

It is proposed that a series of pollution control devices will be provided so as to remove contamination from stormwater runoff to the required level prior to discharge. The devices will include:

- Litter screens in all stormwater pits;
- Trash screen in detention tank; and
- End of line treatment device (Ocean Protect StormFilter Cartridges) to remove nitrogen and phosphorus contaminants etc. prior to discharge to the Council stormwater system.

Furthermore, to limit water quality impacts during construction stages, the Civil Report addresses matters concerning sediment, erosion, and dust control during demolition and construction activities.

Flooding risk

A Flood Report has been prepared by enstruct which can be found at **Appendix Y**. To confirm the site's susceptibility to flooding and assess the potential for flooding impacts affecting the early works site area, a TUFLOW flood model was developed.

The TUFLOW model shows that the proposed building is not susceptible to flood inundation during the 1% AEP storm events as well 0.5% AEP and 0.2% AEP events (as proxies for assessing sensitivity to an increase in rainfall intensity of flood producing rainfall events due to climate change). Flood water for all these events is contained within the road reserve of Glenwood Park Drive and the drainage channel/water course.

Given the above, no floodwaters will be adversely impacted when the new building is constructed, thereby avoiding impacts on neighbouring properties and impacts to riparian zones. In this case, a freeboard of 0.5m above the 1% AEP flood level nearest to the site is required when setting FFLs for the proposed new building. The current proposed FFL of the new building is RL 60.90m which is sufficiently above the 1% AEP flood height nearest to the building location (RL 58.80m) as well as the 0.5% AEP and 0.2% AEP.

The new building location is affected by the flood depths caused by the very rare PMF storm event (RL 60.30m). In the event of the occurrence of a PMF flood event, personnel on the site are to seek refuge within the site and shelter-in place at a level above the PMF flood height (Section 15.3.1 of the BCC WSUD Developer Handbook). It should be noted that the ground floor FFL of the new building is greater than the PMF flood level.

Similarly, for 1%, 0.5% and 0.2% AEP, shelter-in-place will be required as access to Glenwood Park Drive bridge of the drainage channel will be unsafe. Alternatively, leaving the school site on roads away from the bridge is possible as roads to the south are still flood free.

6.12 Contamination and remediation

Douglas Partners has prepared a Detailed Site Investigation (DSI) of contamination for the proposed development, and this can be found at **Appendix R**.

Douglas Partners undertook a desktop study for the larger school site which comprised of a site walkover, review of historical aerial photographs, review of EPA records, historical title deeds search, and appraisal of local geology and hydrogeology.

The desktop study helped identify three potential areas of environmental concern (PAEC) that require investigation to characterise whether or not they pose an actual contamination risk to the proposed development.

Douglas Partners carried out an intrusive investigation to assess possible contamination including testing of the soils. Twenty-one (21) sampling points for the development was undertaken, greater than the minimum sampling points of 13 which is recommended by NSW EPA *Contaminated sites, sampling Design Guidelines (NSW EPA, 1995)* for the development footprint.

The investigation and screening levels applied in the current investigation comprise levels adopted for a high school with garden/accessible soil. Ecological investigation levels and screening levels were adopted to investigate the risk of certain contaminants

to terrestrial ecosystem. Groundwater investigation and screening levels were also adopted.

Analytical results were all within the site assessment criteria except for one sample. There was a marginal exceedance of hydrocarbons at Bore 109. However, the exceedances of these contaminants are not considered to be statistically significant. Furthermore, this material is likely to be removed as part of construction works on-site.

From the groundwater samples tested, all reported concentrations of contaminants were below the adopted SAC with the exception of the well in Bore 105 where a minor exceedance of zinc. The elevated zinc concentration in the well in Bore 105 is only minor and typical of groundwater encountered within urbanised areas of Sydney.

No on-site or off-site (hydraulically upgradient) sources of groundwater contamination in proximity to the site have been identified. Furthermore, the testing of soil and groundwater samples across the site has not reported concentrations of contaminants considered to present a risk of groundwater contamination.

Based on the findings of this investigation, it is concluded that the potential for contamination constraints at the site is considered to be relatively low.

As with any site, there is always the potential that concealed structures and/or materials may be present at the site. An Unexpected Finds Protocol will be established for the proposed development, in order to ensure that due process is carried out in the event of a possible contaminated find.

Subject to the implementation of these recommendations, it is considered that the site can be made suitable for the proposed development.

6.13 Waste Management

A Construction Waste Management Plan (CWMP) and Operational Waste Management Plan (OWMP) have been prepared by EcCell Environmental Management and are attached at **Appendix AC** and **AB,** respectively. Both plans outline provisions that will inform operational and construction waste management measures required on site once planning approval is sought.

Construction waste

The CWMP provides an informed framework to maximise resource recovery and minimise waste during the construction process, primarily through recycling of building materials.

The CWMP identifies management strategies and those responsible for ensuring the strategies are followed. The CWMP estimates waste and recycling volumes during the demolition, excavation, and construction stage. All waste will be removed by a licensed waste contractor when bins are full.

All waste and recycling will be stored in bins on site. This waste storage will also be accessible for waste collection vehicles. Recycling will be comingled on-site for separation off-site. Materials for reuse will be stockpiled separately and will be removed at the completion of the construction stage if not used.

The builder will be responsible for implementing the CWMP. The waste contractor will be tasked with the separation of recycling of materials off-site. Waste audits are to be carried out by the builder to ensure that the procedures are effective and carried out effectively by personnel.

Hazardous Waste

The CWMP also outlines management procedures for different waste stream such as Hazardous Waste Materials.

Regarding the risk of hazardous building materials, it should be noted that demolition works will involve building which were installed at the site post-2000. Therefore, it is unlikely that these buildings will contain hazardous building materials. Notwithstanding, if required, a hazardous material survey can be undertaken prior to commencement of works.

It is also anticipated that the consent authority will impose conditions of consent to ensure that proper handling of any hazardous materials uncovered during construction:

- Construction Waste Management Plan to address the removal of hazardous materials and disposal at an approved waste facility in accordance with the requirements of the relevant legislation, codes, standards and guidelines, prior to the commencement of any building works;
- Applicant to consult with SafeWork NSW concerning the handling of any asbestos waste that may be encountered during construction. Also, compliance with the POEO Regulation 2014 with reference to Part 7 'Transportation and management of asbestos waste'.

Operational waste

The OWMP provides an informed framework to maximise resource recovery and minimise waste during the operation of the school.

To manage operational waste on site, the followings waste streams and bin quantities for the upgraded school are proposed for weekly collection:

- Organics: 3 x 240L Bins
- Comingled recyclables bins: 3 x 1100L Bins
- Soft plastic bin: 3 x 1100L Bins
- Paper and cardboard recycling bin: 3 x 1100L Bin
- Return & Earn: 1 x 660L Bin
- General waste bins: 1 x 4500L Bin

A nominated waste storage area and waste collection point is proposed along the western boundary of the site, adjacent to the existing car park. The area allocated for planned waste storage is sufficiently sized in order to accommodate waste storage requirements of the school, as well as the waste collection vehicle turning requirements.

The appointed waste contractors will wheel the MGBs for each waste stream from their resting position to the back of the truck for collection and then wheel the MGBs back at nominated times in accordance with the relevant waste contract. The waste collection company will determine the collection hours based on school location and logistical access. It is recommended waste collection is undertaken outside of peak school hours between 8 to 9.30am and 2.30 to 4pm to reduce any risk from the truck and bin movements affecting the school children.

6.14 Historical Archaeology

An Aboriginal and Historical Heritage Due Diligence Assessment (AHHDDA) was prepared by Tocomwall Pty Ltd for the broader redevelopment of the school site at **Appendix M**.

The historical use of the study area prior to the school construction was limited to crop cultivation and grazing. It found that there was no evidence to suggest the presence of historical archaeological deposit, and there were no historical objects or structures on the site that were of heritage significance.

As the design of the proposed development has changed since the report was issued, an Addendum to the AHHDDA has been prepared by Tocomwall. The addendum confirms that the findings and recommendations of the AHHDDA are still applicable to the proposed development.

6.15 Aboriginal cultural heritage

An ACHAR has been prepared by Tocomwall Pty Ltd in response to the SEARs and is appended at **Appendix L**.

The Archaeological investigations carried out in accordance with the Code of Practice for Archaeological Investigation of Aboriginal Objects in New South Wales 2010 (DECCW) has determined that there are no Aboriginal objects, sites, potential archaeological deposits, or places within the study area. The site is considered to be highly disturbed from past development at the school site, and therefore it is not anticipated that the proposed development would harm any Aboriginal cultural heritage.

Consultation has been undertaken in accordance with the Aboriginal cultural heritage consultation requirements for proponents 2010. Eleven registered Aboriginal party (RAPs) were consulted, as they hold cultural knowledge relevant to determining the significance of Aboriginal object(s) and/or places(s) in the project area.

During the consultation process, no social, cultural or historical or educational values associated with the study area were communicated or identified.

However, there may be an opportunity to capture the intangible values expressed for the study area and locality as part of the Connecting with Country process being undertaken for the project. A Connecting with Country (CwC) process has been undertaken by Tocomwall which comprised of additional consultation with registered Aboriginal parties.

The proposed development seeks to incorporate Aboriginal cultural references in its design to celebrate local Aboriginal cultures and the traditions of the Dharug people. These are integrated into the selected external materials for the new building, particularly the colour of the screens and panels of glazed brick and tiles which were influenced by artefacts found in the surrounding area.

Reference can be made to Architectural Design Statement at **Appendix I** and the Landscape Design Statement at **Appendix K** for further details of these design elements.

6.16 Social Impact

A Social Impact Assessment (SIA) has been prepared for the proposed development by Elton Consulting, and is appended at **Appendix O**. This report identifies and analyses the potential social impacts of the development and includes a social impact management plan to mitigate any social impacts. The methodology is consistent with the requirements of the DPIE's SIA Guideline (2021).

Significant social benefits have been identified, including the following high and very high benefits:

- The upgrade will provide more learning spaces for students
- The project will respond to future demands for public high school places
- Additional support learning spaces will benefit a greater number of students with special needs as well as their families
- Replacing demountables with permanent learning spaces will address existing maintenance issues, resulting in improved wellbeing including visual appeal/school identity
- Benefits to staff wellbeing and workplace health and safety due to upgrades to staff and administration buildings
- There will be no access to the school's open space during construction for students to play during school hours and for extracurricular activities
- Increase in outdoor learning areas and covered outdoor space, creating additional learning and play opportunities
- The design incorporates Connecting to Country principles which should continue as detailed design progresses

- The main wall visible along Glenwood Park Drive will be designed in association with the school community to reflect a multicultural community
- The design incorporates Safety in Design principles which will benefit the future school community

Some social risks were identified, including the following high (no very high impacts were identified):

- Asbestos has been identified in some demountables and this is to be addressed before relocation of demountables with adequate measures in place. However, it should be noted that the removal of demountables will be undertaken via separate planning pathway at the completion of construction. Accordingly, this matter will be addressed as part of that planning approval pathway.
- There will be no access to the school's open space during construction for students to play during school hours and for extracurricular activities. It is anticipated that additional consultation with Council will result in authorised use of the adjacent Glenwood Reserve.
- With significant pedestrian activity around the site (including children), there are concerns and risks about traffic and machinery around a school site. This is expected to be addressed through the finalisation and implementation of a Construction Traffic Management Plan.
- There will be no change to pick-up and drop-off facilities which will not address existing concerns, noting increased future use. This is expected to be mitigated by increasing active modes and reducing private car use, which would result in a negligible impact on traffic and parking conditions as per TTW's advice. It should be noted that the TAIA prepared by TTW also confirms that the local road network has the functional capacity to accommodate any increase in drop-off/pick-up as a result of the proposed development.
- Noise and vibration impacts on the school community and childcare facility have not been assessed. An additional assessment should be conducted as part of detailed design to describe how these can be mitigated. The acoustic assessment appended to this EIS was amended to consider the impacts to the school community and childcare facility. It should be noted that the childcare centre was not considered to be a highly affected receiver. Nonetheless, the following mitigation / enhancement strategies are to be implemented:
    - Prepare Construction Noise and Vibration Management Plan including AECOM's recommendations from Table 22 (Noise and Vibration Impact Assessment, 2021) and complaints handling procedure.

Subject to the implementation of standard and project-specific mitigation measures, such negative social impacts will be effectively curtailed.

Overall, the proposed development is likely to result in a positive social impact to the locality. Engagement findings to date indicate a great level of positivity about the proposed upgrades to GHS.

6.17 Utilities and services

A Building Services Infrastructure Report has been prepared by AECOM Australia Pty Ltd and is attached at **Appendix AE.** The Report focuses on hydraulic and fire protection services, and electrical and information services, and communication technology (ICT) services. The Report also outlines any upgrades and augmentation strategies required to serve the proposed development.

6.18 Structural

A Structural SSDA Report has been prepared for the proposed development by enstruct group. Refer to this report at **Appendix AA**.

Footings

Piles of a minimum depth of 5 metres will be required. CFA piles or bored piles with temporary or permanent liners are to be used to avoid issues from water seepage. Strip footings and waffle slabs will be required for the performance centre.

Gravity Load Resisting Systems

Suspended structure on ground is expected to be the appropriate structural system due to high shrink/swell movements. One-way banded post-tensioned slabs have been developed for suspended floor plates.

Vertical Structure

It is expected that all columns for the primary building structure will be constructed from reinforced concrete.

Roof Structure

The roof structure to the building generally is proposed to be lightweight steelwork. The steelwork will be designed as appropriate for the loading on the roof (i.e. PV Cells). It is recommended that the PV cells are flush mounted to reduce the applied wind loads.

Lateral Loading Resisting Systems

The structure is required to withstand wind and earthquake loads through the lateral force resisting system. Lateral system achieved via reinforced concrete shear walls at the stair and lift locations

6.19 Economic impacts

The economic impacts of the proposed development are positive, given jobs will be created (+240 construction jobs and additional 27 operational school staff jobs). The construction works with CIV of greater than $50 million will stimulate the economy. Government infrastructure works are particularly important in this COVID-19 environment to generate jobs and stimulate the economy.

6.20 Cumulative impacts

Construction

The early works to the proposed development (subject of a separate planning approval pathway) may result in minor overlapping of construction works. Early works and the proposed development will both be undertaken in the same construction area, in the north eastern portion of the site. This area will be fenced off from the rest of the school grounds to mitigate any additional impact, with the exception of potential minor traffic impacts. As such, the final CTPMP will confirm whether there are any significant cumulative impacts resulting from the construction overlap of these developments.

The Blacktown City Council Development Application Tracker and Department of Planning, Industry and Environment's Major Projects website do not identify any underway or proposed developments in the immediate vicinity of GHS at the time of writing. In addition, the proposed development is situated in an area that has been largely urbanised and low scale residential area. As such, it is not anticipated that there will be any significant cumulative impacts.

It is noted that further details about nearby construction works will be confirmed in a final CTPMP, which is required to be prepared as a condition of consent.

Ecological

The BDAR prepared by Kleinfelder at **Appendix S** has considered the cumulative ecological impact of two other separate planning applications occurring at GHS.

A total of 0.121 ha of native vegetation is predicted to be impacted by the proposed Glenwood High School redevelopment (inclusive of the REF works, local DA, and proposed SSDA). Of this, a total of 0.001 ha (1 tree) of Vegetation Zone 1 (consistent with Cumberland Plain Woodland CEEC) will be impacted as part of the proposed early works, this was determined to not represent a significant impact to the CEEC.

Likewise, the cumulative impacts to native vegetation within the vicinity of the Cumberland Plain Woodland patch is not expected to result in a significant impact to the CEEC or local biodiversity values. Mitigation and management measures (Section 5.3 of the BDAR at **Appendix S**) are provided to minimise indirect impacts to biodiversity values within the site.

It is noted that the ecologist recommends a BMP to be prepared for the restoration and ongoing management of the Cumberland Plain Woodland area on site; although, this is to be developed and implemented by the school operator at an appropriate time separate to this SSDA.

Notwithstanding this, as new planting is proposed within the Cumberland Plain Woodland area on-site, the BDAR provides interim management measures for new planting within the Cumberland Plain Woodland in Section 5.3 of the BDAR at **Appendix S**.

Operational Traffic

For the purposes of modelling of development traffic, a background growth rate of 1.5% per annum was applied for through to 2026 and 2031 respectively. With the addition of the background growth traffic, the results of the traffic modelling at western and eastern intersections of Glenwood Park Drive and Forman Avenue indicates that these intersections will continue to operate with reasonable free flow during the AM and school PM peak.

6.21 Suitability of the site

There are no known site conditions which would prevent the development including geotechnical conditions, contamination, flooding, biodiversity, historical archaeological constraints, and/or Aboriginal cultural heritage. Any environmental impacts are not significant and can be adequately addressed.

While existing trees will be impacted, their removal will be compensated by proposed tree planting to increase the trees on site and tree canopy cover from 17.6% to 24.1%.

There is sufficient land within the site to be able to provide for a generous provision of play space per students and exceed minimum recommended standards. The proposed development will deliver 10.4sqm of play space per student (based on 1,820 student enrolments).

The impacts on surroundings during construction and operation are not significant and can be adequately ameliorated.

The site has been long used as a school, and the proposed development will ensure its longevity as a school is maintained, whilst providing improved facilities to ease capacity pressure and continuing to support students with their primary education. The proposed built form of the new building responds strongly to the residential character of the area, through building setbacks and scale, landscaping, and its use of compatible materials and finishes.

The site is therefore considered suitable for the proposed development.

6.22 Public interest

The proposed development will deliver a significant public benefit as it represents an upgrading important public-school infrastructure, to meet the local demand for educational facilities. It will result in greater access to quality education.

The environmental, social, and economic impacts of the proposed development have been evaluated above. This assessment finds that the impacts of the proposed development will provide significant benefits to the public. Any adverse impacts have been mitigated with measures already incorporated into the design of the development or can be incorporated into the construction and operation of the development through the implementation of the proposed mitigation measures detailed in **Appendix C** of this EIS.

On balance, accounting for site suitability, environmental impacts and key benefits detailed further above, the proposed development is in the public interest.

7. Project justification

GHS was established in 2004 following development consent issued by Blacktown City Council on 29 September 2003. It is in North West Secondary SCG which lies within the Blacktown City Council LGA, forming part of the Central City District.

Although the school was originally built to cater for approximately 1,190 students (with 49 permanent learning spaces), with rapid increases in demand over time, has resulted in additional students being accommodated in temporary learning spaces.

In its current form, approximately 27% of learning spaces are in demountables. Many of the core facilities also do not meet the EFSG requirements for the current student population. Coupled with additional student demand forecasted in the region, these deficiencies create overcrowding issues at the school which serve to diminish the educational outcomes for both existing and future students.

Numerous master plan options were developed to address the service need at GHS. Analyses of several planning options eventually led to the adoption of the current design, which accommodates the SI NSW planning grid and has several advantages, including the physical renewal of an underutilized area that provides for improved play and learning whilst still embracing the existing Cumberland Woodland Area on the site as well as the rejuvenation of the streetscape along Glenwood Park Drive.

The site is relatively free of constraints, including, bushfire, historical archaeological constraints, and/or Aboriginal cultural heritage. Whilst some of the existing vegetation will be impacted because of the proposal; their removal does not significantly impact any biodiversity values on the site. It should be noted that the development has been carefully sited and designed such that it envelopes an area remnant woodland located within the school grounds.

This design creates interstitial spaces between the new building and forest which provide greater physical and visual connections between these two spaces. Furthermore, this loss of vegetation will be compensated by new plantings including tree planting which will increase tree canopy cover on the site from 17.6% to 24.1%. It is considered that these new plantings will improve existing ecological values at the site and the appreciation of these values by the school community.

The site is located within a low flood precinct as the site sits above the 1% AEP and below the rare PMF flood event. The impact of climate change on existing flood levels due to increased rainfall has also been considered. However, the sits above the floodwaters for 0.5% and 0.2% AEP flood events. Notwithstanding this, the proposal has responds to these constraints through the setting FFLs above PMF so that shelter in place is possible if a flood event make evacuation not possible.

The proposal has been designed so that it is compatible with the local character. Any concern regarding bulk and scale is alleviated on consideration of spatial separation from surrounding residences (which also avoids overshadowing and privacy impacts) and the design, which employs pitched roof forms, varied mass of the building into three wings and materials and finishes. Many cultural themes are to be integrated into the design to reflect students ties to their cultural backgrounds, including first nations.

The proposal also improves on-site infrastructure for active travel modes, through the provision of both additional bicycle storage and end-of trip for staff as well as a new pedestrian entrance along Glenwood Park Drive. Coupled with the measures outlined in the School Transport Plan developed for the school, TTW concludes that these arrangements will have the effect of improving uptake in active travel modes.

This modal shift has the effect of reducing car dependencies at the site, reducing the demand of staff parking as well as the number of students that will use pick-up/drop-off facilities within Forman Avenue. Notwithstanding this, a survey of on-street parking suggests that there is spare capacity to accommodate the projected parking demand and

modelling of the road network suggests that there is spare capacity to accommodate additional private vehicle movements, irrespective of the targeted modal shift.

Potential impacts to surrounding residences because of noise and construction activities have also been considered by the project team. It is considered that any adverse impacts of the proposal can be appropriately mitigated through measures, which have been summarised in **Appendix C** of this EIS. This will mainly entail the preparation and implementation of management plans.

Having regard to the above, the carrying out of the project is justified for the following reasons:

- The current school has inadequate core facilities that do not meet required standards. The development will provide permanent and state of the art teaching facilities for students and staff that meet current standards and best practice requirements.
- It will increase student capacity at the school, allowing students living in the GHS catchment to attend the school and ease pressures on other secondary schools in the local area.
- It will provide improved and coherent landscaping, play space, tree numbers, tree canopy, and shade cover of outdoor spaces for students. The proposed landscaping will provide urban amenity for users of the space and make a positive contribution to the local character.
- The proposed development will support the health and wellbeing of students at GHS by integrating new pedestrian and cycling facilities as part of the proposed transport strategy. These interventions will also serve to reduce demand on modes of travel that rely on private vehicle, improving the surrounding road network.
- It will deliver additional support learning spaces to provide greater disability support.
- The proposed development is compatible with the local character. The proposal would not result in adverse amenity impacts on surrounding residents through overshadowing and visual privacy.
- The new building will be designed to provide a 5-star Green Star Building rating, improving environmental performance of the school.
- It will generate 211 construction and non-construction Full Time Equivalent jobs during construction phase, and 27 additional teaching related positions during operational phase. Hence, these jobs, together with the value of the project, will stimulate the economy.

Given the above it is considered that the SSD Application has merit and can be supported by the Department of Planning, Industry and Environment and the Minister for Planning and Public Spaces.