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Upgrades to Glenwood High School

Appendix B Environmental Assessment and Mitigation Measures

Prepared for
NSW Department of Education

Date
14 February 2022

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14 November 2021

Revision history

Issue Reference	Issue Date	Issue Status
A	17 February 2021	Draft for SINSW review

File Ref: 211113_glenwood hs_appendix c - environmental risk assessment and mitigation measures_ for client

Contents

1. Environmental risk assessment

In accordance with the SEARs, this section addresses the following significant environmental risk issues:

- Adequate baseline data;
- Consideration of potential cumulative impacts due to other development in the vicinity; and
- Measures to avoid, minimise and if necessary, offset the predicted impacts, including detailed contingency plans for managing any significant risks to the environment and triggers for each action.

The following table sets out the anticipated impacts, the level of respective impact in terms of severity (low, medium, high), identifies mitigation measures, and once these measures are applied, identifies residual risks (low, medium, high).

Table 1 Environmental Risk Assessment

Impact Theme	Impact Detail	Level of Impact	Mitigation Measures	Residual Risk
Traffic				
Construction	The peak number of trucks visiting the site per day would be 10 trucks (equivalent to 20 vehicle movements). At these volumes, the local road network could accommodate the proposed standard construction vehicle movements subject to appropriate management. There will not be sufficient parking for workers on-site, and workers will need to park in the local area with possible implications on residents. Two options have been considered, including: – Use the vacant parking within Glenwood Reserve which averages 110 vacant spaces each day; and/or – Use of prevalent unrestricted parking along Glenwood Park Drive, Forman Avenue and Shaun Street.	Medium	Construction traffic and pedestrian management – A Detailed Construction Traffic and Pedestrian Management Plan will be developed and required to be prepared as a condition of consent and incorporated into the Construction Environmental Management Plan (**CEMP**). Traffic Control - Construction vehicle management will be subject to local traffic control by qualified traffic controllers. On street parking management - There are several management measures that may need to be established to allow on-street worker parking such as: – Providing workers with information on available public transport options and transport planning – Encouraging workers to carpool where possible – Advise to workers about preferred on-street parking locations which would not occupy residential frontages (such as the southbound side of Glenwood Park Drive and the north-westbound side of Shaun Street). This is to reduce impacts to residents for those workers who do choose to drive	Low

			– No workers to park within 100m of the site boundary to ensure parking availability for school users Glenwood Reserve – Continued consultation with Blacktown Council to designate spaces in the reserve to reduce on-street parking.	
Operation	It has been determined that the proposed development will likely increase the pick-up/drop-off demand. Furthermore, existing car parking at the site does not cater for existing or future staff parking demand. However, analysis of on-street parking capacity shows good spare capacity if current travel mode split does not change. Furthermore, modelling results demonstrate that the local road network could accommodate the additional traffic volumes anticipated because of the proposal. It is also considered that the kiss and ride zone within Forman Avenue has the functional capacity to cater for the forecasted demand. However, a preliminary School Transport Plan (STP) has been prepared which outlines strategies to achieve a modal shift at the site, particularly reducing private vehicle activity with uptake in sustainable modes of travel.	Medium	Implement recommendations from STP including arranging a Travel Coordinator to undertake an initial review following six months operation and every two years, following this initial review.	Low
Noise & Vibration				
Construction	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, Construction traffic would have a negligible impact, and will continue to meet the RNP criteria for surrounding residences.	Medium	A Detailed Construction Noise and Vibration Management Plan (**CNVMP**) will be required to be prepared as a condition of consent and included in the CEMP.	Low
Operation	Noise emissions associated with operation of the school are expected to comply with the applicable noise criteria, subject to mitigation measures. Furthermore, in relation to internal noise levels, with suitable mitigation measures, rooms within the new building will achieve a level that is appropriate for students.	Medium	Amelioration strategies would be required to sufficiently treat noise emissions to minimise possible acoustic impacts on neighbouring areas: – The Public Address and School Bell Systems shall be designed, installed and operated in accordance with the recommendations in **Section 7.5** of the Acoustic & Vibration Impact Assessment. – 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	Low

			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 playing field and COLA during the afternoon period only (3am to 6pm). – Minimum acoustic performance for glazed elements, ventilation louvres and opaque elements at the eastern façade of the proposed classroom building, to be implemented in the design as provided in Section 7.7 of the Noise and Vibration Impact Assessment at **Appendix V**.	
Built Heritage				
Construction and operation	There are no built heritage impacts arising from the proposed works.	N/A	N/A	N/A
Historical Archaeology				
Construction and operation	An assessment did not find any 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.	N/A	N/A	N/A
Aboriginal Heritage				
Construction and operation	There are no Aboriginal cultural heritage constraints for the proposed development.	N/A	None required. If any human remains are identified during the earthworks within the impact footprint, works should cease immediately and the Police and NSW Heritage should be contacted.	N/A
Contamination				
Construction and operation	The potential for contamination constraints at the site is relatively low. However, as with any site, there is always the potential that concealed structures and / or contaminated materials may be present at the site, and this should be considered for the proposed development.	Low	An Unexpected Finds Protocol will need to be established for use during earthworks, to ensure that due process is carried out in the event of a possible contaminated find.	Low
Flooding				
Operation	The site is not inundated by the 1%, 0.5% and 0.2% AEP. The site is inundated by the rare PMF flood. Similarly, having regard to the preliminary information received from Blacktown Council, overland flow only encroaches into the site during a PMF event. During these floods Glenwood Park Drive bridge over the drainage channel will be inundated, meaning that evacuation via this route is not	Low	Flood Evacuation Management Plan to be prepared during detailed design.	Low

	possible. A shelter in place strategy is desired in the event of a flood. Given that the ground level of the new building is greater than the PMF flood event, students will be able to seek refuge in this building. Alternatively, Forman Avenue is still flood free during any of these flood events, and evacuation can be achieved via this road. These strategies are also sufficient from an overland flow perspective.			
Ecology				
Construction and operation	The proposed development will impact 0.02 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.	Medium	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 H**.	Low

2. Mitigation Measures

The collective measures required to mitigate the impacts associated with the proposed development are detailed in **Table 2** below.

These measures have been derived from the environmental risk assessment and those detailed in appended consultant's reports.

Table 2 Recommendations and Mitigation Measures

Item	Mitigation Measures
Aboriginal Heritage	An "Unexpected Finds Protocol" will be put in place prior to the commencement of work for the instance that any archaeological remains are found. If human remains, or suspected human remains, are found during excavation, all work in the vicinity should cease immediately. The site should be secured and the NSW Police and the DPIE notified.
Flooding	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. Notwithstanding this, 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). 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. It is appropriate for an evacuation management plan to be prepared during detailed design. Similarly, having regard to the preliminary information received from Blacktown Council, overland flow only encroaches into the site during a PMF event. It is considered that these evacuation strategies will be sufficient to deal with any overland flow impacts during this rare flood event.
Operational Traffic	Traffic and accessibility management measures will be implemented in accordance with the Transport and Accessibility Impact Assessment prepared by TTW at **Appendix F**. A School Transport Plan (STP) will be further implemented to achieve a shift in sustainable modes of traffic. In conjunction with additional bicycle spaces and end of trip facilities, implementation of the STP will ensure that a greater uptake of active travel modes and public transport modal share thereby limiting the number of private vehicle trips and demand for parking and drop-off/pick-up area.

	Furthermore, local road improvements such as a new pedestrian entrance on Glenwood Park Drive will improve the existing walking and bicycle connections to the school, providing further incentive for greater uptake of active travel modes. The STP provides further measures to manage demand and the daily operation of existing staff car park and pick-up/drop-off area on Forman Avenue, to improve operational efficiencies.
Construction Traffic	Construction traffic measures will be addressed in accordance with the Preliminary Construction Traffic and Pedestrian Management Plan (CTPMP) within the Transport and Accessibility Impact Assessment prepared by TTW at **Appendix F**. A detailed Construction Traffic and Pedestrian Management Plan (CTPMP) will be required to be prepared as a condition of consent. The CTPMP will address traffic impacts during construction, concerns raised by the community during consultation, through several measures: – Access arrangements – measures to ensure as minimal disruption to current traffic as possible; – Parking – providing on-site parking and parking within Glenwood Reserve for workers where possible and implementing mitigation measures for on-street parking of workers so as to reduce nuisance to neighbours; – Vehicle Management – managing deliveries and truck visits to the site to ensure congestion of streets is avoided.
Geotechnical	The proposed development is to be carried out in accordance with the recommendations outlined in the Geotechnical Investigation Report prepared by Douglas Partners at **Appendix Q** of the EIS. In particular, the proposed development is required to be managed impact of saline soils on the proposed development in accordance with a Salinity Management Plan, which is anticipated to be a condition of consent on any SSDA.
Structural	It is anticipated the following conditions of consent will be imposed on the development: “All new buildings and structures, and any alterations or additions to existing buildings and structures, that are part of the development, must be constructed in accordance with the relevant requirements of the BCA.” And – “Prior to the commencement of construction, the Applicant must submit to the satisfaction of the Certifier structural drawings prepared and signed by a suitably qualified practising Structural Engineer that demonstrates compliance with this development consent.”
Contamination	The proposed upgrade works will be delivered in accordance with the recommendations in the Detailed Site Investigation (Contamination) prepared by Douglas Partners (**Appendix R** of the EIS). More specifically, an Unexpected Finds Protocol will need to be established, to ensure that due process is carried out in the event of a possible contaminated find.
Arboricultural	One dead tree is recommended for removal. There will be no other tree removal because of SSDA. 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.

	The proposed upgrade works will be delivered in accordance with the Tree Protection Plan and tree protection measures within Section 4 of the Arboricultural Impact Assessment Report attached at **Appendix I** to ensure that only the trees that have been identified for removal are impacted because of the proposed development.
Ecologically Sustainable Development	The proposal aligns with targeted initiatives under the Green Star scorecard and proposes a 5-star Green Star Rating. The 5 Star Green Star rating is deemed to represent Australian Excellence in development. Through early design input the proposed design has incorporated various sustainability initiatives: – 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 proposed upgrade works will be delivered in accordance with the ESD Report prepared by AECOM attached at **Appendix U** of the EIS.
Accessibility	A BCA Report and Accessibility Report prepared by Philip Chun at **Appendix AG** and **Appendix AF** of the EIS indicates that the proposed development is capable of complying with the relevant statutory requirements at detailed design stage
Ecology	A Biodiversity Development Assessment Report (BDAR) was prepared by Kleinfelder Australia Pty Ltd and is appended at **Appendix H**. 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 5.2.3 of **Appendix H**.
Waste	Construction and operational waste will be managed in accordance with the measures identified in the Operational Waste Management Plan by EcCell Environmental Management at **Appendix AB** of the EIS, and the Construction Waste Management Plan prepared by EcCell Environmental Management at **Appendix AC** of the EIS. Regarding the risk of hazardous building materials, it should be noted that buildings demolished 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'.
Infrastructure Management	The proposed upgrade works are to be designed in accordance with the measures outlined in the Building Services Infrastructure Report Plan prepared by AECOM (**Appendix AE**) and Civil Report prepared by enstruct (**Appendix X**), of the EIS.
Operational Noise and Vibration	Amelioration strategies would be required to sufficiently treat noise emissions to minimise possible acoustic impacts on neighbouring areas as well as the impacts of surrounding uses on the proposed school facilities are identified in the Noise & Vibration Impact Assessment in **Appendix V** of the EIS**.** – 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 **Appendix V**. – Acoustic treatments to be incorporated into the design to limit acoustic emissions from outdoor condenser units as per Section 7.2.2 of **Appendix V**, including lined ductwork for each outdoor condenser unit and noise barriers/acoustic louvres. – Limits on the number of students that are capable of being accommodated on the site for the purpose of OOSCH without obtaining further acoustic information to consider impacts on surrounds.
Construction Noise and Vibration	A detailed Construction Noise & Vibration Management Plan (CNVMP) shall further assess the noise impact of construction works, and shall include a protocol to minimise any potential noise impacts to identified sensitive receivers, and ensure that appropriate noise control measures are defined and implemented to comply with all relevant noise guidelines.
Construction management	Construction will be managed in accordance with the measures identified in the Preliminary Construction Management Plan prepared by Jacobs at **Appendix AC** of the EIS. A Detailed Construction Environmental Management Plan (CEMP) is to be prepared prior to construction commencing on site.
Light spill	External lighting is to be carried out in accordance with the design initiatives outlined in the Lighting Strategy at **Appendix W** of the EIS. It is anticipated that a condition will be imposed on any consent to the effect of: "Prior to commencement of lighting installation, evidence must be submitted to the satisfaction of the Certifier that all outdoor lighting within the site has been designed to comply with AS 1158.3.1:2005

Lighting for roads and public spaces – Pedestrian area (Category P) lighting – Performance and design requirements and AS 4282-2019 Control of the obtrusive effects of outdoor lighting."