



## Appendix D - Environmental Risk Assessment and Mitigation Measures

The following section provides recommendation for mitigation measures in response to potential impacts identified in **Section 6** of the EIS. The structure of mitigation measures is based on the DPIE's hierarchy of approaches for managing impacts identified in the *Draft Environmental Impact Assessment Guidance Series* released by DPE in June 2017, as:

- **Performance based measure** – identify performance criteria that must be complied with to achieve an appropriate environmental outcome but do not specify how the outcome is to be achieved.
- **Prescriptive measure** – require action to be taken or specify something that must not be done.
- **Management based measure** – identify one or more management objectives that must be achieved through the implementation of a management plan.

Following the implementation of appropriate mitigation measures as recommended, it is determined that the proposal will not result in any significant adverse impacts on the surrounding environment. The following table illustrates how the matters raised within the SEARs will be addressed.

This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 *Risk Management–Principles and Guidelines* (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures. In accordance with the SEARs, the Environmental Risk Assessment (ERA) addresses the following significant risk issues:

- The adequacy of baseline data;
- The potential cumulative impacts arising from other developments in the vicinity of the site; and
- Measures to avoid, minimise, offset the predicted impacts where necessary involving the preparation of detailed contingency plans for managing any significant risk to the environment.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence'.

Likelihood	Consequence
A Almost certain	1 Widespread and/or irreversible impact
B Likely	2 Extensive but reversible (within 2 years) impact or irreversible local impact
C Possible	3 Local, acceptable or reversible impact

Likelihood	Consequence
D Unlikely	4 Local, reversible, short term (<3 months) impact
E Rare	5 Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix.

		LIKELIHOOD				
		A	B	C	D	E
CONSEQUENCE	1	High	High	Medium	Low	Very low
	2	High	High	Medium	Low	Very low
	3	Medium	Medium	Medium	Low	Very low
	4	Low	Low	Low	Low	Very low
	5	Very low	Very low	Very low	Very low	Very low

The results of the environmental risk assessment for the proposed development are presented in the below table and are based upon the range of technical and specialist consultant reports appended to the EIS. The table has directly related mitigation measures responding to each impact also based upon the range of technical and specialist consultant reports appended to the EIS.

**N.B. 'O' – Operational; 'C' – Construction**

**'Pe' – Performance based mitigation measure; 'Pr' – Prescriptive based mitigation measure 'Ma' – Management based mitigation measure**

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Approach	Mitigation Measure (Pe/Pr/Ma)	Residual Impact
<b>Trees and Landscaping</b>	Damage to retained trees because of construction.	C	C	2	Medium	<p>The following mitigation measures were listed in relation to the arborist reporting:</p> <ul style="list-style-type: none"> <li>▪ Tree Protection Fencing</li> <li>▪ Mulching</li> <li>▪ Trunk Protection</li> <li>▪ Monitor the excavation work within a five plus metre radius of the tree. Excavation in this zone is to be done using hand tools, not an excavator.</li> <li>▪ An arborist must cut any roots to be removed with a clean sharp handsaw.</li> <li>▪ Wrap any roots found in damp cloth.</li> <li>▪ Any area within five metres of the tree trunk (limited) should not be used to storage or mixing of building materials as this could change the microorganisms in the soil.</li> <li>▪ Any footing in the zone of the roots is to be built with a pier and beam construction with the aim to give 100mm clearance of the roots.</li> <li>▪ Any paving installed must allow air and water penetration to the root zone. The pavers must have sand placed between them and not cement as cement would prevent air flow to the root location.</li> <li>▪ If any roots are found in this zone, the pavers are to be raised by the</li> </ul>	Pr, Ma	Low

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Approach	Mitigation Measure (Pe/Pr/Ma)	Residual Impact
						<p>placement of washed sand over the roots. This RL should be determined at an early stage of the construction so that the pavers do not go above the damp course of the house.</p> <ul style="list-style-type: none"> <li>▪ Ground protection methods for tree roots in Tree Protection Zone.</li> <li>▪ Excavation with Vac truck within Tree Protection Zone when working with services underneath.</li> </ul>		
<b>CPTED</b>	Risk of crime and the fear of crime.	O	B	2	High	<p>The CPTED assessment prepared by Urbis outlines the following mitigation measures:</p> <ul style="list-style-type: none"> <li>▪ Install wayfinding measures (signage, icons, directional markers, colour coding) in carpark areas to guide traffic flow and direct residents and visitors to dedicated entries, lifts, and communal areas.</li> <li>▪ Ensure clear and legible wayfinding to distinguish between various site uses, enhancing navigation and minimising unauthorised access.</li> <li>▪ Implement adequate lighting throughout the carpark, entry/exit points, and residential corridors to support natural surveillance and accommodate varying arrival and departure times.</li> </ul>	Pe, Pr, Ma	Low

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						<ul style="list-style-type: none"> <li>▪ Use balanced lighting between internal and external spaces to avoid mirroring and maintain sight lines, and incorporate lighting in urban design features to enhance safety and character.</li> <li>▪ Install CCTV in hidden and inactivated carpark areas, entry/exit points, and retail spaces to provide 24/7 surveillance, complementing passive surveillance.</li> <li>▪ Use clear signage to inform about CCTV presence and ensure it does not make people feel unsafe.</li> <li>▪ Maintain the site safe, clean, and tidy through regular monitoring and maintenance, including landscaping to prevent overgrowth and blind spots.</li> <li>▪ Ensure retail operators contribute to the site Plan of Management, detailing security and maintenance procedures, and organise security personnel to focus on key areas at night.</li> <li>▪ Provide adequate bins in open spaces, use anti-graffiti materials, and offer welcome packs to new residents to foster community and familiarity with the site.</li> </ul>		

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						<ul style="list-style-type: none"> <li>▪ Implement access control measures for back-of-house facilities, entrances, lifts, and doors to prevent unauthorised access.</li> <li>▪ Enhance pedestrian safety near utility rooms with clear signage, lighting, and barriers, and improve safety in end-of-travel facilities with surveillance and secured access control.</li> <li>▪ Paint basement ceilings/walls white to reflect light and increase appeal, and restrict unauthorised access to retail spaces during non-operational hours.</li> <li>▪ Secure mail areas to prevent theft, consider CCTV for surveillance, and install locked boxes for emergency services with clear signage and monitoring.</li> <li>▪ Expand public art in communal areas to enhance appeal and community connection and develop structured activities to foster social connections.</li> <li>▪ Allow access to rooftop areas for residents of other towers to encourage community bonding and ensure landscaping does not compromise natural surveillance or create concealment spaces.</li> </ul>		

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						<ul style="list-style-type: none"> <li>Provide comfortable seating for seniors and people with disabilities, use transparent materials for lift walls to encourage passive surveillance, and keep pedestrian routes clear of obstructions and concealment areas.</li> <li>Encourage community activities in public spaces to increase legitimate use and surveillance, extend public art installations to create a welcoming environment, and use robust materials and graffiti-resistant coatings to reduce vandalism risk.</li> </ul>		
<b>Traffic and Transport</b>	Impacts of construction activities on the surrounding road network.	C	C	4	Low	<p>TTPP sets forth the following mitigation measures in regard to the onsite traffic, access and parking arrangements:</p> <ul style="list-style-type: none"> <li>a Construction Traffic Management Plan that considers the potential traffic, transport and parking impacts at an overview level that could arise during the construction phase across the precinct and proposed suitable mitigation measures to reduce the impacts</li> <li>a Green Travel Plan that embraces the principles of sustainable transport. It also indicates the measures that will be put in place to influence travel patterns to/from the site with a view to</li> </ul>	Ma	Low

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Approach	Mitigation Measure (Pe/Pr/Ma)	Residual Impact
						encourage more sustainable transport modes from occupation.		
<b>Noise and Vibration</b>	Construction and operational noise affecting surrounding residents and community.	C, O	B	2	High	<b>General Noise Management Measures</b> <ul style="list-style-type: none"> <li>▪ Use less noisy plant and equipment, where feasible and reasonable.</li> <li>▪ Plant and equipment must be properly maintained.</li> <li>▪ Strategically position plant on site to reduce the emission of noise to the surrounding neighbourhood and to site personnel where feasible and reasonable.</li> <li>▪ Avoid any unnecessary noise when carrying out manual operations and when operating plant.</li> <li>▪ Any equipment not in use for extended periods during construction work must be switched off.</li> <li>▪ Simultaneous operation of noisy plant within discernible range of a sensitive receiver is to be limited/avoided where possible.</li> <li>▪ The offset distance between noisy plant and adjacent sensitive receivers is to be maximised where practicable.</li> <li>▪ Plant used intermittently to be throttled down or shut down when not in use where practicable.</li> </ul>	Pe, Pr, Ma	Low

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						<ul style="list-style-type: none"> <li>▪ Noise-emitting plant to be directed away from sensitive receivers where possible.</li> <li>▪ Staging of construction works so as to erect solid external walls first and utilising them to provide noise shielding to the noise sensitive receivers. However, the structural integrity of the external walls should be investigated prior to implementing this measure and should be prioritised over the noise benefits</li> <li>▪ In addition to the noise mitigation measures outlined above, a management procedure will need to be put in place to deal with noise complaints that may arise from construction activities. Each complaint will need to be investigated, and appropriate noise amelioration measures put in place to mitigate future occurrences, where the noise in question is in excess of allowable limits.</li> <li>▪ Upgraded façade treatments to protect future residents from road traffic noise from William Street and to a lesser extent Forbes and Dowling Streets, and rail noise from the Eastern Suburbs line to the North</li> </ul>		

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						<p>(partially screened by adjacent buildings).</p> <ul style="list-style-type: none"> <li>Upgraded façade and dedicated treatments for acoustically attenuated natural ventilation.</li> <li>Defining construction noise and vibration management measures to be employed by the ultimate building contractors.</li> </ul>		
<b>Aboriginal Cultural Heritage Assessment</b>	Impacts of construction activities on unexpected Aboriginal archaeological finds	C	D	1	Low	<p>The Aboriginal Objects Due Diligence Assessment (<b>ADD</b>) prepared by Urbis concludes that there is no known Aboriginal cultural heritage on or near the subject area, nor is it reasonably likely that Aboriginal cultural heritage occurs on or near the subject site. As such, the following mitigation measures are proposed.</p> <p><b>Recommendation 1 – Submission of Report</b></p> <ul style="list-style-type: none"> <li>A copy of this report should be submitted with the Environmental Impact Statement (EIS) in support of SSD-80211463.</li> </ul> <p><b>Recommendation 2 – Aboriginal Cultural Heritage Assessment Not Required</b></p> <ul style="list-style-type: none"> <li>In accordance with the due diligence process described in the Due Diligence Code and SEARs Item 21 for SSD-80211463, no further archaeological investigation is</li> </ul>	Ma	Very Low

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						<p>required for the subject area, subject to the following archaeological chance finds and human remains procedures being implemented and followed.</p> <p><b>Recommendation 3 – Unexpected Archaeological Finds Procedure</b></p> <ul style="list-style-type: none"> <li>▪ Should any archaeological deposits be uncovered during any site works, the following steps must be followed:</li> <li>▪ All works within the vicinity of the find must immediately stop and the location cordoned off with signage installed to stop any accidental impact to the finds. The find must not be moved 'out of the way' without assessment.</li> <li>▪ The site supervisor or another nominated site representative must contact either the project archaeologist (if relevant) or Heritage NSW (Enviroline 131 555) to contact a suitably qualified archaeologist.</li> <li>▪ The nominated archaeologist must examine the find, provide a preliminary assessment of significance, record the item and decide on appropriate management measures. Such management may require further consultation with Heritage NSW, preparation of a</li> </ul>		

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						<p>research design and archaeological investigation/salvage methodology and registration of the find with the Aboriginal Heritage Information Management System (AHIMS).</p> <ul style="list-style-type: none"> <li>▪ Depending on the significance of the find, reassessment of the archaeological potential of the subject area may be required and further archaeological investigation undertaken.</li> <li>▪ Reporting may need to be prepared regarding the find and approved management strategies.</li> <li>▪ Works in the vicinity of the find can only recommence upon receipt of approval from Heritage NSW.</li> </ul> <p><b>Recommendation 4 – Human Remains Procedure</b></p> <ul style="list-style-type: none"> <li>▪ In the unlikely event that human remains are uncovered during future works, the following steps must be followed:</li> <li>▪ All works within the vicinity of the find must immediately stop and the location cordoned off with signage installed to stop any accidental impact to the finds.</li> </ul>		

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						<ul style="list-style-type: none"> <li>▪ The site supervisor or other nominated manager must notify the NSW Police and Heritage NSW (Enviroline 131 555).</li> <li>▪ The find must be assessed by the NSW Police, which may include the assistance of a qualified forensic anthropologist.</li> <li>▪ Management recommendations are to be formulated by the NSW Police, Heritage NSW and site representatives.</li> <li>▪ Works are not to recommence until the find has been appropriately managed.</li> </ul>		
<b>Waste Management</b>	Improper waste handling leading to environmental pollution, hygiene issues, or local amenity impacts	O	B	3	Medium	<p>Elephants foot concludes the following mitigation measures with respect to the waste management on site:</p> <ul style="list-style-type: none"> <li>▪ Educational materials are to be provided consistently on a regular basis to all staff and contractors to encourage behaviour change and account for transient building personnel such as new tenants, or cleaning staff.</li> <li>▪ Signage and education are essential components to support best practice waste management. Appropriate signage must be prominently</li> </ul>	Pe, Pr	Low

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						<p>displayed on doors, walls and above all bins, clearly stating what type of waste or recyclables is to be placed in each bin.</p> <ul style="list-style-type: none"> <li>▪ School management shall be responsible for minimising dispersion of site litter and prevent stormwater pollution to avoid impact to the environment and local amenity. This can be done by ensuring all bin rooms are secure and taking action to prevent dumping.</li> <li>▪ The bins are to be cleaned by the building manager or cleaners periodically to ensure hygiene and minimise odour.</li> </ul>		
<b>Contamination and Remediation</b>	Potential exposure to contaminated soils, hazardous building materials, or improper disposal, impacting human health, workers, and the environment	C	B	2	High	<ul style="list-style-type: none"> <li>▪ Preparation of a RAP to outline the soil remediation and management protocols based on the outcomes of this DSI.</li> <li>▪ Further targeted assessment of the contamination status of soils following the demolition and removal of existing buildings, including (but not necessarily limited to): <ul style="list-style-type: none"> <li>– The two known UST locations; and</li> <li>– The location of previous bowsers and UST infrastructure.</li> </ul> </li> <li>▪ Confirmation of the preliminary waste classifications through additional soil</li> </ul>	Pe, Pr, Ma	Low

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						<p>investigations which are to be conducted prior to the disposal of any soil off-site during bulk excavation works;</p> <ul style="list-style-type: none"> <li>▪ A hazardous building material survey prior to the demolition of any structures on site, following by the removal of hazardous building materials in accordance with current regulations which may be conducted as part of the construction phase of the project; and</li> <li>▪ Completion and validation of remediation works as stipulated in the RAP following demolition and bulk excavation works at the site.</li> </ul>		
<b>Community &amp; Social Impact</b>	Misunderstanding of affordable housing, social cohesion issues, local amenity disturbances, safety/security concerns, community dissatisfaction.	C, O	C	3	Medium	<p>The Social Impact Statement recommends the following mitigation measures:</p> <p><b><u>Communication</u></b></p> <ul style="list-style-type: none"> <li>▪ Following lodgement of the proposal, provide the local community information about affordable housing, including its benefits to low- and medium-income households such as essential workers. The information should aim to avoid any confusion between affordable housing and social housing.</li> </ul>	Pe, Pr, Ma	Low

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						<ul style="list-style-type: none"> <li>▪ Consider undertaking a community open day once the site is operational to invite the community in and facilitate community connections.</li> <li>▪ Provide information to incoming residents on local facilities and amenities, through materials such as welcoming packs and display posters in communal areas.</li> <li>▪ Continued community consultation is recommended to keep residents informed of construction periods and significant milestones in the project's construction.</li> <li>▪ Communicate with neighbours about the impacts of the development and design considerations which reduce the shadow impact and/or reduce prolonged shadow-cast, and all design provide to enhance the visual amenity</li> <li>▪ Ensure ongoing community communication and engagement throughout all planning, design, construction and operation phases.</li> <li>▪ Implement ongoing community engagement and regular monitoring to minimise disturbances associated with multiple residential developments occurring simultaneously.</li> </ul>		

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						<ul style="list-style-type: none"> <li>Undertake community days within the proposal once operational and incorporate public art reflecting local values into the building design and public realm areas to foster sense of belonging to current residents.</li> </ul> <p>Design</p> <ul style="list-style-type: none"> <li>Ensure that any public art strategy for the proposed development recognises and celebrates the character and heritage of the local area. The strategy should be actively communicated to the local community to reduce community concerns. It should include guidelines for selecting and curating artworks and the allocation of spaces for potential art installations, murals and exhibitions. The strategy should propose partnerships with local art schools, galleries, and cultural organisations.</li> <li>If art installations are installed on-site, establish a selection process that prioritises local talent to reflect the local community character.</li> <li>During the detailed stage, and as recommended by Council, ensure that the open space is accessible and incorporates universal design principles for people of all abilities</li> </ul>		

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						<p>especially in consideration of the site's sloping topography.</p> <ul style="list-style-type: none"> <li>▪ Communicate Designing with Country initiatives within the architectural and landscape design clearly to the local community where appropriate (e.g. signage).</li> <li>▪ Implement relevant CPTED recommendations to ensure the safety of the incoming residents and ensure that the new public space does not create a place for visitors with anti-social behaviours to gather, especially at nighttime.</li> <li>▪ Clearly demonstrate how community concerns and ideas have been addressed and adopted in the plans for the development.</li> </ul> <p><b><u>Construction Management and Opportunities</u></b></p> <ul style="list-style-type: none"> <li>▪ Develop and implement a final CTPMP and GTP, in consultation with key stakeholders</li> <li>▪ Consider developing and implementing a communication and engagement strategy for the construction period (as part of the Construction Management Plan) to ensure effective and ongoing communication with the surrounding</li> </ul>		

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						<p>community (including in relation to traffic/ local road access changes), provide an opportunity for the community to express queries and concerns, and enable the proponent to address any issues.</p> <ul style="list-style-type: none"> <li>▪ Investigate initiatives to provide targeted employment and training opportunities for Aboriginal and Torres Strait Islander people during the construction period.</li> <li>▪ It is recommended that both the construction contractor and the proponent consult with surrounding future developments to understand expected construction timelines and activities, and coordinate schedules and mitigation measures (for example, relief days). This should then be reflected in the detailed Construction Traffic and Pedestrian Management Plan (CTPMP) and the detailed Excavation and Construction Management Plan (ECMP). The ECMP should also note site specific plant and equipment to be used and noise and vibration management procedures.</li> <li>▪ Due to the high level of crimes and offences around the site, provide</li> </ul>		

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						<p>additional security on-site during the construction period to prevent and deter common offences in the local area. This could include hiring security personnel, installing temporary CCTV cameras, implementing controlled access points, and providing secure storage for construction equipment.</p> <ul style="list-style-type: none"> <li>▪ Develop a Construction Noise and Vibration Management Plan at the Construction Certificate (CC) stage which consider potential cumulative impacts from surrounding developments.</li> <li>▪ Coordinate construction activities and management measures across associated adjoining developments to minimise impacts on surrounding residents. This includes coordinating construction 'relief' days.</li> </ul> <p><b><u>Operation Management and Opportunities</u></b></p> <ul style="list-style-type: none"> <li>▪ Develop a strategy with the CHP to support community cohesion and local social connectedness amongst all residents, including affordable housing residents. This strategy should also consider the integration of the incoming residents into the suburb, which may present more socio-</li> </ul>		

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						<p>economic diversity than the targeted population of this proposal.</p> <ul style="list-style-type: none"> <li>▪ Consider ongoing programs and events for residents and the broader local community that will foster a sense of belonging and community cohesion.</li> <li>▪ Consider public art initiatives to recognise and celebrate the mixed and diverse community of Woolloomooloo. This could include curating public art that engages the local communities in art projects and that showcases the suburb's unique characteristics.</li> <li>▪ It is recommended that the proponent discuss the proposal's integration into the existing and surrounding pedestrian and cycle network with Council, Transport for NSW and any relevant active transport groups.</li> <li>▪ Consider incorporating end-of-trip facilities and secured bike storage for incoming workers of the proposal (in addition to the facilities provided for residents).</li> <li>▪ With the review of social infrastructure and open space in this report being high-level, the proponent is advised to undertake a community infrastructure</li> </ul>		

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						<p>assessment (including Council engagement) to understand in more depth the potential needs and pressure associated with the proposal.</p> <ul style="list-style-type: none"> <li>▪ It is recommended that Council and other state and non-profit social infrastructure and services providers continue to monitor supply and demand for social infrastructure and services associated with population growth attributed to this and other similar developments in Woolloomooloo, to seek to ensure adequate provision to meet demand.</li> <li>▪ In consideration of the high proportion of homelessness in the vicinity of the site and the potential for the public space to host a portion of this population, it is advised that the proponent work with Council and local support services to provide support and programming for these individuals. This could be part of a broader community contribution, ensuring that the development not only addresses immediate safety and security concerns but also fosters inclusivity and support for vulnerable populations.</li> </ul>		

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						<ul style="list-style-type: none"> <li>Consider developing and implementing local employment/procurement strategies and programs that provide opportunities to source locally and/or support marginalised groups in the community.</li> <li>Monitor updated forecasted local facilities and services needs throughout the project timeline. This needs the proponent to develop relationships with key State Government agencies and Council to manage the impact of additional pressure on transport networks, services, facilities, and open space.</li> </ul>		
<b>Water Management</b>	Pollution of receiving waters, increased sedimentation, or flooding impacts due to construction and operational runoff	O	B	2	High	<ul style="list-style-type: none"> <li>Erosion and sediment control</li> <li>Installation of OSD tank to meet minimum storage and Permissible Site Discharge (PSD) requirements specified by Sydney Water</li> <li>Operation of stormwater quality treatment train</li> <li>Implementation of the proposed stormwater management strategy shown in the civil engineering drawings and attached to the IWMP.</li> </ul>	Pe, Pr, Ma	Low

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Ground and Groundwater Conditions	Contamination, groundwater depletion, subsidence, impacts on nearby water bodies and wells, saline intrusion, and structural integrity.	C	C	3	Medium	<p><b>Groundwater</b></p> <p><b>Groundwater Inflow Control:</b></p> <ul style="list-style-type: none"> <li>▪ Implement perimeter drainage to capture and divert groundwater.</li> <li>▪ Use inflow reduction measures such as grouting or ground improvement.</li> <li>▪ Conduct groundwater level and inflow monitoring to: <ul style="list-style-type: none"> <li>– Validate inflow predictions and control measures.</li> <li>– Ensure drawdown remains within acceptable limits.</li> <li>– Implement trigger contingency responses if unexpected inflow or impacts occur.</li> </ul> </li> </ul> <p><b>Trigger Levels:</b></p> <ul style="list-style-type: none"> <li>▪ Monitor control measures against: <ul style="list-style-type: none"> <li>– Volume trigger: inflow exceeds maximum predicted by sensitivity modelling.</li> <li>– Drawdown trigger: groundwater drawdown exceeds RL 0.5 m at any monitoring well.</li> </ul> </li> <li>▪ Halt dewatering and excavation if either trigger is reached and implement a mitigation strategy before resuming work.</li> </ul> <p><b>Water Quality Control:</b></p> <ul style="list-style-type: none"> <li>▪ Test groundwater quality prior to discharge to prevent contamination.</li> <li>▪ Collect water samples and quality control samples from the inlet and outlet of the treatment system.</li> </ul>	Pr, Ma	Low

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						<ul style="list-style-type: none"> <li>▪ Measure general groundwater physical parameters (EC, pH, temperature).</li> <li>▪ Analyse samples by a NATA accredited laboratory for specified analytes.</li> <li>▪ Review and update testing parameters and methodology as required.</li> </ul> <p><b>Discharge Options and Contingency Measures:</b></p> <ul style="list-style-type: none"> <li>▪ Option 1: On-site treatment and disposal to stormwater.</li> <li>▪ Option 2: Disposal to the sewer under a Trade Waste Agreement with Sydney Water.</li> <li>▪ Option 3: Tanker off-site for disposal at an aqueous treatment plant by a licensed contractor.</li> </ul> <p><b>Water Quality Acceptance Criteria:</b></p> <ul style="list-style-type: none"> <li>▪ Assess groundwater quality results against water quality acceptance criteria (WQAC) based on relevant guidelines and Council's requirements.</li> <li>▪ Adopt the 95% level of protection (LOP) for non-bioaccumulating contaminants and the 99% LOP for bioaccumulating contaminants for freshwater ecosystems.</li> </ul>		

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**Treatment Options:**

- Sediment control: Settling tanks or flocculation.
- pH adjustment: Dosing with lime or acid.
- Hydrocarbon removal: Oil-water separators and activated carbon filters.
- PFAS removal: Activated carbon filters.
- Metals removal: Filtration or chemical precipitation.

**Monitoring and Reporting Requirements:**

- Conduct daily visual inspections for oil, grease, sheen, discolouration, or odours.
- Monitor groundwater levels at a minimum of three wells.
- Sample and test treated water to assess compliance with WQAC.
- Report groundwater abstraction volumes weekly.
- Prepare a dewatering completion report documenting compliance and any non-conformances.

**Contingency Plan:**

- Communicate identified issues between the Site Manager, Contractor, Geotechnical Consultant, and Environmental Consultant.

SEARS	Potential Impact	Stage of Project	Likelihood	Consequence	Risk Level	Approach	Mitigation Measure (Pe/Pr/Ma)	Residual Impact
						<ul style="list-style-type: none"> <li>▪ Suspend construction and reduce pumping rates if dewatering volumes exceed predictions or discharge limits.</li> <li>▪ Treat water prior to discharge if water quality is unsuitable.</li> <li>▪ Inspect the site and collect additional water quality samples if unexpected finds occur.</li> <li>▪ Use off-site tankering to meet disposal requirements if necessary.</li> <li>▪ Obtain written confirmation from the Environmental Consultant that water quality meets WQAC before recommencing discharge.</li> </ul>		
						<p><b><u>Ground</u></b></p> <p><b>Excavation Conditions and Excavatability:</b></p> <ul style="list-style-type: none"> <li>▪ Reference SafeWork NSW Excavation Work Code of Practice – January 2020 before commencing excavation.</li> <li>▪ Use conventional earthmoving equipment for excavation in fill, soil, and very low strength sandstone.</li> <li>▪ Use moderate to heavy ripping, large excavators with hydraulic rock hammers, and rock saws for low to medium and higher strength rock.</li> </ul>		

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						<ul style="list-style-type: none"> <li>▪ Conduct independent excavatability assessments by excavation contractors prior to tendering.</li> </ul> <p><b>Excavation Induced Ground Movement (Stress Relief):</b></p> <ul style="list-style-type: none"> <li>▪ Carefully consider the effects of stress relief on existing neighbouring structures, buildings, and surrounding services.</li> <li>▪ Assess rock pillars formed between the proposed excavation and neighbouring excavation.</li> <li>▪ Consider the effect on any adjacent high-level footings.</li> </ul> <p><b>Dilapidation Surveys:</b></p> <ul style="list-style-type: none"> <li>▪ Conduct dilapidation surveys on surrounding infrastructure, buildings, and pavements before commencing excavation to document existing defects.</li> </ul> <p><b>Disposal of Excavated Material:</b></p> <ul style="list-style-type: none"> <li>▪ Dispose of surplus excavated materials in accordance with the Protection of the Environment Operations Act 1997 (POEO Act).</li> <li>▪ Follow guidelines for Virgin Excavated Natural Materials (VENM), waste classification, or Resource Recovery Order (RRO) compliance.</li> </ul> <p><b>Vibration:</b></p>		

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						<ul style="list-style-type: none"> <li>▪ Use appropriate excavation methods and equipment to keep ground vibration within acceptable limits.</li> <li>▪ Conduct a vibration trial at the commencement of rock excavation to determine suitable equipment.</li> </ul> <p><b>Trafficability:</b></p> <ul style="list-style-type: none"> <li>▪ Use road-base gravel or recycled crushed concrete to improve trackability on site during wet weather.</li> <li>▪ Conduct a working platform assessment for larger plant such as piling rigs and mobile cranes.</li> </ul> <p><b>Excavation Support:</b></p> <ul style="list-style-type: none"> <li>▪ Design excavation retention systems to support soil and rock, considering allowable deformation limits and surcharge loads.</li> <li>▪ Inspect and map batters and excavation faces every 1.5 m drop in excavation.</li> <li>▪ Use shotcrete protection for clay seams and shale layers to prevent weathering and regression.</li> </ul> <p><b>Ground Anchors and Rockbolts:</b></p> <ul style="list-style-type: none"> <li>▪ Use temporary ground anchors, rockbolts, and dowels to support shoring walls and unstable rock masses.</li> </ul>		

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						<ul style="list-style-type: none"> <li>▪ Conduct pull-out tests to confirm bond stresses before installation.</li> <li>▪ Test temporary anchors to 125% and permanent anchors to 150% of their nominal working load.</li> </ul> <p><b>Foundations:</b></p> <ul style="list-style-type: none"> <li>▪ Design foundations based on allowable bearing pressures and modulus values.</li> <li>▪ Inspect footings prior to concrete placement to confirm suitability.</li> <li>▪ Extend foundations below the zone of influence of tunnels if necessary.</li> </ul> <p><b>Ground Slabs:</b></p> <ul style="list-style-type: none"> <li>▪ Design basement floor slabs as slabs on ground with proper subgrade compaction.</li> <li>▪ Provide under-floor drainage with subsoil drains and sumps to safeguard against uplift pressures.</li> </ul> <p><b>Earthquake/Seismic Design:</b></p> <ul style="list-style-type: none"> <li>▪ Use a Hazard Factor (Z) of 0.08 for earthquake design.</li> <li>▪ Classify the site subsoil as Class Ce (Shallow soil) or upgrade to Class Be (rock) if the building is founded directly on rock.</li> </ul> <p><b>Aggressivity:</b></p> <ul style="list-style-type: none"> <li>▪ Design foundations for a moderate exposure classification for buried</li> </ul>		

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						<p>concrete structures and non-aggressive classification for buried steel structures.</p> <p><b>Geotechnical Considerations Relating to TfNSW Assets:</b></p> <ul style="list-style-type: none"> <li>▪ Refer to TfNSW Technical Direction GTD 2020/001 for requirements when excavating and loading adjacent to TfNSW assets.</li> <li>▪ Conduct numerical analysis, risk assessment, and monitoring strategy for the Cross City Tunnel (CCT).</li> </ul> <p><b>Additional Geotechnical Works</b></p> <ul style="list-style-type: none"> <li>▪ To confirm the subsurface profile from street level down to the existing basement level, it is recommended that inspection slots are cut into the basement walls during the early demolition stages.</li> <li>▪ These slots should be inspected and mapped by a geotechnical engineer to confirm parameters for shoring design and provide the subsurface profile in these areas. The slots should also be inspected by the structural engineer to confirm the existing shoring details.</li> <li>▪ An assessment on the impact of the proposed development on adjacent assets will be required once the</li> </ul>		

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						<p>design has been finalised and prior to construction.</p> <ul style="list-style-type: none"> <li>An Inspection Test Plan and Geotechnical Monitoring Plan will also be required.</li> </ul> <p>The comprehensive list of mitigation measures is available in the Geotechnical Report at <b>Appendix Y</b> and the Groundwater Impact Assessment at <b>Appendix Z</b>.</p>		
<b>Ecology and Sustainable Development</b>	Environmental degradation, resource depletion, pollution, climate change, waste generation, urban heat island effect, inefficient water and energy use, and adverse social and economic impacts	C, O	E	5	Very Low	<p>It is acknowledged that some strategies will need further refinement, during the latter stages of design. Strategies to be explored and refined in the future design stages include:</p> <ul style="list-style-type: none"> <li>Refinement of renewable energy design (such as final PV type and sizing, to optimise all available space – but currently 80 kW or more)</li> <li>Energy-efficient building fabric and services to deliver optimal energy savings</li> <li>Energy-efficient windows (double-glazing and performance frames) to maximise thermal comfort, natural daylighting and views</li> <li>Careful lighting design (further refinement for both energy efficiency and "indoor environment quality")</li> <li>Selection of non-toxic materials, finishes, adhesives and products to</li> </ul>	Pe, Pr, Ma	Low

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						<p>improve Indoor Environmental Quality (IEQ)</p> <ul style="list-style-type: none"> <li>▪ Final brand and model selection for efficient fittings, fixtures and appliances (noting that better options may be available in 1-2 years)</li> <li>▪ Water-reuse balance, with an intelligent synergy between the reuse strategies for rainwater</li> <li>▪ Active transport facilities to encourage healthier living while reducing carbon emissions from transport</li> <li>▪ Selective procurement of materials and internal finishings (to minimise any possible environmental and social impacts)</li> <li>▪ Management and governance procedures (which will improve sustainability outcomes during operation).</li> <li>▪ The project will be designed under the guidance of BASIX, NatHERS, NCC's Section J Energy Efficiency and also Sydney Council's Development Control Plan.</li> </ul>		