

Construction and Environmental Management Plan (CEMP)



Central Barangaroo Early Works

AQL-CBD-CEMP-002

REVISION 02 – Final Issue

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1. INTRODUCTION

1.1. Context and Planning Background

Approval of the Modification 9 Concept Proposal (Mod 9) by the NSW Minister for Planning and Public Spaces was granted on 14 February 2025. Aqualand will prepare and lodge detailed State Significant Development Applications (SSDAs) for the buildings and public domain and these will be submitted and determined in stages. To date, two Early Works SSDAs have been determined as follows:

- | | | |
|----------------|---|----------------------|
| • SSD 39587022 | Central Barangaroo Early Works – Hickson Road Interface | Approved 29 Jan 2025 |
| • SSD 46922214 | Central Barangaroo Early Works – Phase 2 | Approved 23 Dec 2025 |

These SSDAs are subject to numerous consent conditions imposed to:

- prevent, minimise or offset adverse environmental impacts; and
- set standards and performance measures for acceptable environmental performance.

This Construction Environmental Management Plan (CEMP) is the governance document that describes how Aqualand will manage the construction related environmental impacts during the Central Barangaroo Early Works phases while ensuring statutory obligations are fulfilled, and to satisfy the consent conditions of the SSDAs listed above.

The CEMP includes the following Sub-Plans as appendices:

- Construction Traffic and Pedestrian Management Sub-Plan (CTPMP)
- Construction Noise and Vibration Management Sub-Plan (CNVMP)
- Air Quality Management Sub-Plan (AQMP)
- Construction Waste Management Sub-Plan (CWMP)
- Construction Soil and Water Management Sub-Plan (CSWMP)
- Unexpected Heritage Finds Protocols

1.2. Purpose

The primary purpose of the CEMP and its associated sub-plans is to outline the scope of the construction works, the proposed staging, methodology and logistics arrangements, and describe the construction management strategies and procedures that will be employed to mitigate any associated risks and minimise impacts of the works on the environment and the community.

More specifically, the objectives of the CEMP (and sub-plans) are to:

- provide a description of the project and information about the construction planning and logistics.
- assess the impacts of the construction works on local traffic, pedestrians and cyclists, and outline the mitigating control measures to reduce the impacts and ensure safety.
- provide guidelines to reduce potential noise and vibration impacts to nearby affected tenants, residents and asset owners during demolition, excavation and construction works.
- outline measures and procedures for the effective management of the environment in relation to air quality and hazardous materials.
- outline effective waste management practices consistent with the hierarchy of avoid > reuse > recycle > dispose.
- describe how construction works will be managed in wet weather including site stabilisation, erosion and sediment controls and overland rainwater flow paths.
- provide unexpected finds protocols for Aboriginal and non-Aboriginal heritage and associated communications procedures.
- outline an unexpected finds protocol for contaminated soils and groundwater.
- provide a communication plan detailing consultation with affected stakeholders, community updates and enquiries, and a complaint handling procedure.

All construction activities will be undertaken in accordance with the relevant sections of the Building Code of Australia, Australian Standards, City of Sydney and Place Management NSW approvals, Work, Health and Safety Act and Regulations.

All personnel, contractors, and subcontractors involved in the project are required to understand and comply with the requirements of this CEMP and the plan will be reviewed and updated as necessary to reflect changes in project scope, project staging, regulatory requirements and environmental conditions.

2. DEFINITIONS

The meaning of terms and acronyms used in this CEMP document are as follows:

Terms	Description
AMP	Asbestos Management Plan
AQMP	Air Quality Management Plan
Aqualand	Aqualand B Holdings Pty Ltd
Archaeology	The scientific study of material remains of past human life, including artefacts, relics, ruins, buildings and their environment and context.
ARDM	Archaeological Research Design and Methodology
ASSMP	Acid Sulphate Soils Management Plan
CEMP	Construction and Environmental Management Plan
Council / CoS	City of Sydney local government
CNVMP	Construction Noise and Vibration Management Plan
CPTMP	Construction Pedestrian and Traffic Management Plan
CWMP	Construction Waste Management Plan
EPA	NSW Environmental Protection Authority
EIS	Environmental Impact Assessment
HAA	Historical Archaeological Assessment
HIS	Heritage Impact Statement
Landowner	Infrastructure New South Wales (INSW)
MARDM	Maritime Archaeological Research and Design Methodology
NCC	National Construction Code
NVIA	Noise and Vibration Impact Assessment
PMF	Probable Maximum Flood
PRW	Perimeter Retention Wall
RWP	Remedial Works Plan
SEARS	Secretary's Environmental Assessment Requirements
SDS	Safety Data Sheet
SEA	Specialist Engineering Assessment
Site	Central Barangaroo Development land being part of Lot 52 DP1213773 and known as Blocks 5, 6 and 7
SSDA	State Significant Development Application, under Division 4.7 of the EP&A Act.
SWMS	Safe Work Method Statement
TfNSW	Transport for New South Wales

3. PROJECT OVERVIEW

3.1 Barangaroo Precinct

Barangaroo is located within City of Sydney local government area and is bounded by Sydney Harbour to the north and west and Hickson Road to the east and is divided into the three distinct areas known as: Barangaroo South (approx. 7.5ha), Central Barangaroo (approx. 5.2ha) and Barangaroo Reserve (approx. 6.1ha).

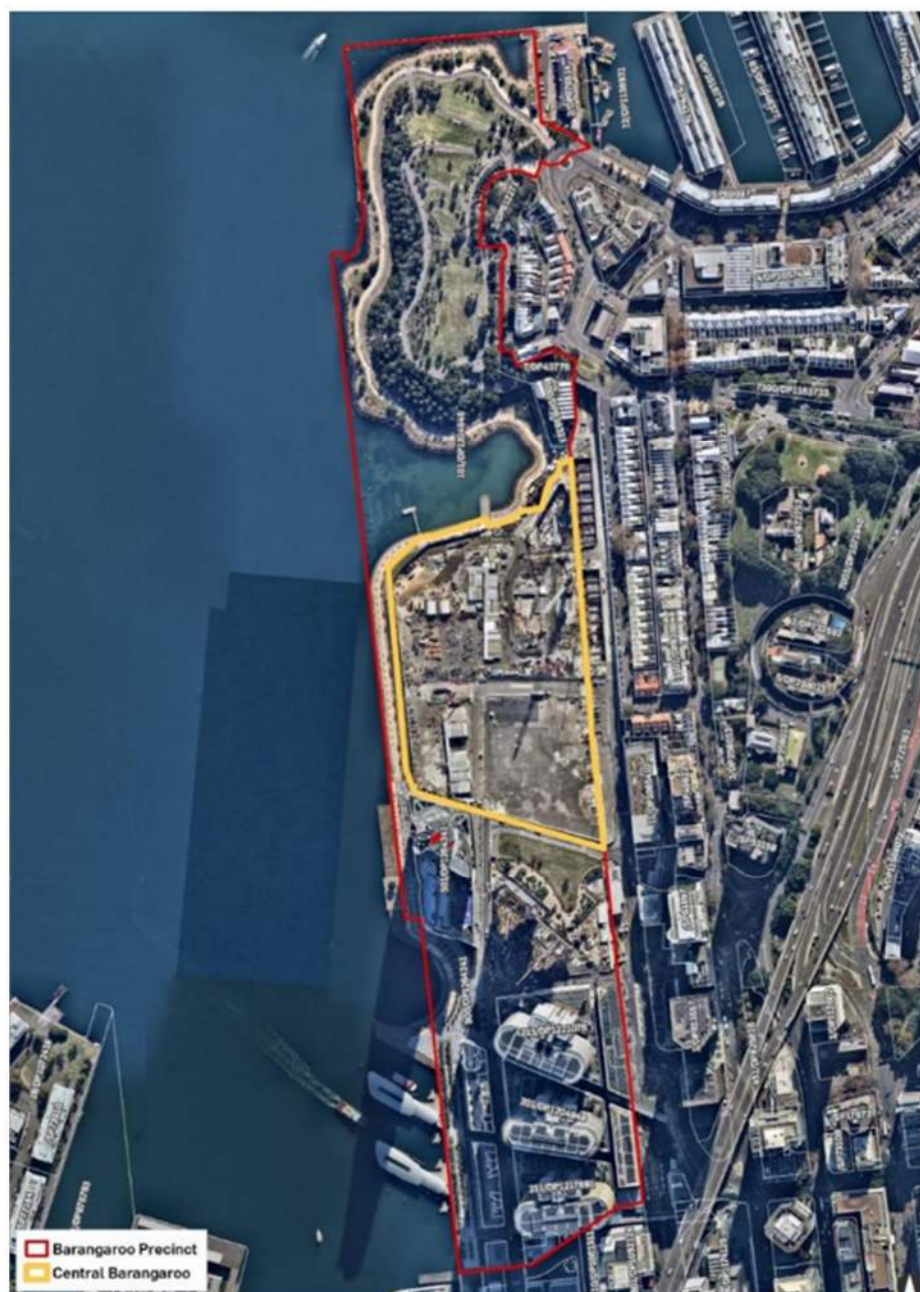


Figure 1 – Aerial map of Central Barangaroo and the Barangaroo Precinct

3.2 Central Barangaroo

Central Barangaroo will be a dynamic hub, featuring a mix of uses, public domain and parklands. It generally encompasses the area west of Hickson Road, north of Barton Street and Barangaroo South and south of Nawi Cove and Barangaroo Reserve.

Harbour Park will be constructed on the western portion of the site as illustrated below and Aqualand will develop a mix of uses and public domain on the eastern portion of the site, known as Block 5, 6 and 7.



Figure 2 - Aerial Image of Central Barangaroo areas

Central Barangaroo currently features a large vacant concrete hardstand area at approximately RL 2.5m that was previously occupied by Sydney Metro during construction of Barangaroo Metro Station with staging areas for logistics and materials handling, and vehicle parking for site workers. Within the site, there is a Sydney Water active sewage pumping station and a temporary power kiosk substation and switchboard, both fronting Hickson Road. An A-Class hoarding is currently erected around parts of the site with chain wire fencing along the remainder of the perimeter and a temporary access road runs off Hickson Road and around the southern portion of the site.

Land uses in the immediate vicinity of Central Barangaroo are diverse, including residential apartment buildings, tourist and visitor facilities, restaurants, cafes, terrace housing, office and parklands.

3.3 Project Details

The project is detailed in the Environmental Impact Assessments prepared for the Early Works SSDAs and as set out in the SSDAs:

- | | | |
|----------------|---|----------------------|
| • SSD 39587022 | Central Barangaroo Early Works – Hickson Road Interface | Approved 29 Jan 2025 |
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The basement is essentially rectangular and measures approximately 240m long x 75 m wide and 11.5m deep. The north-east corner interfaces the Barangaroo Metro station and steps down an additional 5.2m in depth. Refer to the Site Plan below.

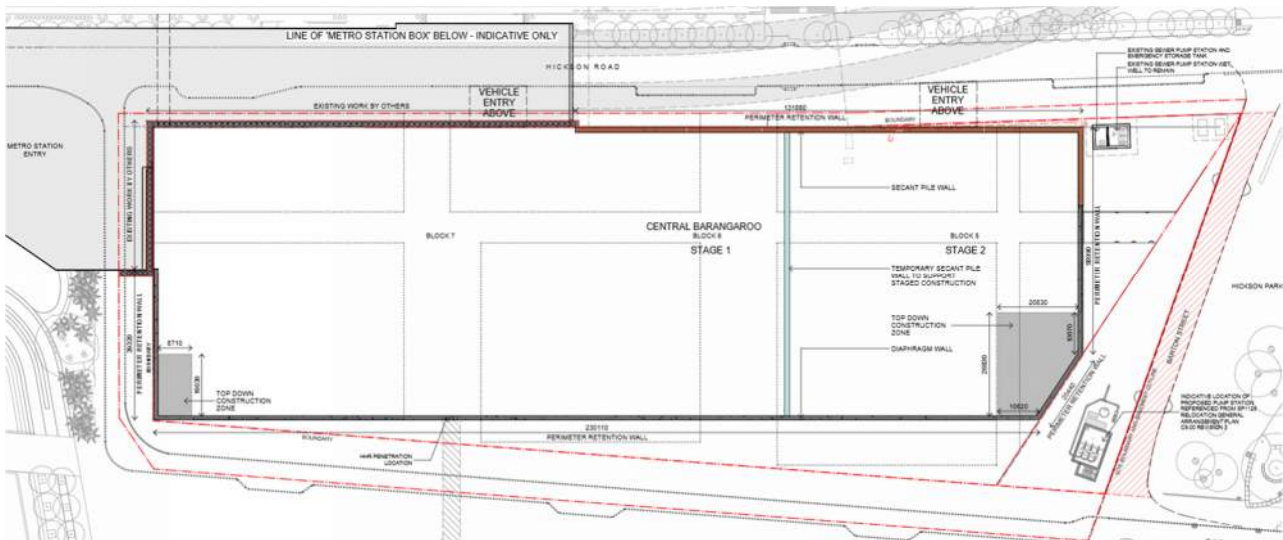


Figure 3 - Basement Footprint Diagram

The basement retention strategy includes secant pile walls, a temporary staging wall, permanent in-situ walls to be constructed inboard of the temporary secant walls, and permanent diaphragm walls.

4. CONSTRUCTION MANAGEMENT

4.1 Hours of Construction Work

In accordance with the SSDA consent conditions, construction works, including demolition, excavation, building work and the delivery of materials or machinery to and from the site, will only be carried out between the following hours:

Construction Hours	High Noise Emission Works
7am – 6pm Monday - Friday	9am – 12pm Monday - Saturday
7am – 5pm Saturday	2pm – 5pm Monday to Friday
No work Sundays & Public Holidays	

Under exceptional circumstances, activities may be undertaken outside of these hours if required:

- by the Police or a public authority for the delivery of vehicles, plant or materials to and from the site; or
- in an emergency to avoid the loss of life, damage to property or to prevent environmental harm.

Notification of activities undertaken under these circumstances will be given to affected residents before undertaking the activities or as soon as is practical afterwards.

All reasonable and feasible steps will be undertaken to ensure that the works, including demolition, excavation and building comply with the *City of Sydney Code of Practice for Construction Hours/Noise 1992* and *Australian Standard 2436-2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites*.

4.2 Project Delivery Team

Aqualand will establish a project delivery team that will have the responsibility and authority to assure that the proposed works fully comply with the project requirements as follows:

Senior Project Manager:

- Ultimate responsibility for the delivery of the project.
- Ensure compliance with Aqualand systems, policies, and procedures.
- Lead stakeholder interface and communication to ensure positive project outcomes are achieved.
- Mitigate project risk related to health, safety, environment, programme, cost, and quality.
- Project reporting
- Compliance with relevant Industry standards codes of practice and legislation.

Construction Site Manager:

- Ultimate responsibility for all site works undertaken on the project.
- Ensure compliance with Aqualand systems, policies, and procedures.
- Primary point of contact for daily subcontract works – both within working hours and after hours.
- Planning and logistics management
- Labour and resource management
- Lead health, safety, and environment to ensure positive project outcomes are achieved.

HSE Coordinator:

- Support the Site Manager with daily HSE matters including but not limited to site inductions, plant and equipment inductions, inspections and task observations and reviewing SWMS and operating procedures.
- Assist subcontractors as required to ensure compliance with Aqualand systems, policies, and procedures.
- Reviewing HSE alerts received from the Aqualand HSE Manager and communicating with the project team.

The Project Manager and Site Manager will report directly to the Aqualand General Manager, Construction.

4.3 Scope of Works & Methodology

The Scope of Works described within the Early Works SSDAs and covered by this document is broken down into the following key work elements:

Preliminary Site Establishment (Short-term)

This includes installation of new or adjustment of the existing perimeter hoardings and gates, establishment of the short-term site facilities and services, and installation of the environmental controls required to conduct the early works only.

Archaeological Investigations

The Archaeological Investigation scope element includes two separate stages. Firstly, a series of test trenches will be excavated in targeted locations nominated by the Archaeological consultant to explore whether evidence of historic maritime or industrial structures or relics remain, after which a report will be produced detailing the findings and the recommendations. Secondly, after the initial report is reviewed and final endorsement is granted by Heritage NSW, additional excavation for further investigation or salvage of known items of interest may be required. All excavations will be backfilled on completion.

Main Site Establishment (Long-term) and PRW Enabling Works

The Main Site Establishment works includes installation of the long-term site accommodation and welfare facilities, temporary services (including HV kiosks and LV switchboards, potable water, sewer, comms), internal traffic management and pedestrian delineation, site access and security, environmental controls, delivery, laydown and storage areas, etc.

Enabling works for the PRW construction includes diversion of existing stormwater drainage, proof drilling, removal of buried structures, construction of temporary working platforms, construction of temporary guide walls, establishment of Bentonite storage tanks and recycling equipment, and mobilisation of crawler cranes, piling rigs and D-Wall construction plant and machinery.

Perimeter Retention Wall (PRW)

The PRW is a watertight basement excavation retention system comprising a secant piled wall along Hickson Rd and adjacent to the Sydney Water Sewer Pump Station with a diaphragm wall retaining the remainder of the basement along the southern, western and northern perimeter. The base of the secant piles and D-wall panels will be socketed into bedrock and temporary ground anchors will be installed during excavation of the basement to provide lateral restraint to the wall systems. A capping beam will be constructed around the top of the PRW to tie the wall panels or piles into single load bearing structures.

Bulk Excavation

Following construction of the PRW and capping beam, bulk excavation for the basement will proceed. A dewatering and water treatment plant will be established to progressively extract ground water during excavation and treat sufficiently to allow discharge to the stormwater drainage system. Excavation will involve use of excavators (~30t) and dozers for most of the work and will advance from North to South in horizontal layers. Excavated spoil will be loaded out and transported in heavy haulage truck & dog trailer vehicles to appropriately licenced waste facilities according to the Waste Classification of the various material types.

Foundation Piling

Upon final trimming of Bulk Excavation levels, a temporary working platform will be installed to support the piling equipment. A series of reinforced Continuous Flight Auger (CFA) piles socketed into bedrock will be constructed across the basement to support the ground slab and the above building structures. Piles will be cropped to the correct cut-off levels.

Detail Excavation and Installation of In-ground Services

Detail excavation for footings and slab thickenings and trenching for in-ground services will follow completion of the foundation piling in each zone. Services including electrical conduits, plumbing and sub-soil drainage pipes will be installed and backfilled prior to final trimming of the excavated subgrade and placement of a drainage aggregate layer and a concrete blinding slab.

Hydrostatic Ground Slab

The ground slab will be constructed in stages from North to South following progressive completion of the foundation piling. The slab will be keyed into the base of the PRW to create a watertight basement structure and incorporate a set-down in the northeast corner for future interface with the Barangaroo Metro Station. The slab will be poured in manageable sections that can be finished within the approved working hours.

A detailed methodology for each of the above key construction elements is contained in Appendix A – Detailed Construction Methodology.

4.4 Construction Programme

A high-level programme of the Early Works scope elements is shown below:

Estimated Timeline	2026				2027				2028				2029			
Description	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Preliminary Site Establishment		◆														
Archaeological Investigations		◆	◆													
Main Site Establishment & Enabling Works			◆													
Perimeter Retention Wall			◆	◆	◆	◆										
Bulk Excavation					◆	◆	◆	◆	◆							
Foundations							◆	◆	◆	◆	◆					
Detail Excavation and In-ground Services									◆	◆	◆	◆				
Hydrostatic Slab											◆	◆	◆	◆	◆	

Figure 4 - Early Works programme

4.5 Temporary Structures

Prior to commencement of works, an assessment of the existing perimeter A-Class hoardings and fencing will be undertaken by a suitably qualified Temporary Works engineer. A report will outline any compliance issues with the design, installation or condition of the hoardings, with respect to the relevant Australian Standards and Codes of Practice. The existing chain mesh fencing along a section of the Hickson Road frontage will be replaced with A-Class hoarding and depending on the engineering assessment, the existing hoardings will either be repaired or replaced with new compliant hoardings to provide a robust and secure perimeter.

Other temporary structures to be erected during the course of the early works will include but not limited to the following:

- Temporary site accommodation buildings with access decks and covered canopies
- Mobile Crane and Concrete Pump working platforms or support grillages
- Piling Platforms and Guide walls
- Bentonite Plant
- Tower Crane foundations
- Internal fencing, access platforms and stairs

All temporary works structures will be designed and certified by a suitably qualified temporary works engineer.

4.6 Site Security

Aqualand will include the following security measures as a minimum:

- Hoarding and site security strategy to prevent unauthorised access
- Shut down risk assessment process which details prevention of persons trespassing
- Ant-climb and security measures for tower cranes
- Secure storage areas and theft management
- Site CCTV camera locations
- After Hours Contacts
- Major event security protocols and requirements

4.7 Construction Interfaces

The following utilities and infrastructure assets are located within and/or adjacent to the Central Barangaroo site.

Barangaroo Metro Station and Tunnels

The Barangaroo Station box and running tunnels are located under Hickson Road immediately to the east of the site and the trapezoidal 'Shark Fin' structure that houses the northern station entrance, back-of-house services and staff facilities is located to the north.

To ensure the Sydney Metro assets are fully protected and construction impacts are considered, the following documents have been issued by Sydney Metro and all requirements and recommendations contained within the will be adhered to during design and construction.

- Barangaroo Station Protection Guidelines
- Sydney Metro Corridor Protection Guidelines
- Barangaroo Station Structural Interface Report

The interface between Barangaroo Station and the site requires detailed planning, staging, coordination and execution and it will be imperative that clear communication protocols between Aqualand and Sydney Metro are established and maintained.

Sydney Water Sewer Pump Station (SP1129)

Sydney Water operate and maintain a sewer pump station SP1129, which is situated on Hickson Rd within an easement towards the southern end of the site. It is positioned approximately 2.5m from the proposed southern end of the perimeter retention wall and a Specialist Engineering Assessment has been completed to analyse the structural effects that construction of the proposed secant pile shoring wall and basement excavation has on the asset. The report concludes that the impact of the proposed construction of the adjacent secant pile wall and excavation is deemed structurally acceptable and that the imposed loads and displacements are well within reasonable limits.

A dilapidation survey and CCTV survey will be conducted prior to PRW works commencing and a vibration monitoring program and movement monitoring program will be implemented during these works.

A chain wire fence will be maintained around the asset during construction for protection and to prohibit unauthorised entry, and 24-hour access will remain for Sydney Water.

Ausgrid HV Electrical Substation

An existing live HV kiosk substation is also situated on the Hickson Rd frontage to the south of the main site entry gates. The asset will be decommissioned and removed as part of an Ausgrid certified design to install two new temporary power substations near the south-east corner of the site.

Decommissioning and installation of the substations will require some trenching and conduit installation and access to the junction pits located on Hickson Rd to the south of the site.

Sydney Metro Water Treatment Plant

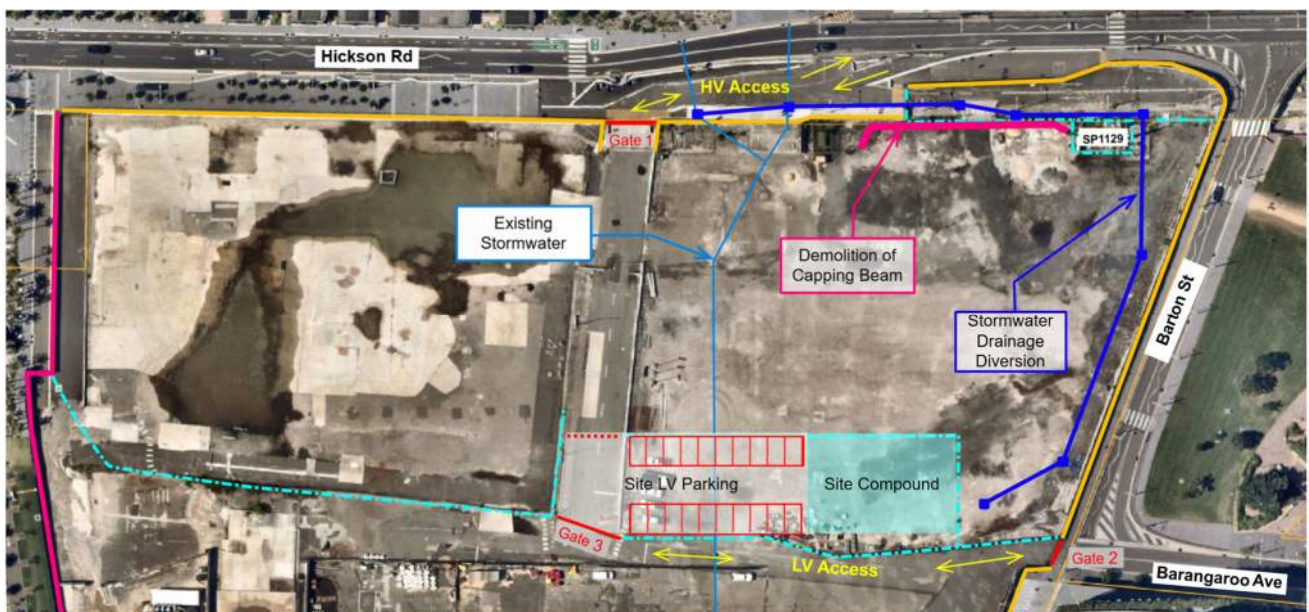
The Sydney Metro Water Treatment plant is located to the west of the site and is used to treat groundwater collected in Barangaroo Station for discharge to the harbour. 24-hr access will be maintained for Sydney Metro contractors working at the plant as required.

4.8 Construction Staging

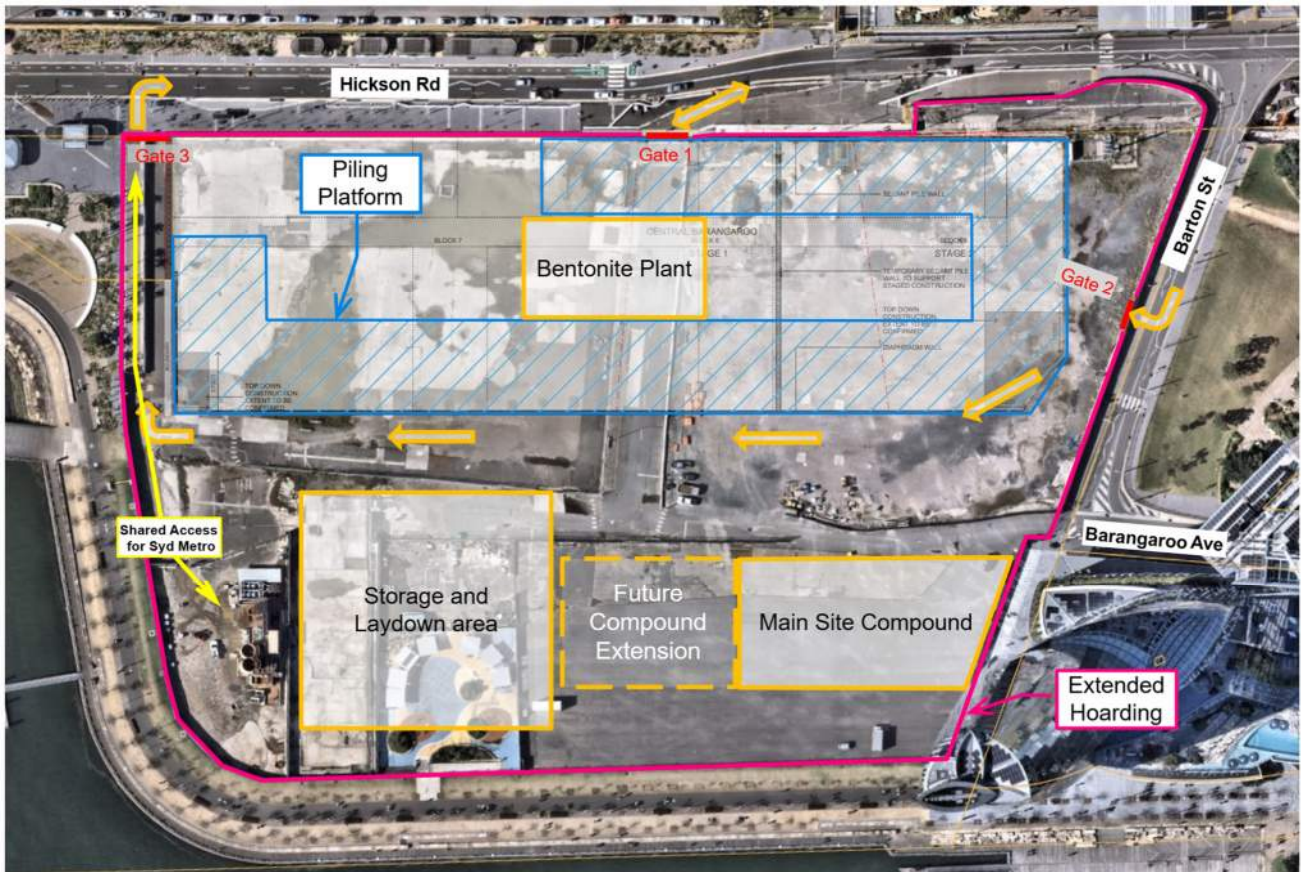
The following diagrams outline the staging of the key elements of the construction scope of works.



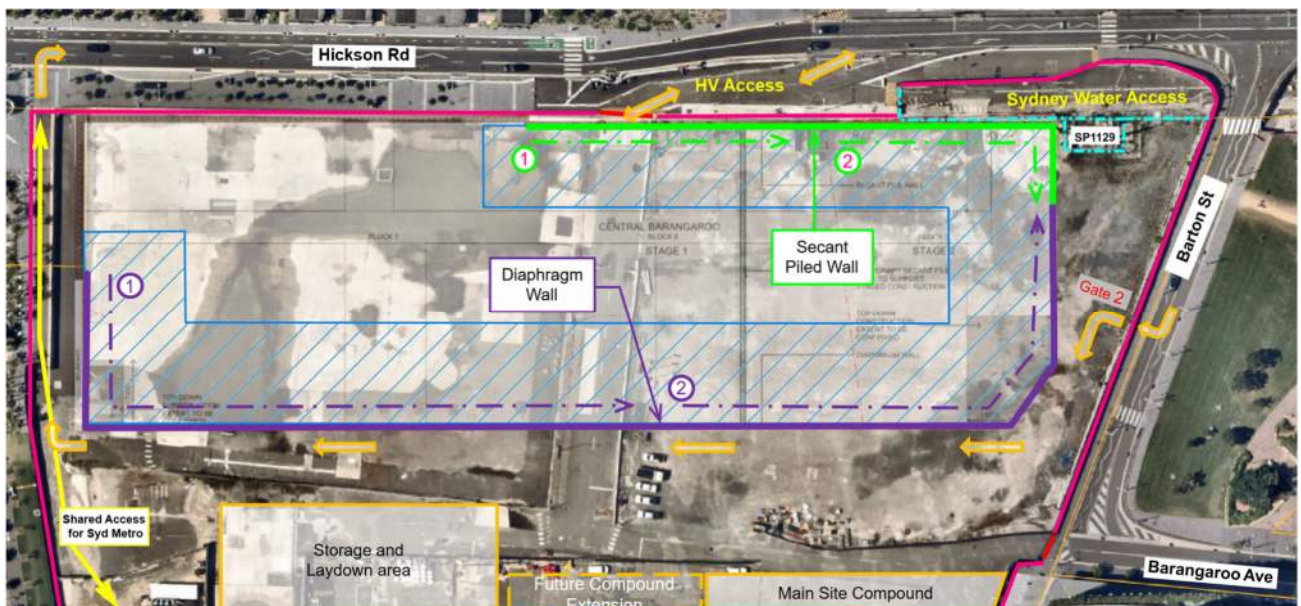
Archaeological Investigation



Demolition and Stormwater Diversion

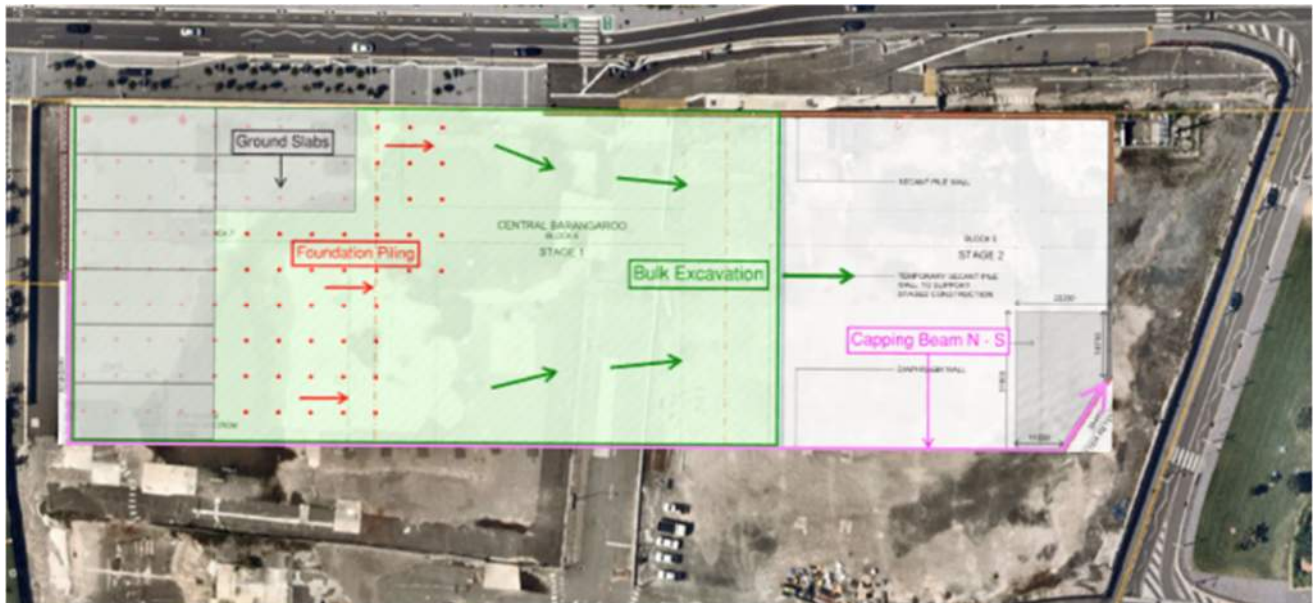


Main Site Establishment and PRW Enabling Works



Construction Sequence of Secant Pile Wall, D-Wall and Capping Beams

The bulk excavation, foundation piling and construction of the hydrostatic slab will generally progress in a North-South direction, with the commencement of each activity staggered and programmed to allow continuity of works for each activity and to maintain a clear separation of the access, work crews and equipment. In broad terms, the excavation will commence when the PRW capping beams are sufficiently progressed, followed by the foundation piling, followed by the detail excavation and in-ground services then finally, completion of the hydrostatic slab pours as indicated in the diagram below.



Bulk Excavation, Foundation Piling and Hydrostatic Slab

5. ENVIRONMENTAL MANAGEMENT

As part of the SSDA Environmental Impact Statement preparation several impact assessments have been carried out identifying environmental risks associated with the works. This document provides an overview of the risks and outlines the construction management strategies and procedures that will be employed to mitigate those risks and minimise impacts of the works on the environment and the community.

The procedures aim to protect the environment, prevent pollution, and ensure responsible environmental performance throughout the works and will be monitored and evaluated for effectiveness during the works. All personnel working on the project will be made familiar with the risk mitigation procedures through site inductions along with regular communications in pre-start and toolbox meetings.

The key impacts from the various construction activities have been shown in the matrix below.

Construction Phase	Environmental Impact						
	Traffic and Pedestrian	Noise and Vibration	Air Quality	Waste Generation	Soil & Water Pollution	Excavation Contamination	Heritage
Site Establishment	✓						
Archaeological Investigations	✓		✓		✓	✓	✓
Perimeter Retention Wall	✓	✓	✓	✓	✓	✓	
Bulk Excavation & Foundation Piling	✓	✓	✓	✓	✓	✓	✓
Hydrostatic Slab Construction	✓	✓		✓	✓		

Figure 5 - Environmental Impacts

5.1 Traffic and Pedestrian Management

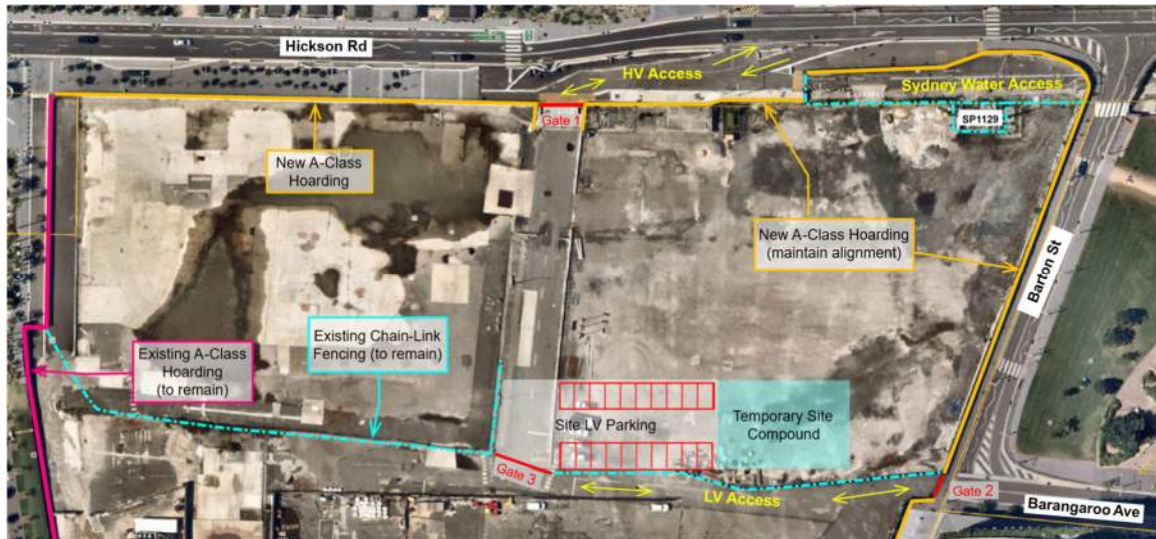
A Traffic, Transport and Accessibility Statement was prepared as part of the SSDAs and sets out an assessment of the anticipated impacts on the surrounding public transport and road network and how the site will manage the interfaces with Hickson Road (sub-arterial road) and Barton Street (local road). The report describes the site access and egress arrangements and swept path analyses, expected construction vehicle types and volumes, vehicle approach and departure routes and the proposed traffic and pedestrian management measures to mitigate impacts.

Key points of the assessment are summarised below, and a site-specific Construction Pedestrian and Traffic Management Plan (CPTMP) is appended to this document.

5.1.1 Site Access

During the Preliminary Site Establishment and Archaeological Investigation phases, there will be three separate access gates to the site:

- Gate 1 – Located in the current position on Hickson Road for Heavy Vehicles. Traffic Management will be established at this gate to control access and manage safety of pedestrians using the footpath crossing point.
- Gate 2 – Situated at the western end of Barton St for Light Vehicles to access the site and temporary parking area. This will also be a shared access for other users, including the Sydney Metro Water Treatment Plant.
- Gate 3 – An internal gate to secure the site.



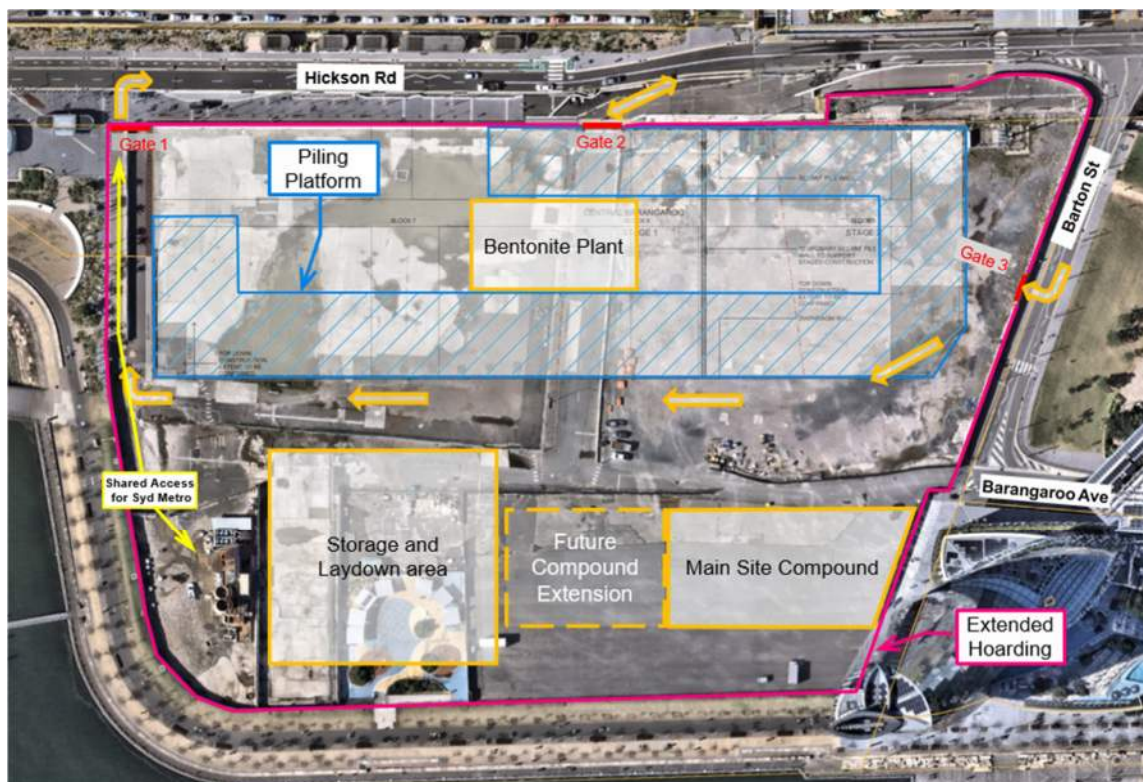
Stage 1 Vehicle Access & Site Layout

During the latter stages of the Early Works (PRW, Excavation and Slab Construction), the site layout will be reconfigured, and access will be modified to manage higher volumes of construction traffic as follows:

- Gate 1 - Will become a northern exit point via Street D to Hickson Road and the shared access for Sydney Metro
- Gate 2 - Will remain in place as a main central vehicular entry and exit point to the site
- Gate 3 - Will be moved east along Barton St and become an entry only southern access point.

When Gate 2 is inaccessible due to work staging, Gates 1 & 3 will become operational as the exit and entry respectively.

Accredited traffic controllers will be positioned at all active site access gates to manage traffic and pedestrian movements when construction vehicles are entering/exiting the site. Queuing or marshalling construction vehicles will not be permitted on the CBD road network, noting there is expected to be sufficient marshalling areas within the site.



Stage 2 Vehicle Access & Site Layout

5.1.2 Construction Worker Parking

During the early Site Establishment and Archaeological Investigation phases, there will be limited on-site temporary car parking provided (approx. 25 spaces – refer Stage 1 Site Layout diagram on p. 16), however this will not be available to construction workers in the long term.

Site parking in later stages of the project will be limited to key project stakeholders and executives and is not expected to exceed 20 parking spaces. Construction workers will be directed not to park on the surrounding roads and will be encouraged to utilise the nearby public transport including train, metro, bus or ferry. The public transport options will be outlined to the workers during the site induction. Appropriate arrangements will be made for any equipment / tool storage and drop-off requirements.

5.1.3 Construction Vehicle Volumes

Depending on the stage of the project, the daily peak number of construction vehicles may vary. Vehicle types will be a range of heavy haulage vehicles such as semi-trailers and truck & dog trailers, and heavy rigid vehicles including concrete agitators, mobile pumps and cranes, bogie tippers, water carts and other delivery vehicles. The estimated peak vehicle volumes are summarised below:

- Stage 1 - Site Establishment and Archaeological Works: 15 vehicles per day
- Stage 2 - Perimeter Retention Wall: 60 vehicles per day
- Stage 3 - Bulk Excavation: 100-180 vehicles per day
- Stage 4 - Foundations: 80 vehicles per day
- Stage 5 - Hydrostatic Slab: 80-120 vehicles per day

The peak hourly construction traffic volumes expected on Hickson Road, are relatively minimal compared to the peak hourly background traffic, and thus not anticipated to adversely impact the operation of the surrounding road network.

5.1.4 Construction Vehicle Routes

Construction vehicles will have origins and destinations from a wide variety of locations throughout Sydney. It is anticipated that concrete would be delivered from batching plants located in Artarmon (north of the site), and/or St Peters (south of the site). All construction vehicles will be restricted to the State and Regional Road network where practicable.

Any vehicles over 12.5 metre heavy rigid vehicles will be restricted to using Hickson Road/ Sussex Street to/ from the western distributor on and off ramps at Market Street and King Street respectively. Permits must be sought from the City of Sydney for any one-off deliveries for larger vehicles if the use of any other roads in the CBD area is required.

The proposed construction vehicle routes to and from the site are the proven routes used for all other construction activities in the Barangaroo precinct to-date and are detailed and shown below:

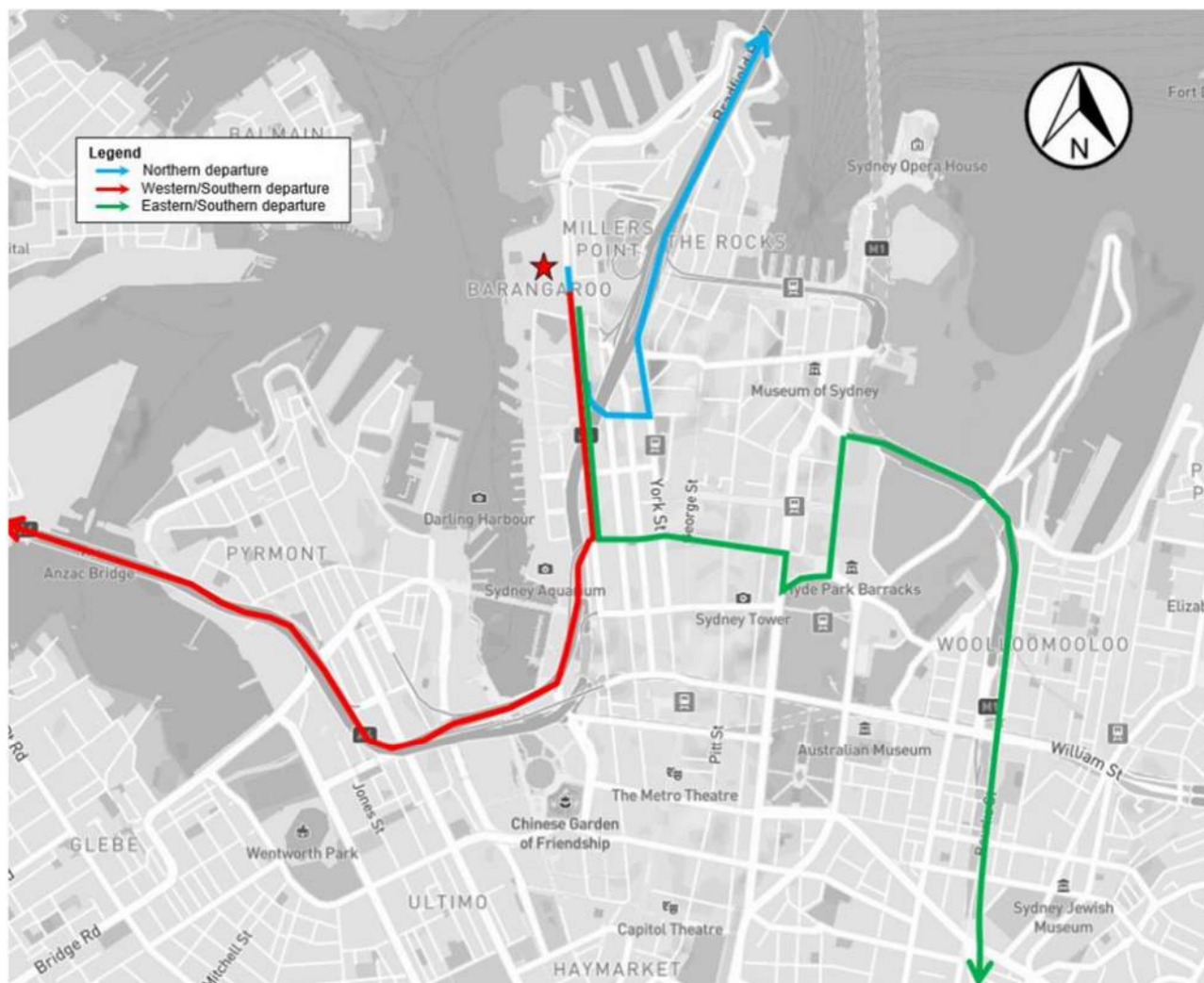
Approach Routes

- North: Harbour Bridge, Western Distributor, York St, Margaret St, Napoleon St, Sussex St, Hickson Road.
- South / West: Victoria Road, Western Distributor, Sussex Street, Hickson Road.
- South / East: Eastern Distributor, Cross City Tunnel, Wheat Road, Shelley St, Erskine St, Sussex St, Hickson Road.



Departure Routes

- North: Hickson Road, Napoleon Street, Kent Street, Western Distributor, Harbour Bridge.
- West: Hickson Road, Sussex Street, Western Distributor, Victoria Road.
- South: Hickson Road, Sussex Street, King Street, Elizabeth Street, St James Road, Macquarie Street, Eastern Distributor.



5.1.5 Traffic Guidance Schemes

Traffic Guidance Schemes (TGS), formally known as the Traffic Control Plans, will be prepared with the detailed Construction Pedestrian and Traffic Management Plan (CPTMP) and will include the following considerations:

- Construction vehicle activity, including the loading / unloading of trucks will be conducted within the work site and queuing of vehicles will be avoided by providing sufficient marshalling area within the site.
- Accredited traffic controllers will be positioned at all active and access points.
- Pedestrians and all passing vehicles will maintain priority.
- Clear definition of the construction boundary to be provided by erection of A-Class hoarding around the site.
- All signage will be clean, clearly visible and not obscured.
- All construction vehicle activity will be minimised during peak periods, where possible.

Supplementary TGS may be required throughout the course of the construction works to reflect changing conditions or extraordinary circumstances.

5.1.6 Pedestrian Management

Pedestrians mainly moving to and from the Barangaroo Metro Station and the Barangaroo commercial precinct can use the western side of Hickson Road or may cross to the eastern side using the marked pedestrian crossings. Alternatively, pedestrians can move around the western perimeter of the site along the Wulugul Walk foreshore promenade. Boom gates operated by traffic controllers will be utilised to assist safe crossing of the driveways into the site.

Cyclists will utilise the new cycleway partially constructed along the eastern side of Hickson Road and in a mixed-traffic arrangement along the incomplete southern section of Hickson Road. Traffic controllers will manage interaction with construction vehicles if necessary.

5.1.7 Public Transport

The construction activities are not expected to impact existing public transport services near the site. All works will be contained within the site boundary or Hickson Road compound. There are existing bus routes that service Hickson Road, however, construction vehicles turning to/ from Hickson Road will do so under normal road rules, giving way to through traffic (including buses) and cyclists.

5.2 Noise and Vibration Management

5.2.1 Noise and Vibration Impact Assessment

A Noise and Vibration Impact Assessment (NVIA) has been prepared to consider and address potential impacts resulting from the proposed works in accordance with the following guidelines:

- NSW EPA's Interim Construction Noise Guideline (ICNG).
- City of Sydney Construction Hours /Noise Code of Practice 1992
- Development Near Rail Corridors and Busy Roads – Interim Guideline (2008)
- Sydney Metro Underground Corridor Protection Guidelines
- General guidelines in respect of other nearby infrastructure.

The principal objective of the assessment is to conduct an impact evaluation of the proposed works and develop management strategies with the following objectives to:

- Minimise unreasonable noise and vibration impacts on residents, businesses and the public domain
- Avoid structural damage to buildings or heritage items as a result of construction vibration
- Undertake community consultation
- Maintain positive, cooperative relationships with local residents, businesses, and building owners.

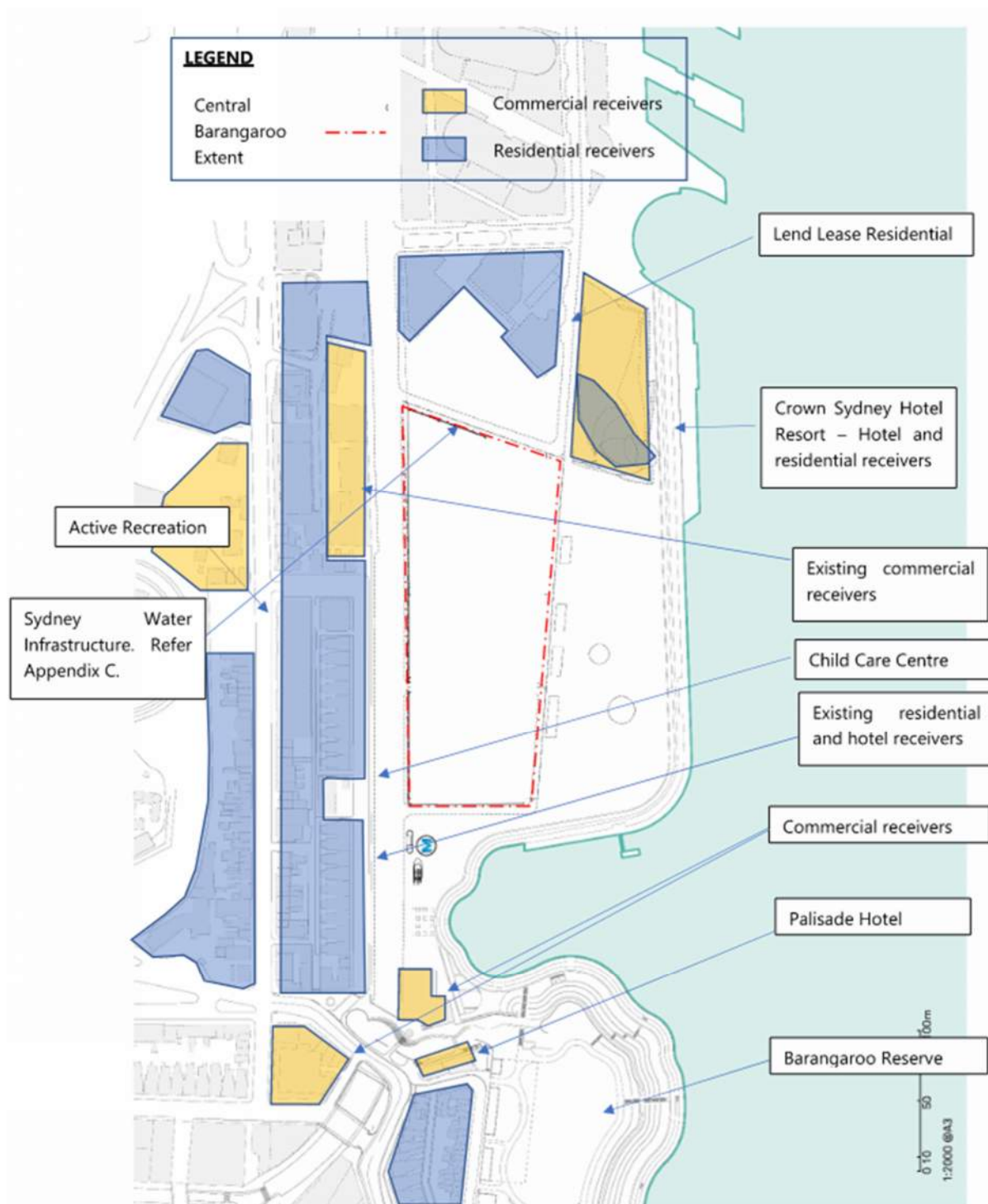
The precinct is surrounded by the following uses:

- Barangaroo Metro Station, Nawi Cove public domain, Barangaroo Reserve to the north, with a hotel, commercial and residential properties further to the north.
- Crown Sydney Hotel Resort and Residential to the south-west.
- Balmain, Darling Harbour and Pyrmont to the west.
- Hickson Park, Lendlease One Sydney Harbour Residences and Barangaroo Commercial Towers to the south.
- Hickson Road and High Street residential dwellings, Childcare, Commercial Offices, Serviced Apartments and Hotel to the east.

Sensitive receivers around the subject site have been identified, and noise and vibration management levels appropriate to the receiver have been determined based on recommendations contained in the ICNG. Noise level predictions for the proposed works at the receiver locations indicate that most receivers around the site will not be exposed to noise or vibration levels above the established management levels.

There are a limited number of receivers where minor exceedances of 1-3 dB(A) are predicted, and some High Street residences will be exposed to noise levels up to a maximum of 15 dB(A) above the applicable management levels, however no residential receiver will be subject to noise exceeding the highly affected noise management levels.

The following diagram shows the various noise and vibration receivers located around the site.



Noise from the water treatment plant may operate into the night-time period, falling under the NSW EPA's outside of standard hours management levels. An assessment has been carried out determining reasonable and feasible mitigation to be incorporated so that noise associated with this plant is maintained in accordance with the NSW EPA guideline.

It is not expected that vibration generated by the proposed activities will produce adverse impact at any surrounding property. Vibration monitoring within 25m of the Sydney Metro tunnels is recommended to ensure that levels are managed to those stipulated by NSW Transport Asset Authority Standards and Sydney Metro Underground Corridor Protection Guidelines.

5.2.2 Construction Noise and Vibration Mitigation

The determination of appropriate additional noise control measures will depend on the nature of the construction activities and the type of equipment being used. Various methods and strategies for the mitigation of excessive noise impacts have been provided in the NVIA and are summarised below:

- Selection of alternate equipment or processes such as low-impact techniques
- Ensuring equipment is well maintained and fitted where possible with mufflers, silencers or acoustic shrouds
- Turning off plant when not in use
- Provision of acoustic barriers / enclosures for stationary plant
- Positioning equipment as far as practicable from sensitive receivers
- Avoiding multiple noisy activities at once
- Consideration of off-site prefabrication if feasible

The following principles will be considered to minimise any potentially adverse vibration impacts:

- Selection of processes that minimise structure and ground vibration – generally avoiding percussive methods.
- Use smallest plant that is able to efficiently undertake the work activity.
- Application of vibration dampening pads to metal surfaces subject to impacts.
- When demolishing, cut control joints in structures to form vibration ‘breaks’, or work away from sensitive receiver locations to form natural vibration breaks in propagation path.
- Monitoring of structures using attended and/or unattended monitors with alarms.
- Time scheduling works to minimise amenity impacts.
- Communicating with affected receivers.

5.2.3 Construction Noise and Vibration Management Plan

A site-specific Construction Noise and Vibration Management Sub-Plan (CNVMP) is appended to this document and includes the following content:

- Identification of sensitive receivers and applicable noise and vibration management levels.
- A description of the main noise or vibration producing activities, processes and equipment that will be employed and an indicative construction programme.
- Proposed construction hours.
- A prediction of likely noise/vibration levels at the most impacted receivers.
- The assessment and recommendation of mitigation methods to be applied where the predicted levels exceed the management levels.
- A monitoring plan including the type and extent of monitoring, reporting procedures.
- Recommended management procedures including complaints handling, response to monitoring exceedances, reporting, site training, etc.
- Community liaison.

5.3 Air Quality Management

An Air Quality Impact Assessment (AQIA) has been prepared to consider and address potential air quality impacts resulting from the proposed works. The report identified and assessed several pollutants of interest and used soil contaminant concentrations identified in the Remedial Action Plan to predict concentrations of toxic air pollutants at receptor locations during the excavation of contaminated soil.

The pollutants assessed were:

- Nitrogen dioxide (NO₂).
- Particulate matter (TSP and PM₁₀).
- VOCs (benzene, ethylbenzene, naphthalene, toluene and xylenes).
- Heavy metals (arsenic, cadmium, chromium VI, copper, lead, mercury, nickel, and zinc) attached to TSP.
- Benzo(a)pyrene.

Asbestos was not assessed as any asbestos encountered on the site will be managed in accordance with the project Asbestos Management Plan. The report concluded that there is potential for odour emissions to occur during the proposed works due to exposed soil which contains some level of contamination however the predicted concentrations of all toxic air pollutants are well below the applicable impact assessment criteria. Odour impacts associated with the excavation of contaminated soil were assessed in a manner consistent with previous assessments in the greater Barangaroo precinct and the modelling study indicated that odour nuisance from the development is unlikely to be significant.

5.3.1 Air Quality Management Plan

A site-specific Air Quality Management Sub-Plan (AQMP) has been prepared by a qualified and experienced expert in accordance with the EPA's Approved Methods for the Modelling and Assessment of Air Pollutants in NSW. The AQMP is appended to this document and provides details of dust and odour management practices, and procedures to monitor performance and identify non-conformances along with procedures to implement corrective and preventative actions and respond to complaints.

The proposed dust management and mitigation measures are summarised below and will be modified to suit the nature of the works being undertaken on site at any time.

- Vehicle engines will be turned off while parked on site.
- Vehicular access will be confined to designated access roads, and speed limits across the site will be implemented.
- Exposed surfaces and roads will be watered, and stockpiles will be covered as required.
- Plant and machinery will be appropriately tuned and maintained to minimise visible smoke and emissions.
- All trucks transporting contaminated spoil will be covered to minimise dust emissions during transport.
- Disturbed areas will be minimised and progressively stabilised as much as is practical.
- Good housekeeping practices will be implemented to minimise dust across hardstand areas.
- Spills will be cleaned up as soon as reasonably practicable.
- Work practices will be adjusted (as required) based on wind observations.
- General environmental controls will be installed for excavation works, including bunding and sediment controls.
- Vehicles/plant would be decontaminated in a wheel wash/cleaning area prior to moving to other areas of site or off-site. Waste water from the decontamination activities would be transferred to the water treatment plant.

5.4 Waste Management

Waste generated during construction of the works will be minimised wherever practicable in accordance with the waste management hierarchy of **avoid > reduce > reuse > recycle > dispose**.

All subcontractors and suppliers that generate medium to high volume waste streams will be informed during tender and pre-construction meetings of the project waste diversion strategies and targets to be implemented during the works and all personnel working on the site will be informed of the requirements during site inductions and regular site meetings.

5.4.1 Waste Diversion Targets

To quantify and measure a sustainable approach to waste management, the NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021 outlines specific targets to achieve the state's long-term goals and priorities. These targets have been supported by industry, community, state, and local governments during the Strategy's consultation phase, and includes:

- The diversion of no less than 90% of all construction waste (except any contamination or hazardous substances)
- Reducing litter by 40%
- Reduce illegal dumping incidents by 30%.

5.4.2 Opportunities to Reuse and Recycle

As a priority, and wherever practicable, waste avoidance and reduction strategies would be employed that could include the following examples:

- off-site fabrication of elements such as reinforcement cages or precast concrete
- accurate take-offs and site measures to reduce over-ordering
- bulk ordering rather than purchasing individually packaged items
- using returnable pallets, crates and packaging

There are also many opportunities to reduce the volume of waste generated during the works. Adaptive reuse of building materials will be encouraged, with significant consideration given to methods of reusing or recycling materials onsite as well as sourcing used or recycled materials from elsewhere to be used on site.

Material	Reuse / Recycling Potential
Asphalt	Recycled for use in Reclaimed Asphalt Pavements (RAP)
Concrete, Masonry	Processed and Reused on-site as Select Fill or for road base
Hardwood Beams	Reused as floorboards, fencing, furniture or sent to second-hand timber supplier.
Insulation Material	Reprocessed to remove impurities and reused for the same purpose, or reused as offcuts, or compressed for ceiling tile manufacture.
Metal, Steel, Copper Pipe or Cable	Recycled at a metal recycling facility, melted into secondary materials for structural steel, roofing, piping etc. copper sold for re-use.
Other Timber	Reused in formwork, ground into mulch for garden or sent to second-hand timber supplier.
Plastics	Reused as secondary materials for playgrounds, park benches etc.
Soil or Topsoil	Stockpiled onsite or transported to other sites for reuse as fill or landscaping.
Synthetic & Recycled Rubber	Reused for the same purpose or reprocessed for use in manufacture/construction of safety barriers, speed humps.

For all waste materials other than excavation spoil, a specialist Waste Management Contractor will be engaged to coordinate recycling, recovery and disposal of the waste during the works. Metal waste will be separated wherever practical and other bulky waste will be kept in skip bins located in a designated storage area, with regular collection for off-site sorting and processing. Depending on the activities underway and to encourage usage, smaller satellite bins may be located around the site that can be transferred to the larger bins in the main waste storage area as required.

Separate receptacles will be provided for hazardous items such as batteries, fluorescent tubes, smoke detectors etc. and putrescible waste from lunchrooms etc. will be collected in a general waste bin with lids. Additional recycling bins will be provided in the site compound for office paper and commingled recyclables such as aluminium and plastic drink containers.

5.4.3 Demolition and Excavation Waste

Existing concrete and asphalt hardstand pavement areas present across most of the site will remain in place as long as possible prior to excavation commencing. Subject to construction staging, material testing and overall feasibility, the material generated during demolition of the hardstands will either be processed for reuse on site or transported to a suitable recycling facility.

Excavation waste consists of any unsuitable or excess material generated from any excavation activities, including excavation for the PRW, bulk excavation of the basement, boring of foundation piles and detail excavation for lift pits and service trenches that cannot be reused on site for backfilling, structural fill or landscaping.

Current estimates of demolition and excavation volumes and tonnages are as follows:

Material	Volume (m ³)	Tonnage (t)
Demolition Concrete & Asphalt	10,000	22,000
Excavation Material	208,000	395,000
Total	218,000	417,000

Demolition and excavated materials removed from the subject site will be managed in accordance with the current legislation and may include segregation by material type classification (in accordance with NSW EPA's *Waste Classification Guidelines, Part 1: Classifying Waste*), and disposal at waste facilities appropriately licensed to receive the various materials.

5.4.4 Management of Contaminated Waste Materials

Various Environmental Site Investigations have confirmed the presence of contamination across the site. All excavation and spoil handling will be managed in accordance with the appended Remedial Works Plan and the other following specific management plans and outlined in the Excavation and Spoil Management section of this document:

- Asbestos in Soil Management Plan, Central Barangaroo Early Works DA-02, prepared by EDP, dated Oct. 2022
- Remedial Works Plan EWDA-02 Central Barangaroo, prepared by EDP, dated April 2024
- Acid Sulphate Soils Management Plan, Central Barangaroo Early Works DA-02, prepared by EDP, dated Feb. 2024

During the construction phase of the development, there will be a commitment to engage qualified and certified contractors to handle and transport all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility.

If any unexpected contaminated or hazardous material is encountered during demolition or excavation works, the Site Manager will stop work in that location immediately and contact the Environmental consultant for advice prior to further works being undertaken in the area.

5.4.5 Recycling Directory

The below table outlines possible waste disposal facilities for further consideration.

Business Name		Suburb	Distance (km)
Excavation Material	Bingo Industries	Alexandria	4.7km
	Banksmeadow Recycling	Banksmeadow	9.5km
	Cleanaway Ryde Resource Recovery Centre	North Ryde	11.9km

Concrete & Asphalt	Metropolitan Demolitions & Recycling	St Peters	6.2km
	Bingo Industries	Alexandria	4.7km
	Banksmeadow Recycling	Banksmeadow	9.5km

5.4.6 Site Housekeeping

A targeted weekly subcontractor housekeeping program will be implemented to ensure remaining miscellaneous waste materials and general litter is regularly collected, with particular attention around the site perimeter and around stormwater drain inlets and overland flow paths. As a general practise, and as addressed in other sections of this document, all vehicles used to transport waste or excavation spoil, will have loads covered and wheels cleaned before leaving the site

5.4.7 Construction Waste Management Plan (CWMP)

A Construction Waste Management Plan (CWMP) has been prepared to address the proposed works on the subject site and is appended to this document. The CWMP has three (3) key objectives which include:

- To promote responsible source separation to reduce the amount of waste that goes to landfill, by implementing convenient and efficient waste management systems.
- To ensure adequate waste provisions and robust procedures consider potential changes during the operational phase of the proposed works.
- Compliance with all relevant Australian Standards, legislation, policies, local council codes, and guidelines.

The primary sources of compliance guidelines include:

- Sydney Development Control Plan 2012.
- City of Sydney's Guidelines for Waste Management in New Developments 2018.
- Australian Government, Department of Sustainability, Environment, Water, Population and Communities. Construction and Demolition Waste Guide – Recycling and Re-use Across the Supply Chain. (2014, November).
- NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014-2021.
- NSW Waste Classification Guidelines 2014.
- Australia's National Waste Policy 2018.

The CWMP will also contain the following information:

- requirement that all waste generated during the project is assessed, classified and managed in accordance with the EPA's "Waste Classification Guidelines Part 1: Classifying Waste"
- demonstrate that an appropriate area will be provided for the storage of bins and recycling containers and all waste and recyclable material generated by the works
- procedures for minimising the movement of waste material around the site and double handling
- requirement that wastes (including litter, debris or other matter) are not permitted to enter any waterways
- requirements that vehicles transporting waste or excavation spoil from the site are covered before leaving
- requirement that the wheels of any vehicle leaving the site are cleaned of debris prior to leaving the premises
- details in relation to the transport of waste material within the site and from the site, including:
 - a traffic plan showing transport routes within the site
 - a commitment to retain waste transport details for the life of the project to demonstrate compliance with the Protection of the Environment Operations Act 1997
 - the name and address of each licensed facility that will receive waste from the site

5.5 Construction Soil and Water Management

The location of the site adjacent to the Sydney Harbour foreshore highlights the risk of environmental impacts related to soil erosion and runoff and potential contamination of stormwater. This section outlines the potential impacts and describes the mitigation measures and control procedures. Further details are contained in the site-specific Construction and Soil Water Management Plan (CSWM) appended to this document.

5.5.1 Potential Construction Impacts

During the early Site Establishment and Archaeological Investigation phases of the works, soil and water impacts are considered to be low, as the site is protected by existing paved surfaces and there will be no changes to the existing site topography or surface flows. Disturbed areas are limited to test pits only, and as the excavated material will be temporarily stockpiled for reuse as backfill, offsite export and disposal will not be required.

During the PRW and Bulk Excavation phases of the works, the risk of environmental impacts is considered moderate to high. Primarily, the exposure of disturbed soils during excavation and construction can lead to soil erosion and sediment laden water run-off breaching site boundaries or entering stormwater pits. Furthermore, high winds and poor stockpile management may also result in soil erosion and potentially cause migration of sediment into the waterways via stormwater runoff.

Other potential impacts include:

- discharge of contaminated wastewater impacting water quality or ecosystem function
- offsite tracking of sediment entering road drainage lines and resulting in pollution
- increased volumes of contaminated waste by inappropriate management of impacted soil
- alterations of surface and sub-surface flows could cause disturbances to hydrology and contribute to flooding.

5.5.2 Integrated Water Management

An Integrated Water Management report has been prepared to review the existing stormwater drainage network and provide conceptual diversion requirements as well as advice for on-site management of rainwater and groundwater during the early works phases of the project. The report also provides details of any water quality management measures and on-site treatment, reuse and detention facilities and the nominated discharge points.

The existing drainage infrastructure consists of four 525 – 600mm pipes that were installed to convey stormwater from Hickson Road on the east to discharge through outfalls to the harbour to the west. Three of the pipes were diverted and partially removed with the Barangaroo Metro Station construction and One Sydney Harbour development works. One pipe remains active through the site and will need to be diverted around the basement as part of the enabling works.

A temporary 600mm diversion is proposed to intercept the active pipe at the eastern boundary and divert stormwater around the basement and tie back into the existing stormwater line at the southwest of the site. The diversion will remain active until the new drainage planned as part of the Hickson Road upgrade works are complete and when the existing drainage line will be permanently connected to a new trunk drainage system to the south of the development.

5.5.3 Mitigation Measures and Controls

The Integrated Water Management report also provides general advice on implementation of soil erosion and sediment controls in line with the general principles for management of stormwater and soil erosion taken from the NSW Government published guidelines: *Managing Urban Stormwater: Soils and construction - Volume 1*, commonly known as the “Blue Book”. These will apply to all phases of the project and progressive Erosion and Sediment Control (ERSED) Plans will be produced throughout the works with specific diagrams and control measures listed. Some of the general principles that will be employed during the early works include:

- Clean water will be diverted around disturbed site areas, stockpiles and contaminated areas.
- Control measures will be installed downstream of works, stockpiles and other disturbed areas.
- Disturbed areas and exposed surfaces will be minimised as far as is practical and stabilised as soon as feasible on completion of the various work phases.
- Suitable stabilised driveways and truck wash or shaker grids will be installed as appropriate at site access points and vehicles leaving the site will secure and cover their loads.

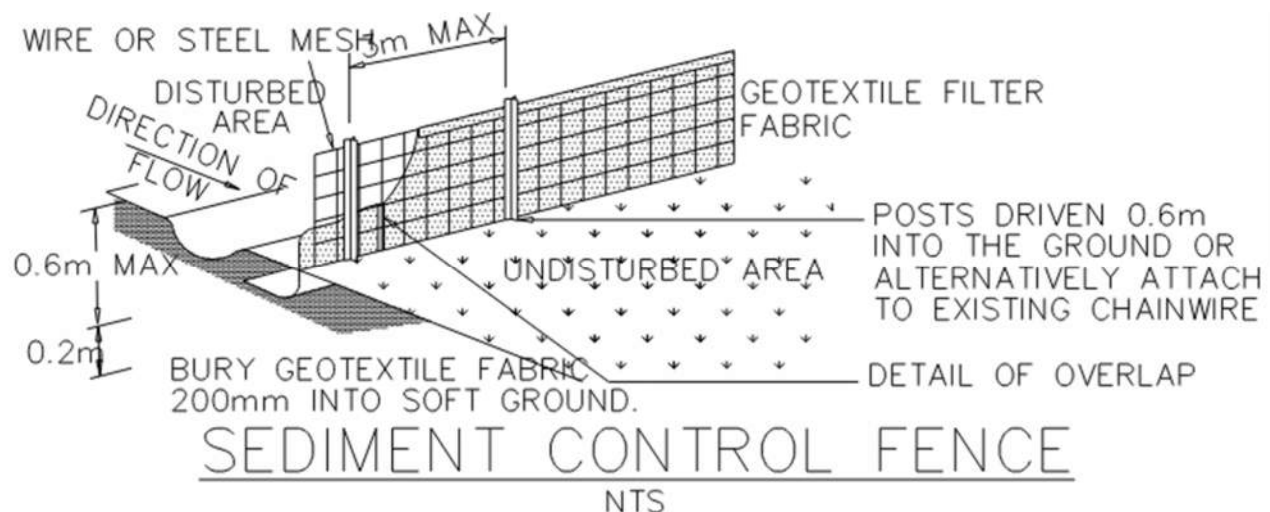
- All roads and pedestrian footways surrounding the site will be regularly swept to remove any debris arising from the works on the site.
- Dangerous Goods and Hazmat will be stored within bunded containments with 110% capacity of the maximum single storage volume.
- Spill kits will be provided at the spoil treatment areas, water treatment plant and other storage areas.

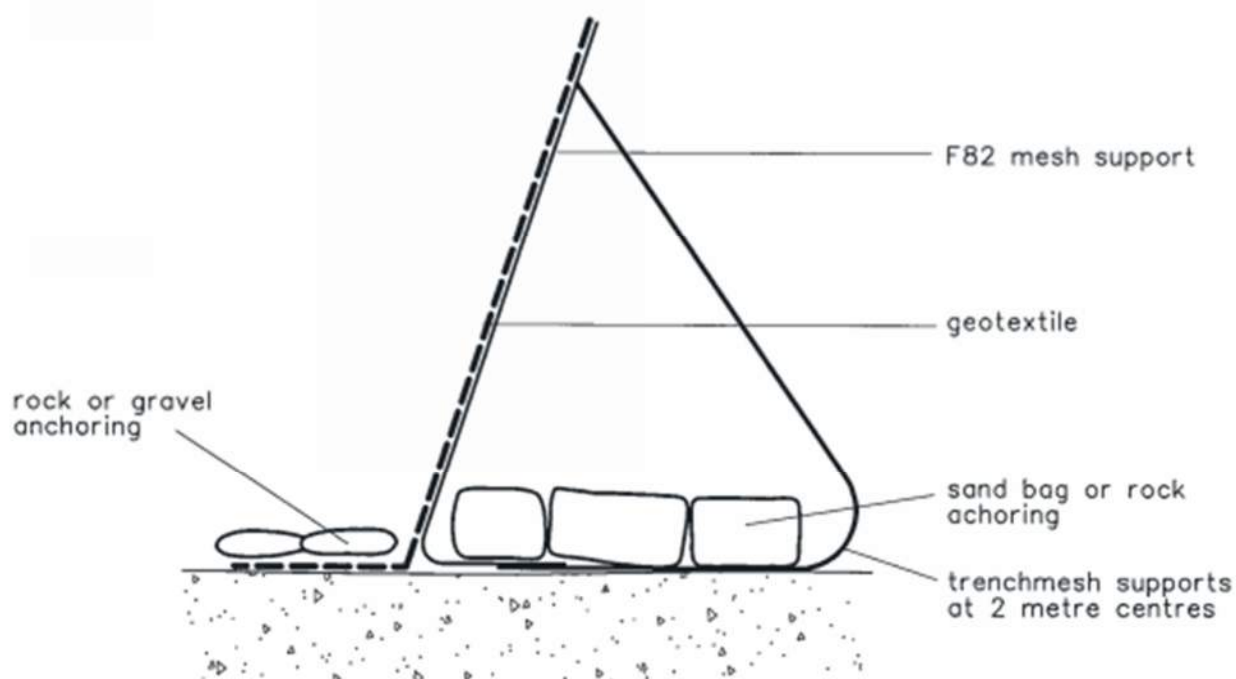
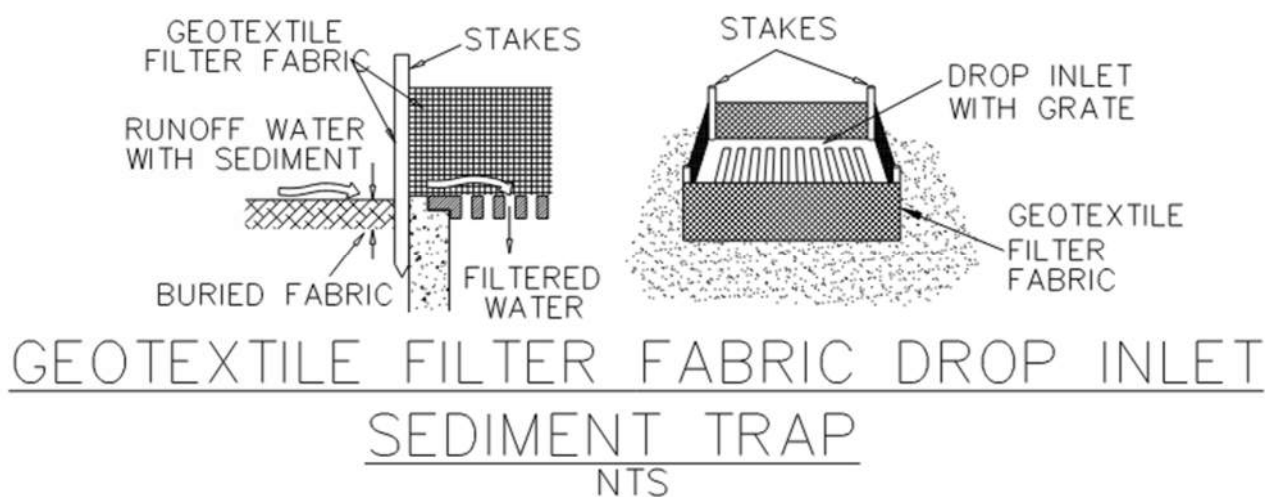
During the archaeological investigation phases, cut-off bunds will be formed around the test pits to divert clean water away from the excavations. Due to the high permeability of the shallow soils and the relatively high tidal influenced groundwater table, it is expected that any rainwater that is collected in the pits will naturally dissipate away via sumps at the base of the excavations. Excavated spoil will be temporarily stockpiled in nearby bunded storage areas and reused to backfill the test pits on completion. Stockpiles will be covered and bunded to avoid erosion, and any limited run-off will be contained with silt sausages or similar sediment control.

During the PRW phase, excavated material will be processed in designated spoil handling area to be made suitable for off-site transport and disposal. Bentonite will be separated from the spoil and recycled for reuse, and free water will be removed from the spoil and treated in a Water Treatment Plant where sediments and other potential contaminants are removed. The spoil handling and treatment areas will be bunded to avoid erosion and cross-contamination of separate spoil types. Stockpiles will be watered to suppress dust in hot windy weather and covered when not in use. Sediment controls will also be placed downstream of the spoil management area.

During the bulk excavation phase, groundwater and rainwater will be directed to and collected in sumps and also pumped to the Water Treatment Plant. Treated water will either be reused for dust suppression on site or tested for compliance and approval before being discharged into the stormwater system.

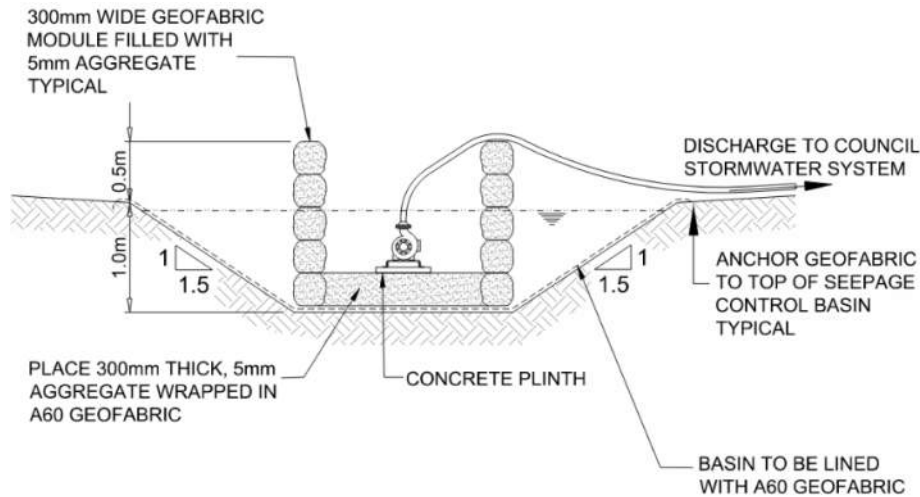
In specific locations around the site where there is a risk that rainwater flows could contribute to water and soil runoff outside the construction boundary, or via stormwater inlet pits, sediment control measures will be installed to mitigate any potential contaminants or other materials entering external waterways. Examples of typical sediment controls from the 'Blue Book' are shown below.





The proposed Civil & Stormwater design provides a conceptual arrangement of the temporary stormwater diversion pipe as well as the temporary sump and pump arrangement to manage the ingress of stormwater and groundwater during the bulk excavation phase. The water collected in the excavation will be drained to sumps and pumped to the water treatment plant before discharge via the new stormwater diversion line.

A typical sump and pump arrangement would be similar to the below:



5.5.4 Dewatering and Water Treatment

Groundwater and Stormwater collected during bulk excavation will likely need to be treated to remove contaminants and suspended solids before approval can be obtained for discharging into the local stormwater drainage system. Further groundwater sampling and testing will be carried out to identify the pollutants present and to determine the most efficient treatment required. This may be one or a combination of processes such as filtration, clarification or chemical treatment. Treated water is also tested to verify environmental compliance and operational efficiency. All sampling and testing will be performed in consultation with the Environmental Consultant.

5.5.5 Flooding Assessment

A flood assessment has been conducted by GRC Hydro to review the potential construction impacts on flood levels during the proposed works. The analysis considers the existing site and the surrounding areas and incorporates the proposed stormwater diversion pipe. The study identified that there are no adverse impacts to the surrounding areas during a 1% AEP storm event. During a Probable Maximum Flood (PMF) event, the impact is between 10 and 44mm for a limited area of Hickson Rd near the southern end of the site and is considered a minor impact in the context of the improbability of PMF occurrence. Further detailed flooding assessments will be carried out during development of the design.

5.6 Excavation and Spoil Management

This section outlines the procedures for handling and management of all spoil material, and to mitigate environmental impacts related to the bulk excavation phase of the project. In line with the NSW Waste Avoidance and Recovery Strategy to minimise waste disposal, the primary objective of spoil management is to seek opportunities to reuse materials on site and recycle or divert excess waste to minimise landfill. In instances where material is designated for offsite reuse or disposal, in-situ waste classification will be utilised as often as practicable to help minimise the need for stockpiling of materials.

All excavation works will be carried out in close consultation with the Environmental Consultant and the Site Auditor to ensure that any contaminated spoil is identified, classified, handled, tracked, transported and disposed in accordance with all health, safety and regulatory requirements, and the development land is made suitable for its intended use.

5.6.1 Contamination

Results of various Environmental Site Assessment reports show evidence, past and present, of contamination on the site. The southern portion of the Central Barangaroo site and part of the adjoining South Barangaroo site previously contained a manufactured coal gasworks and was declared by the NSW EPA as a Remediation Site. A Remedial Action Plan (RAP) for the area was prepared by JBS Environmental and subsequent remediation was carried out during the development of the South Barangaroo sites. The Declaration was lifted by the EPA in 2020, however the RAP noted that additional remediation may be required for further development for residential usage. A Section B Site Audit reviewing the JBS RAP identified the following documents to be prepared and reviewed by the Auditor prior to the commencement of remediation and development works:

- A revised Remedial Works Plan (RWP) to confirm the sequence of proposed remediation and validation tasks.
- Materials Compliance Management Plan (MCMP)
- Validation Sampling and Analysis Quality Plan (VSAQP)
- Asbestos Management Plan (AMP)
- Acid Sulphate Soil Management Plan (ASSMP)

This required documentation has been prepared by EDP for EWDA-02 in the form of an overarching RWP which includes MCMP and VSAQP elements. The AMP and ASSMP are included as appendices to the RWP. The Site Auditor has assessed the RWP and the associated documents by comparison with the JBS RAP and found the documents adequately addressed the required information. Furthermore, the Site Auditor has stated that the proposed remediation works are practical and appropriate for the contamination identified with consideration of the proposed development, and subject to successful validation, should ensure that the site is suitable for the proposed land use. The EWDA-02 RWP is appended to this document.

5.6.2 Waste Classification

EDP completed a site-wide in-situ waste classification assessment in 2023, which included 81 sampling boreholes within the proposed basement footprint and 23 sampling boreholes outside the proposed footprint. Additionally, eight test pits were advanced systematically at the site to provide sufficient soil sample volumes for field screening for asbestos in accordance with NEPM (2013). Based on the visual assessment and analytical results, the bulk of the in-situ fill materials were pre-classified as Special Waste (Asbestos). Chemical classification of the in-situ soils fell under three types: General Solid Waste (GSW), Restricted Solid Waste (RSW) and Hazardous Waste (HW).

A subsequent in-situ VENM assessment was carried out in 2024 which targeted the Declaration Area where VENM fill had been placed. The assessment concluded that there was an estimated volume of approximately 4,500m³ placed in the area meeting the definition of VENM.

Quantities of natural soils will be encountered at depths below the fill along the eastern side of the site which comprise residual soils, Acid Sulphate Soils (ASS) or Potential Acid Sulphate Soils (PASS) and sandstone bedrock (VENM).

Materials that do not have an in-situ pre-classification or that visually differ, are to be stockpiled onsite with suitable environmental controls to allow ex-situ sampling, analysis and subsequent classification by the Environmental Consultant in accordance with the NSW EPA Waste Classification Guidelines (2014).

5.6.3 Site Remediation

The extent of remediation is limited to the in-situ materials proposed for removal during basement wall construction, piling and bulk excavation or earthwork activities associated with approved works. The extent of remediation will only be to the limit of the development design, including the base of service trenches and pits. No chase out of any contamination impact beyond the limit of the works (including tar impacted soils or otherwise) as part of this RWP is envisaged.

During excavation for the PRW, bentonite slurry will be utilised to prevent collapse of the trench walls prior to casting concrete. A bentonite slurry plant will be installed to recycle and reuse the bentonite, and as part of this process a dewatered solid waste spoil will be generated. The spoil will require classification for off-site disposal in accordance with the MCMP.

For bulk excavation, the in-situ waste classification report provided a grid of waste classification cells that will allow excavation to advance in 1m vertical layers, and depending on the nature of the materials, stockpiling and/or treatment of similar materials in pre-determined locations. This will enable effective tracking and separation of different material types to ensure materials are not cross-contaminated and are treated or disposed of according to their waste classification.

During the excavation works, an inspection process will observe the nature of the excavated materials for evidence of gross contamination or material that may differ from the in-situ classification. Where required, additional ex-situ waste classification will be carried out during excavation to assist in in-situ classification verifications and waste segregation and reuse or disposal requirements.

Several remedial options have been considered in the RAP however given the nature of contamination, the fill material is generally considered unsuitable for re-use without remediation or management. Notwithstanding, and while the works involves bulk excavation and off-site disposal for a future basement construction, there is still some opportunity for potential over-excavation beneath the current planned slab for isolation and containment of more contaminated materials. This will require an addendum to the RWP will and further details of a burial / borrow pit would be required. Furthermore, a review of the applicability of the current HHRA and a revised HHRA will likely be required for further assessment and to confirm acceptable risks associated with this option.

5.6.4 Validation

The Materials Compliance Management System (MCMS) prepared as part of the RWP provides a process for inspections, stockpile testing, material tracking, material handling, imported material validation and procedures for dealing with non-conformances. At the completion of the works a Site Remediation and Validation Report (SRVR) will be prepared in accordance with the NSW EPA Consultants Reporting on Contaminated Land guidelines (EPA 2020) and with other relevant guidelines endorsed by NSW EPA. The Validation report will be of sufficient reliability to allow the Site Auditor to complete the Site Audit Statement.

The validation report shall include:

- Details of the remediation works conducted
- Information demonstrating that the objectives of the RWP have been achieved, and the results of the data have been assessed against the remediation criteria
- Any variations to the strategy undertaken during the remedial works
- Details on volumes of materials removed
- A photographic record of the works
- Details on waste classification, tracking and off-site disposal
- Results of environmental monitoring undertaken during the remedial works
- Details of any environmental incidents occurring during the remedial works and the actions undertaken in response to these incidents
- Verification of regulatory compliance
- Detail of imported materials
- Documentation of visual inspections
- Details on the reinstatement works undertaken
- Validation of compliance with CEMP
- Results of groundwater monitoring
- Recommendations regarding the need for a LTEMP

- Comment on the site's compliance with the RAP/SAR and the RAP objectives
- Reporting on waste management
- Recommendations on the requirements for future groundwater monitoring, or additional soil validation sampling.

5.6.5 Unexpected Finds

As unforeseen sub-surface conditions impose a degree of uncertainty for the remediation works, potential risks and/or unexpected issues or events have been identified as follows:

- Unexpected finds, including extensive liquid chemical contamination
- Variation of contaminant characteristics or identification of unanticipated contaminants and materials
- Generation of unacceptable levels of dust
- Release of unacceptable levels of volatile gases during the excavation works
- Generation of unacceptable odours from the excavation works

An Unexpected Finds Procedure will be implemented to manage these issues and is contained in the RWP. Training in this procedure will be provided to all workforce and staff involved in excavation.

5.6.6 Standard Mitigation Measures and Controls

General mitigation measures to control the environmental impacts of excavation and transport of waste will be as follows:

- The reuse and recycling of materials generated on the project, where practicable and appropriate, will be prioritised over disposal at landfill facilities.
- Waste and spoil will be transported by reputable transport companies and where required will be suitably licenced for transporting certain types of waste material.
- Excavation spoil haulage vehicles will be fitted with GPS tracking systems, and the locations of all vehicles will be monitored in real time. GPS records will be made available to the environmental consultant and the site auditor as required.
- 100% of Project spoil will be tracked using a waste tracking register
- Spoil transport will be completed via approved haul routes only. The use of approved haul routes will be included in haulage contractor subcontracts and compliance with these requirements will be monitored through the GPS tracking system.
- Contaminated stockpiles will be managed to minimise the dispersion of contaminated material, through:
 - Bunding of contaminated stockpile areas to prevent dispersion into waterways
 - Covering stockpiles to minimise dust dispersion from wind
 - Uncovered stockpiles must be kept moist to avoid migration by dust
 - Stockpiles will be located away from environmentally sensitive receivers

5.7 Heritage, Archaeological and Cultural Management

5.7.1 Impact Assessments

Various Heritage, Archaeological and Cultural assessments have been carried out to determine and address any potential impacts of the development and include management procedures to be implemented during the works to avoid or minimise those impacts. The reports that have been prepared are listed below:

Heritage Impact Statement (HIS)

The HIS states that the Central Barangaroo site is not identified as a site that contains heritage significance under any statutory legislation, however is located adjacent to the NSW State heritage curtilage of the Millers Point & Dawes Point Village Precinct and in the vicinity of a number of other local heritage items including the High Street Terrace Duplexes, the Lance Kindergarten and the High St Palisade Fence and High Steps.

This report concludes that the proposed early works will not result in any adverse impacts as the works are within or beneath the ground plane and therefore considered acceptable from a heritage perspective.

Aboriginal Cultural Heritage Assessment (ACHA)

The ACHA aims to investigate whether future development of the subject area is likely to impact any Aboriginal objects or Aboriginal places that may exist within the subject area and provide measures to mitigate such impacts.

The report states that prior to reclamation in the 19th and 20th centuries the entire subject area was located beyond the high-water mark of Darling Harbour and is therefore not associated with any landscape features that are indicative of past Aboriginal land use and concludes that the Aboriginal archaeological potential of the site is assessed to be Very Low. Furthermore, the report states that as there are no known Aboriginal objects, places or cultural associations within the subject area, and it is unlikely that any objects are retained anywhere within the subject area, the proposed physical works are unlikely to cause either direct or indirect harm to Aboriginal objects or negatively impact inter-generational equity.

The report recommends that an Unexpected Archaeological Finds procedure and a Human Remains Procedure should be followed in the unlikely event that any archaeological materials, or suspected archaeological materials, or suspected human remains are uncovered during any works.

Historical Archaeological Assessment (HAA) and Maritime Archaeological Assessment (MAA)

The HAA and MAA have been prepared to investigate the likelihood that the proposed works would impact any historical archaeological and/or maritime resources within the subject area and concluded that there is moderate potential for the subject area to retain relics dating to the historic development phases which may have Local heritage significance. This includes physical evidence such as seawalls, retaining walls and reclamation fills, structural remains of jetties, shipwrecks, wharf frontages and paved surfaces, or buildings and other structures associated with ship building operations, and the historic AGL gasworks.

The reports recommend that an Archaeological Research Design and Methodology (ARDM) and a separate Maritime Archaeological Research Design and Methodology (MARDM) should be prepared in accordance with the NSW Heritage Council's guidelines that outlines an archaeological monitoring and excavation program to investigate the nature, extent and significance of this potential archaeological resource. The investigation works will be directed by experienced Heritage Consultants and will occur prior to commencement of the proposed development works to mitigate the potential for harm to archaeological resources.

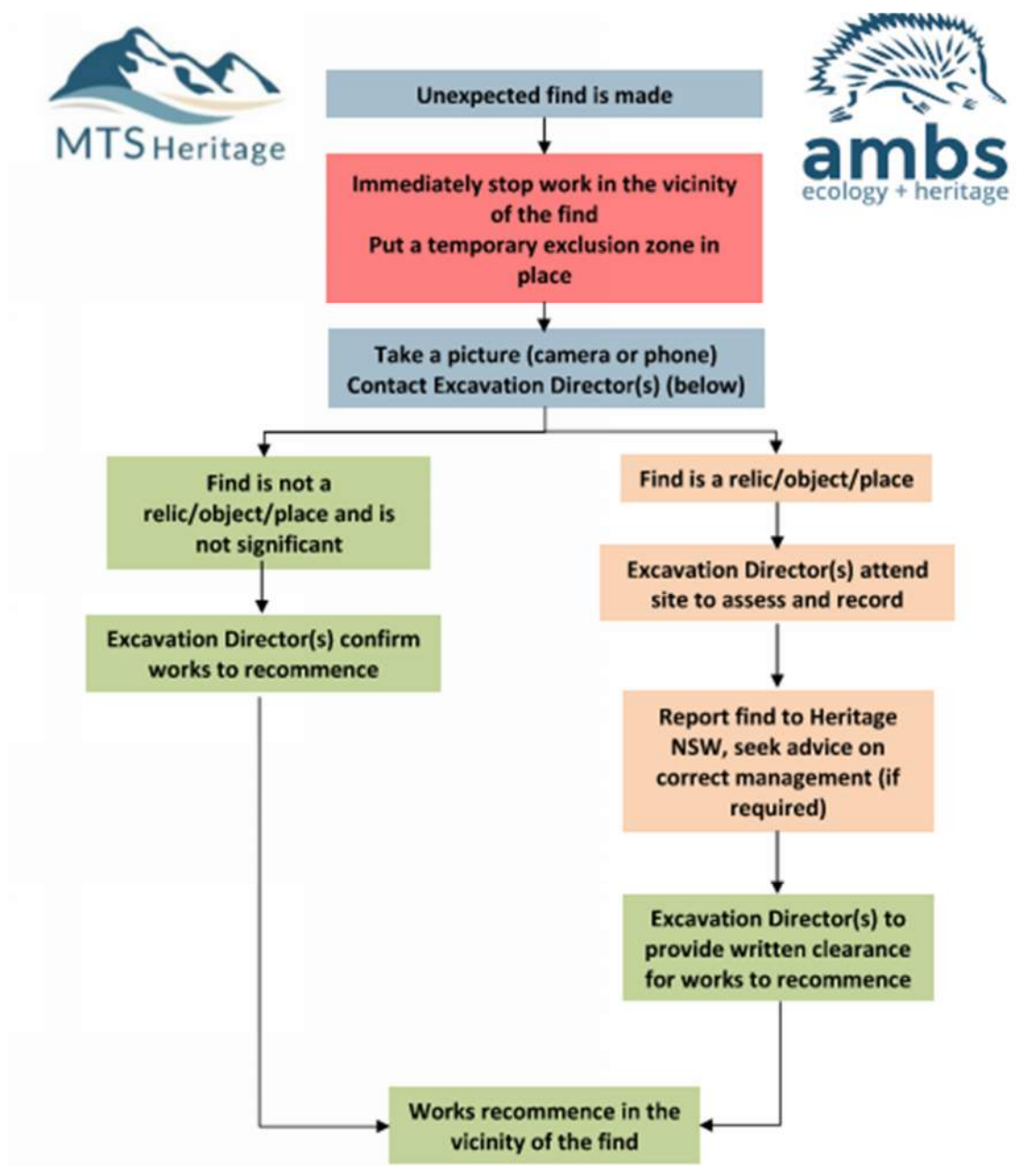
5.7.2 Unexpected Finds

An 'unexpected find' can be defined as any of the following:

- Any unanticipated discovery of an Aboriginal object or site, or non-Aboriginal archaeological work or relic, that is not covered under an existing management process or plan
- A find that has not been identified, assessed or referenced in the 2025 ARDM or MARDM
- A find that is not covered by the current SSD approval
- Human skeletal remains
- A shipwreck and/or articles associated with a shipwreck.

If any Aboriginal objects, places or non-Aboriginal heritage items are uncovered during the project works outside of the planned archaeological investigations, an Unexpected Finds Procedure be implemented. The procedure generally involves ceasing works in the vicinity, protecting the area and consulting with the nominated archaeologist to assess the find, and provide advice. Where the unexpected find is a historical work or relic, work cannot resume until written approval has been provided by the archaeologist. Where the unexpected find is an Aboriginal object, works cannot resume until written approval has been provided by Heritage NSW.

A detailed procedure for management of Unexpected Finds is contained in Appendix G of this document and summarised in the flowchart below.



6. CONSTRUCTION COMMUNICATIONS

Consultation will be ongoing with the local community and adjacent landowners and key stakeholders and will be undertaken in accordance with the Community Communication Strategy (CCS), dated 6 February 2026 and approved by the Secretary.

The objective of the consultation is to outline all major activities, operations and environmental performance of the project which may affect their amenity.

Specific stakeholder engagement will continue with Council and the relevant government departments and agencies as part of satisfaction of conditions of consent including the following:

- Infrastructure NSW
- City of Sydney
- Heritage NSW
- Sydney Metro
- Transport for NSW
- Ausgrid
- Sydney Water Corporation

It is anticipated that the key stakeholder concerns will include but are not limited to:

- Proposed construction period and length of time
- Likely impacts to local businesses and residents
- Traffic and transport impacts to local road network, notably Hickson Road
- Pedestrian impacts to and from the precinct and public transport options
- Proposed hours of construction work and potential out-of-hours work
- Notification of any high impact activities
- Possible respite periods and applicable activities
- Remediation concerns
- Odour, dust, noise and vibration mitigation measures

Communication Methods and Tools

As set out in the CCS multiple methods and tools will be utilised to communicate including but not limited to the following:

Tool	Description	Timeframe
Project Dedicated Hotline and Email	A 1800 hotline (1800 726 707) and email address (barangaroo@aqualand.com.au) are already in place to provide direct contact points for enquiries, feedback, or complaints. Both channels ensure prompt acknowledgement and response in line with committed timeframes.	Ongoing.
Project Website	The Aqualand Central Barangaroo website serves as the central hub for Project information. A QR code linking directly to the website will be included on all printed materials and site signage to encourage easy digital access to project information and updates.	Ongoing.
Email Subscription	Stakeholders can subscribe to receive email alerts for new content on the Project website.	Ongoing.
Community Updates and Fact Sheets	Regular community updates and fact sheets will be produced to summarise progress, upcoming works, and impact-mitigation measures. These will be distributed via email subscription, letterbox drops to affected areas, and available on the Project website. The materials will be clear, concise, and include QR code link to the Project website.	As required.

Tool	Description	Timeframe
Works Notifications	Works notifications will be distributed to inform local community of current and upcoming work with the potential to impact them. Notifications will be issued for activities such as construction commencement, milestones, large deliveries or traffic impacts, out of hours work et al.	As required.
Targeted Meetings / Briefings and Correspondence	One-on-one or small group meetings/briefings will be offered to a range key stakeholders, such as government agencies and elected officials. These provide opportunities for detailed discussion of specific interests and technical matters.	As required.
Community Forums	Community forums will be held during construction if significant issues arise or multiple stakeholders request the same complex information.	If required.
On-Site Signage and Hoardings	Project signage and hoardings will display information about the Project and include the QR code linking to the website, and the contact phone number. The hoardings will be updated over the life of the Project to reflect current activities.	Ongoing.

Complaints Handling Procedure

Complaints will be managed systematically to ensure fair and efficient resolution:

- A complaint may be submitted via phone, email or in person.
- The dedicated Project hotline (1800 726 707) will be monitored 24/7 by a call centre. During construction hours (7am–6pm Monday to Friday and 7am–5pm on Saturday, excluding public holidays), calls will be logged and shared with the Engagement & Communications Manager.
- Outside these hours, the call centre will advise the Project Director of any emergency (e.g. fire), with other enquiries logged and shared with the Engagement & Communications Manager before the next business day 7am.
- The Project mailbox will be checked daily by the Project Team during weekday business hours (9am–5pm Monday to Friday, excluding public holidays). An automatic response will acknowledge receipt of email enquiries.
- Each complaint will be logged by the Project Team receiver in the Complaints Register (with details to include the date received, complainant contact information (if provided and with consent), and a precise description of the issue.
- An investigation of the complaint will follow, which may involve site inspections, consultation with relevant experts, review of monitoring data, and reference to approved management plans.
- Responses will be prepared and delivered in accordance with the timeframes outlined in the CCS.

The Engagement & Communications Manager will monitor the status of complaints to ensure that they are actioned in a timely manner, and any emerging issues are identified and raised by with the Project Team and added to the Issues Register.

APPENDIX A – DETAILED CONSTRUCTION METHODOLOGY

A.1 Preliminary Site Establishment

The Preliminary Site Establishment scope element includes assessment and adjustment of the existing perimeter hoardings and gates, establishment of the short-term site facilities and services, and installation of the environmental controls required to enable the Archaeological Investigation works only.

Hoardings and Fencing

Subject to an engineering assessment, the existing hoardings and fencing will remain, however if any rectification or adjustments to the hoardings are required, the works will be planned to allow daily reinstatement of manageable sections and to maintain a secure perimeter and safe public access around the site at the end of each day.

Any adjustment to the hoardings will generally follow the below procedure:

- 1) Consult with Place Management NSW and the City of Sydney construction liaison team for any specific hoarding requirements and produce a temporary pedestrian & traffic guidance scheme for approval.
- 2) Set up the required controls such as temporary pedestrian diversion walkways and/or traffic management to delineate the work zone and ensure the public are protected during any works to the hoardings.
- 3) Dismantle any sections of the fencing, hoarding panels and framing requiring replacement with hand tools and stack neatly inside the site
- 4) Adjust/reposition or replace any concrete barriers as necessary with either a forklift or crane truck operating from within the site boundary.
- 5) Install the new framing and hoarding panels in accordance with the engineered design and secure any temporary gaps between sections of the site perimeter with temporary fencing panels.
- 6) Upon completion of the hoarding works remove any temporary pedestrian controls to return the footpaths to normal configuration. Engineering certification of the installation will be obtained.

Statutory signage and wayfinding, warning, or instructional signage fixed to the perimeter fencing will be also reviewed and adjusted as necessary.

Services Investigations and Surveying

Prior to any ground disturbing works commencing, a desktop study of the 'Before You Dig Australia' (BYDA) services drawings, in conjunction with the 'Detailed Survey' drawings will be conducted to determine the presence of any buried services within the vicinity of the proposed archaeological investigation areas, and as required for the site establishment works (e.g. temporary services trenches or holding down anchors). Upon mobilisation to site the following process will be carried out.

- 1) A physical services scan will be carried out to detect any known services either identified during the desktop investigations or during site observations of pits, trenches etc.
- 2) Services will be marked out on the ground with colour-coded paint markings and positively identified by using non-destructive vacuum excavation methods or by hand potholing for shallow services.
- 3) A surveyor will pick up the position and RL of any positively identified services and mark-up the services drawings for future reference.

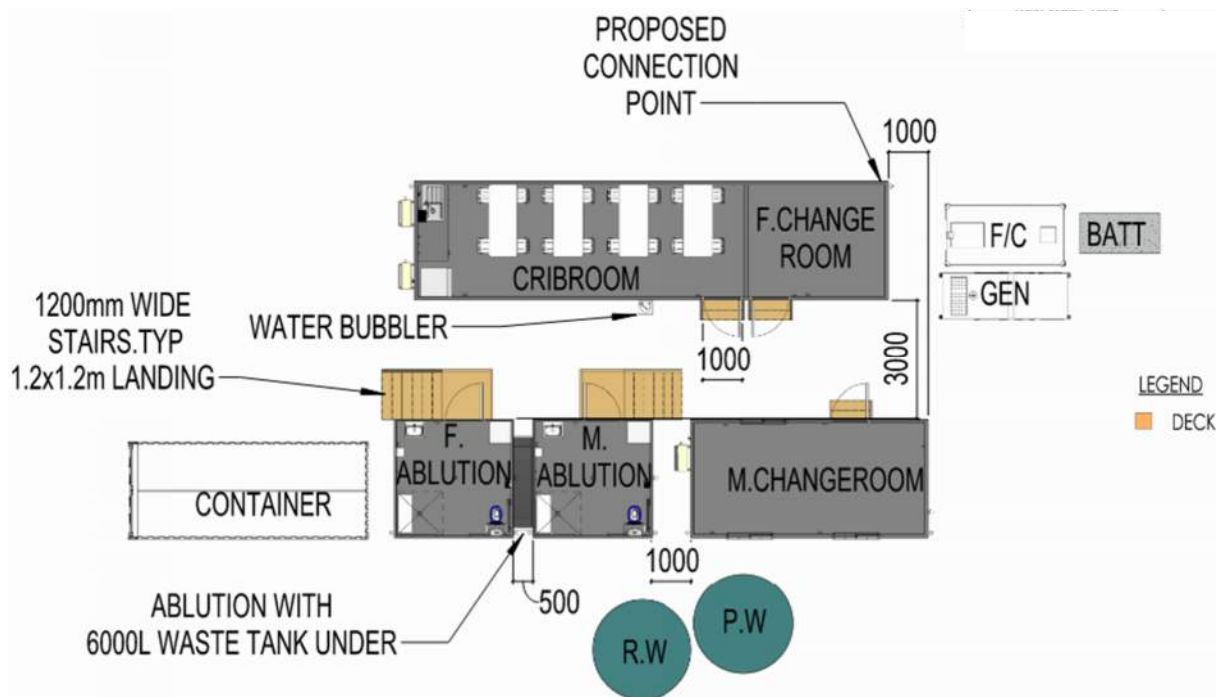
Preliminary Environmental Controls

In accordance with the Construction Soil and Water Management Sub-Plan and in consultation with City of Sydney council, the environmental control measures required for the Early Works will be installed as follows:

- 1) Sediment fencing will be installed for protection around areas where it may be possible for rainwater runoff to transport silt across the down slope boundaries of the site.
- 2) Internal site drainage pits shall be protected by sediment traps consisting of filter bales.
- 3) A suitable wheel wash facility or shaker grid will be installed as required at the vehicle exit point.
- 4) Bunding will be erected around excavations to divert clean rainwater runoff.
- 5) Bunding will be erected around stockpile bays to prevent dirty runoff or cross contamination.
- 6) Geotextile fabric will be placed around vehicle loading areas and replenished as required.
- 7) Dust suppression measures will be applied to stockpiles, internal roads and the wider site areas as required.

Early Works Site Compound

A temporary short-term construction compound will be established on the site and will be delineated from the active construction areas and directly accessible from the on-site parking area. The compound will consist of portable offices, meal rooms, M/F ablutions with showers, waste holding tanks, M/F change rooms, a covered assembly area and equipment storage containers. Refer to the below diagrams for a proposed building layout.



The installation will generally follow the below process:

- 1) Temporary concrete block piers will be installed on a suitable hardstand and levelled with packer shims. Ablutions buildings will be supported on compatible waste holding tanks.
- 2) Access steps and landings will be installed to the buildings, and a covered awning will be erected.
- 3) Potable water services will be connected to any plumbed buildings and wastewater will be plumbed to the waste holding tanks.
- 4) Electrical connections will be made to all buildings via a portable generator and switchboard.

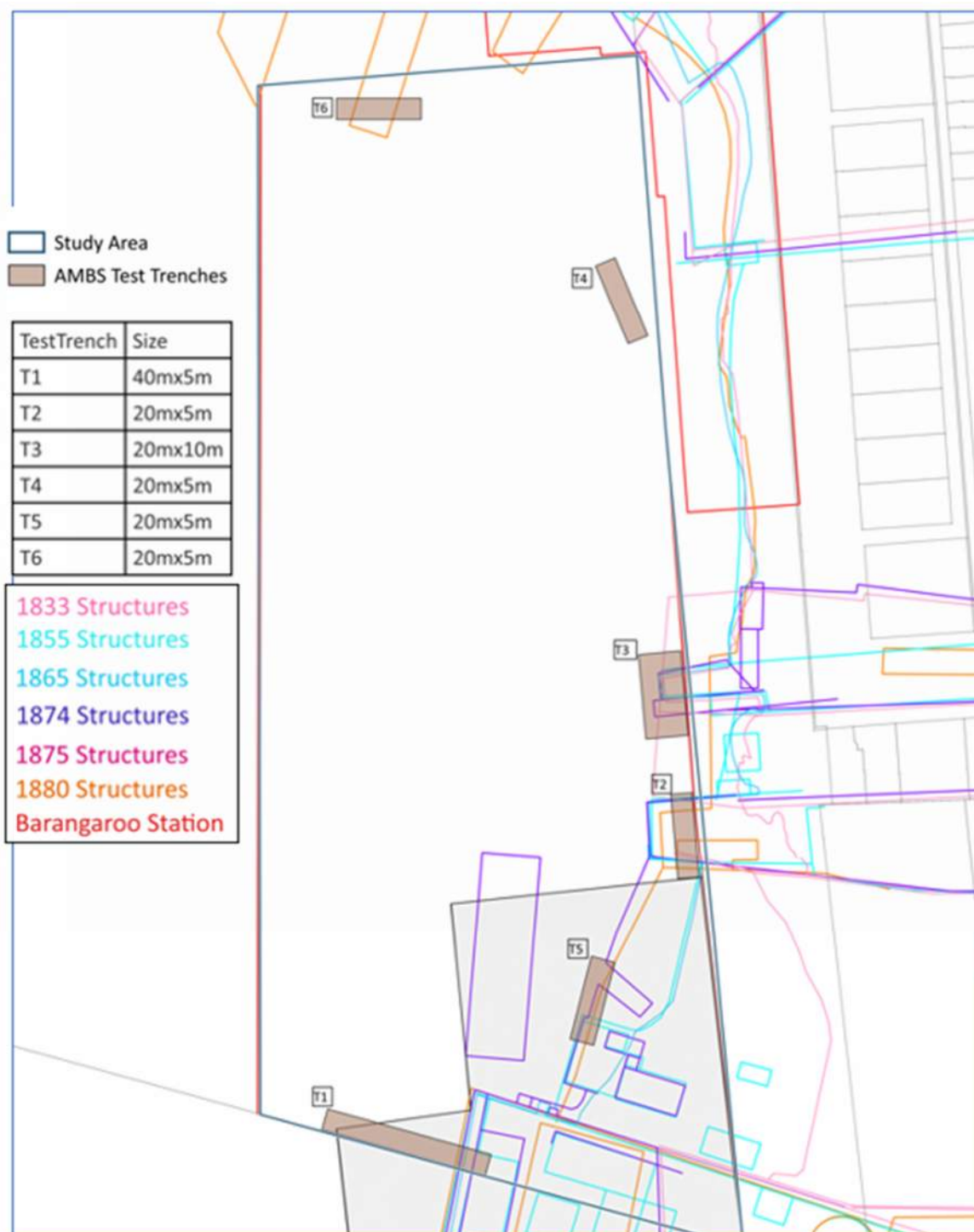
All engineered temporary works and services installations will be inspected and certified by the appropriately qualified personnel.

A.2 Archaeological Investigations

A recent Heritage Archaeological Assessment (HAA) concludes that there is a moderate likelihood that the proposed Central Barangaroo development works will impact potential archaeological resources. The HAA includes 'Areas of Interest' drawings overlaying the site boundaries on potential heritage structures. The archaeological consultant has prepared an Archaeological Research Design Methodology (ARDM) report and proposed that the investigation be carried out in two stages:

- 1) Test Trenching - to confirm the presence (or absence) of potential heritage elements; and
- 2) Salvage Excavation – to expose any elements positively identified in Stage 1 on a wider scale to determine the full extents and document the findings.

The proposed test trenching location diagram is shown below.



Following a field assessment of the findings from the test trench investigations (Stage 1), the Archaeological Consultant will prepare an update to the ARDM report with recommendations for further open area investigation or salvage excavation (Stage 2), or routine ongoing archaeological monitoring during bulk excavation at the site in other areas where historical remains are not predicted to have survived. The revised ARDM report will be submitted to Heritage NSW for review and endorsement prior to the Stage 2 investigation excavations commencing.

Given the proximity to the harbour shoreline and the tidal inflows, it is considered impractical for either stage to excavate below the existing ground water levels. Therefore, excavations depths will not be expected to exceed more than 2.0mbgl.

Based on the geotechnical and environmental site investigations completed, there is evidence of asbestos contamination encountered at one location at 1.0mbgl, and at several other locations below 2.0mbgl. For both Stage 1 and Stage 2 of the investigation works, it is therefore determined that the excavations are to be carried out under the supervision and direction of both the archaeological and environmental consultants and by following the below general excavation methodology:

- 1) Demolish the concrete hardstand over the investigation areas and dispose of at an appropriate recycling facility. Depending on the extent of the concrete pavement to be removed there may be an option to process the concrete by crushing and screening and reusing on site as select backfilling.
- 2) Excavate the clean underlying pavement and subgrade materials to a depth of about 2.0mbgl and stockpile in a designated clean fill area. For any excavation within the known asbestos contamination or where asbestos may be identified, stockpile the contaminated spoil in a separately designated bunded stockpile area under the direction of an Occupational Hygienist and a qualified Asbestos Supervisor with all asbestos controls in place.
- 3) To maintain trench stability the excavations will be battered or benched and safe personnel access/egress will be provided.
- 4) Following the excavation and archaeological survey the test pits will be backfilled with the excavated material and a granular capping layer at the surface.

All excavations and reinstatement works will be executed in accordance with the Remedial Works Plan, the Asbestos Management Plan, and a project-specific Spoil Handling procedure to be prepared by the Environmental Consultant.

A.3 Perimeter Retention Wall Enabling Works

Proof Drilling

Pre-construction proof drilling of boreholes along the proposed PRW alignment will be carried out to verify ground conditions, detect the presence of voids or obstructions and confirm founding strata at and below the proposed wall toe level. This process reduces construction and geotechnical risk prior to commencement of diaphragm wall excavation.

The methodology involves setting out the borehole positions in accordance with approved drawings, checking for in-ground services, establishing exclusion zones, positioning the drilling rig and vertically drill boreholes using rotary auguring or coring techniques to the minimum depths (typically 3-5m) below proposed toe of wall. Drilling rigs are typically truck mounted as shown in the diagram below.

Depending on the material types, it may be necessary to use temporary casing to support soft or wet ground and carry out in-situ testing if specified. Rock cores and other samples may be recovered if necessary to measure various material properties. Once boreholes are complete and the required information is obtained, they will be backfilled with recovered spoil and sealed with concrete at the surface.

Removal of Buried Obstructions

Prior to construction of the PRW, and if reasonably practical to do so, it may be necessary to remove any buried obstructions that may have been detected during the proof drilling works and that would impede PRW construction. This may include relatively shallow concrete or steel obstructions or other buried man-made debris.

This will include the existing shoring wall structure that was constructed to facilitate remediation of the site in 2017. The shoring structure consists of a jet-grout wall with intermittent steel micro-piles and a reinforced concrete capping beam (approx. 600mm Wide x 500mm Deep) along its length. Ground anchors were installed to restrain the top of the wall however these were destressed when the structure was backfilled. To remove the obstruction, the capping beam will firstly be demolished using a hydraulic breaker on a small excavator and the piling contractor will core around the full depth of the micropiles to extract the cores with the piles before reinstating the holes with sand or similar. The permanent piles will be drilled and installed through any remaining jet-grouted matrix.

There is also evidence that tower crane foundations may still remain from construction of the Barangaroo Metro Station. Investigations will determine if these obstruct the construction of the PRW or can be removed during bulk excavation.

Stormwater Diversion

The site is currently traversed by one active stormwater drainage pipe (~600mm dia.) connected to a number of drainage pits in Hickson Rd. To enable construction of the PRW, the drainage pipe will be diverted around the basement to the southern part of the site and reconnected to the existing drainage that discharges to the harbour. Approval for stormwater diversion in Hickson Road will be undertaken subject to City of Sydney's approval.

Detailed design is currently being undertaken however the method for constructing the stormwater diversion will generally follow the below process:

1. Construction will proceed in stages between pit locations commencing from the downstream end. The pit and pipe alignments will be set out by a surveyor, and any concrete or asphalt surfacing will be saw cut and removed.
2. Trenches will be excavated using appropriately sized excavators and spoil removed to temporary onsite stockpiles in a suitable location under the direction of an environmental consultant.
3. Trench stability will be maintained by benching or through use of engineered shoring boxes.
4. Precast junction pits will be installed as required, and pipes will be laid between pits on a bedding of drainage aggregate. Trenches will be backfilled with select material in the overlay zone, and clean fill in the upper layers.
5. Connections will only be completed to the existing pipe during suitable weather with the downstream connection being made prior to the upstream connection.

Working Platform

In preparation for construction of the basement Perimeter Retention Wall, it will be necessary to provide a suitable working platform to support the piling and diaphragm wall construction machinery including piling rigs, trench cutters, hydraulic grabs and crawler cranes, as well as other equipment including bentonite slurry mixing and storage tanks, pumps and laydown areas for reinforcement cages.

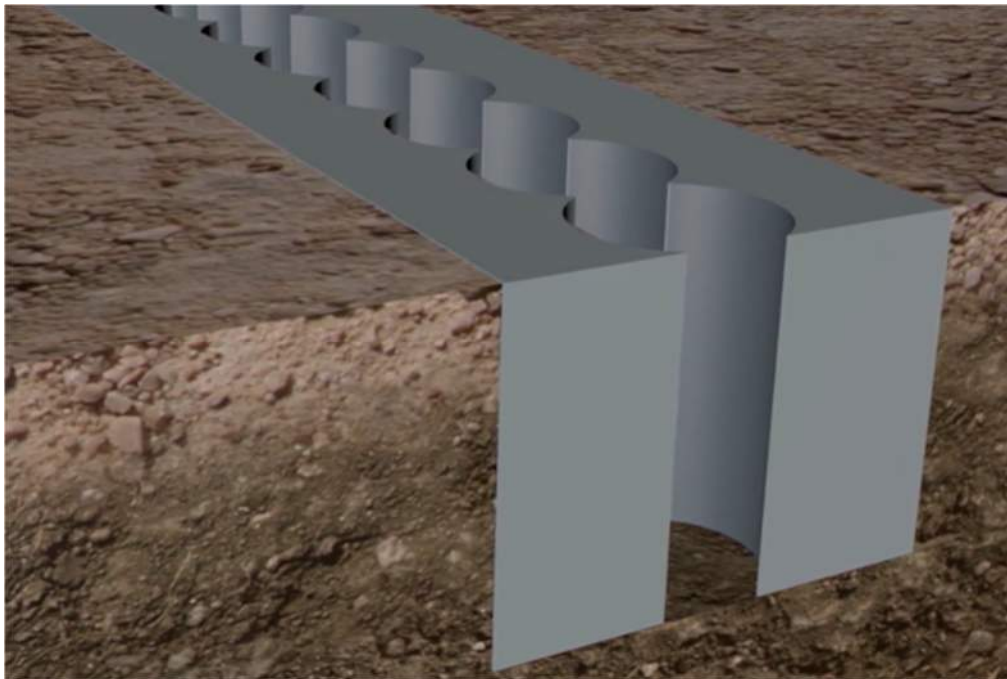
To inform the Temporary Works design, the consultant will carry out an assessment of the existing hardstand undisturbed during the archaeological investigations. The assessment will determine whether the existing hardstand will support the construction machinery or provide details to increase performance.

The Temporary Works engineer will also provide a specification for backfilling the excavated areas and a design for a suitable working platform in the upper zones. It is expected that a drainage or bridging layer will be required at the base of the excavations, followed by a geotextile fabric layer, placement of granular backfill and geogrid layers, and heavily bound basecourse materials at the surface.

Construction of Guide Walls

Following setting out of wall centreline, shallow trenches will be excavated to receive the guide walls. The base of the trench will be compacted and a layer of blinding concrete placed to support formwork. The formwork will be installed on both sides of the wall and appropriately braced. Set out position and verticality will be checked by a surveyor and marks placed for panel widths or pile centres as applicable. Void formers will be installed for secant piled walls.

Reinforcement will be placed according to the temporary works design and secured. Pre-pour checks will be carried out, and concrete will be placed using a boom pump or directly from the chute where truck access is suitable. Following curing, formwork will be carefully removed, and excavations backfilled before final inspections and handover is completed.



Establishment of Bentonite Plant

The bentonite plant will be positioned inside the PRW to optimise pumping distances to all parts of the D-wall. The plant will require level, bundled concrete slabs to be designed and constructed to support the large tanks and silos and manage any spills and washout. Suitable hardstand areas are constructed around the plant slabs for access for bentonite delivery and waste removal trucks. Key components of the bentonite plant include:

- silos for storing raw bentonite powder
- high-shear bentonite mixers to hydrate the bentonite with water
- agitated storage tanks to hold freshly mixed and recycled slurry
- de-sanding units to clean the excavated sludge returned from the trench by separating suspended soil particles from the bentonite slurry.
- Slurry pumps and pipework for circulating fluids between the plant and the trench.

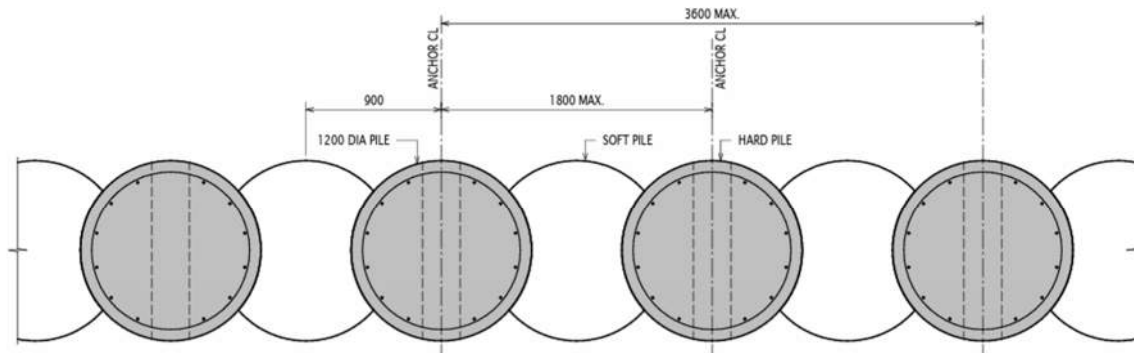
A.4 Perimeter Retention Wall System

Secant Piled Wall

Following installation of the guide wall outlined above, the secant pile walls are constructed by drilling a line of intersecting concrete piles with watertight secant joints between the piles to form a continuous, rigid retaining wall structure. The process will generally be as follows:

1. Steel segmental casing is drilled into the ground to achieve stability of the bored hole and ensure construction tolerances
2. Primary pile holes are drilled using an auger attachment and spaced apart to allow for alternate secondary holes to be placed between. Segmental casing is installed in soft or water charged ground to ensure pile hole stability and construction tolerances. Excavated material is moved to a local stockpile for sorting and disposal off site.
3. Pile holes are advanced to reach the required rock socket depth and cleaned out of loose material.
4. Lower strength concrete is poured via tremie pipe into the bored holes to form unreinforced 'soft' piles.
5. The casings are removed when concrete has cured and the auger is used to remove the soil between the primary piles to form a secondary borehole that overlaps the primary soft piles.

6. Steel reinforcement cages are lowered into the boreholes with a crane and concrete is poured into the boreholes via a tremie pipe to form the secondary 'hard' piles.
7. Steps 1-6 are repeated along the length of the secant piled wall.



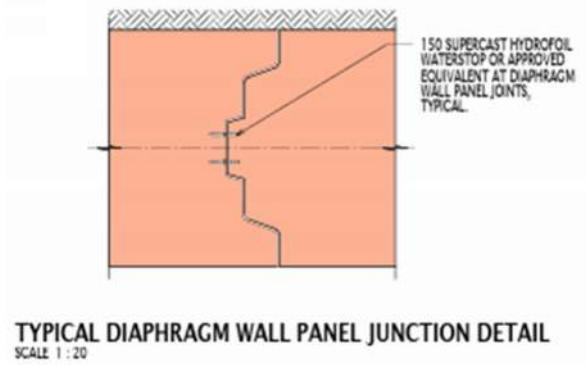
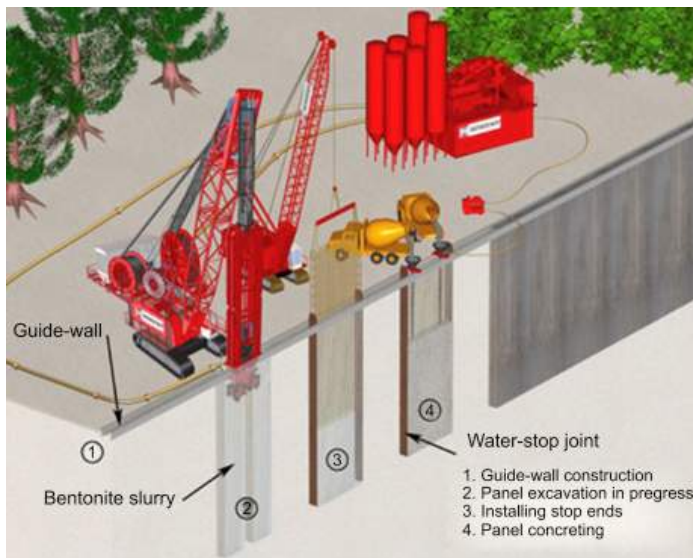
TYPICAL SECANT PILE WALL DETAIL



Diaphragm Wall (D-Wall)

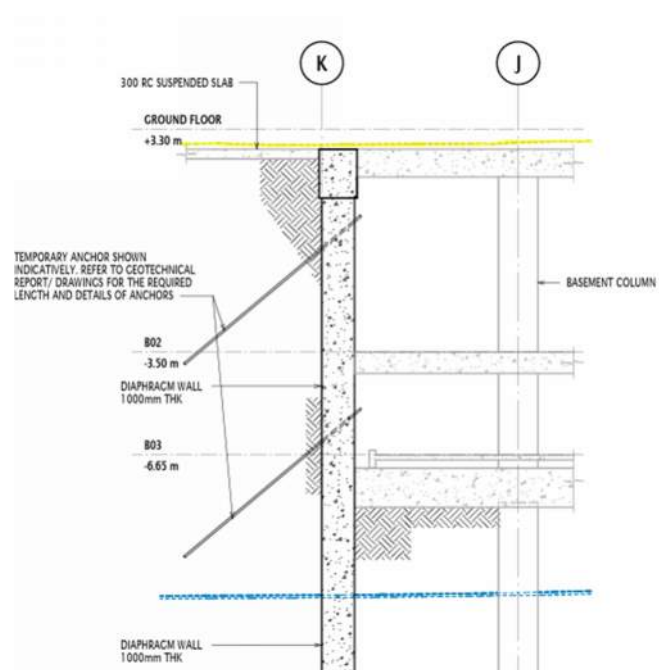
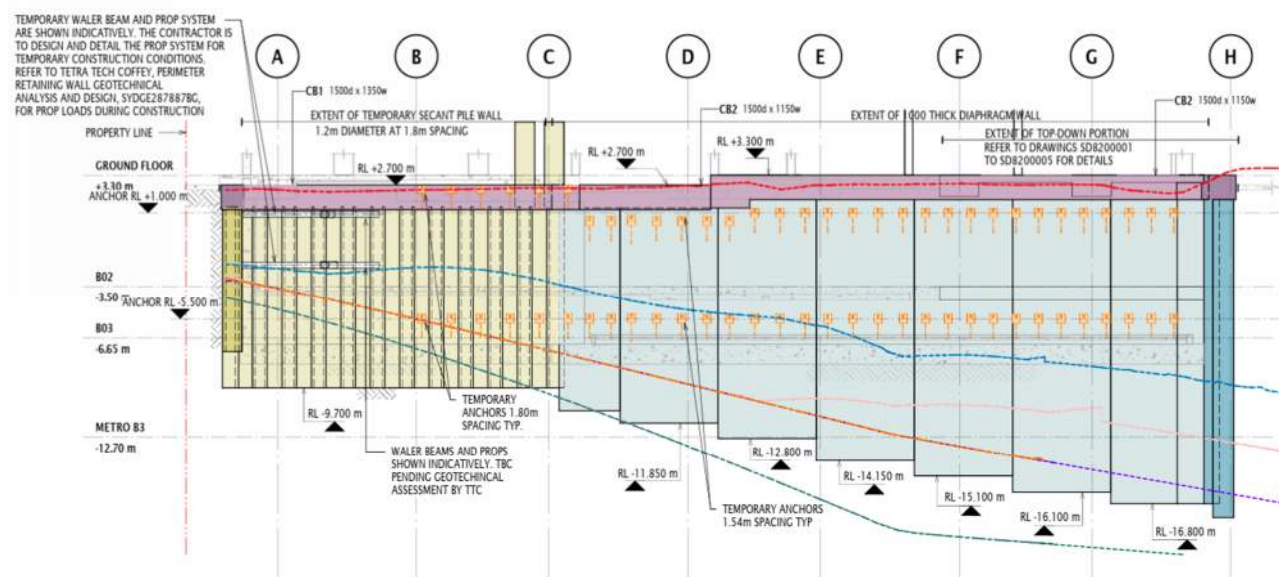
The diaphragm wall (D-wall) is a 1m thick rigid reinforced concrete structure constructed in the ground and made up of a series of interlocking panels to form a single continuous wall. The construction sequence can be summarised as follows:

1. Following construction of a guide wall, rectangular panels approx. 6m wide are excavated through the softer soils with rope-suspended mechanical or hydraulically operated grabs, and hydromill trench cutters may be adopted when hard rock is encountered. As the trench is excavated, a viscous bentonite slurry is continuously circulated that exerts pressure on the trench walls to maintain stability and keep groundwater from entering the excavation.
2. Once the trench reaches full depth, a prefabricated steel reinforcement cage is lowered into the excavation and stop ends are installed to form watertight interlocking joints between adjacent panels.
3. Concrete is placed using tremie pipes installed through the reinforcement cages from bottom to top and displaces the bentonite slurry upwards as the concrete rises.
4. The slurry is collected and pumped to the bentonite recycling plant where it is cleaned to separate solid contaminants and tested for compliance before storage for reuse.
5. Spent slurry that is non-recyclable is transported by specialised carriers for disposal at an appropriately licenced waste facility.



Ground Anchors

A key element of the PRW system is the ground anchors that will be installed as excavation progresses to provide temporary lateral support to the secant pile and D-walls during excavation and basement construction. Ground anchors will be installed in one to two rows at defined levels around the PRW. Installation involves drilling a hole, inserting a steel tendon (bar or strand), and filling the hole with high-strength cement grout to create a bond with the soil or rock. The tendon is then tensioned using a hydraulic jack transferring the tensile load via an anchor head to the face of the wall or waler beam. In areas where anchors cannot be used because of structures or services behind the wall, structural steel bracing or propping may be used to provide the necessary support.



When the basement construction is complete to ground level, the floor slabs will support the retaining walls and replace the restraint loads provided by the temporary ground anchors. During the basement construction, the ground anchors will be progressively destressed in accordance with the sequence outlined in the structural design documentation. This is further detailed in the excavation, anchoring and dewatering sequence methodology below.

A.5 Bulk Excavation

Bulk excavation will follow construction of the PRW and capping beam and demolition of the piling platform and hardstand areas. A dewatering and water treatment plant will be established to progressively lower the ground water table during excavation. Excavation will generally advance from North to South, in horizontal layers approximately 1m deep and will be carefully staged to allow for progressive drawdown of groundwater and installation of ground anchors in a specific sequence. Ramps will be created as the depth increases to maintain access for trucks and machinery.

Asbestos impacted soil is present within the site along with other contamination 'hot spots and excavation will be managed in accordance with the Remedial Works Plan. Excavated spoil will be processed and sorted for loading out and transported in truck & dog trailer vehicles to appropriately licenced waste facilities according to the Waste Classification of the various material types. Details of the remediation process is contained under the Excavation Management section of this document.

It is expected the upper layers of fill material (0 – 1.5 m depth) should mostly be suitable for trafficability of heavy bulk haulage vehicles where direct access to the excavation face can be achieved. This will allow excavators to dig and load truck and trailers directly and avoid double handling of the materials. Given the assumed high moisture content and softness of the lower soil layers below the groundwater table (>1.5 - 2m depth), it is expected that trafficability for heavy road vehicles will be problematic and therefore tracked dozers (e.g. CAT D9) will be used to dig and push the fill materials to a designated stockpile and loading area. This will be situated adjacent to a stabilised haul road where truck and dog trailers can readily access the site and be loaded with a dedicated excavator (~30T). Haul routes and stockpile/loading areas will be adjusted and relocated as the excavation progresses.

Throughout the excavation process, sufficient cross falls will be maintained during excavation to direct any rainwater or surface water flows to dewatering sumps situated midway across the site.

A row of ground anchors supporting the temporary Sydney Metro piled wall across the new Barangaroo Station southern entrance will be destressed when sufficient depth of excavation is achieved to balance restraint loads.

Excavation, Dewatering and Anchoring Sequence

The bulk excavation will commence at the northern end of the basement and advance in a southerly direction when construction of the PRW capping beam has sufficiently progressed to allow separation of those activities and the respective work crews. To prevent the occurrence of out-of-balance groundwater loads between the east and west walls of the Sydney Metro Barangaroo Station box during dewatering and excavation of the site, a depressurisation system has been installed by Sydney Metro that will equalise the hydrostatic pressure across the station box. It will be critical that the Sydney Metro depressurisation is carefully coordinated and sequenced with the dewatering of the site.

The following sequence for dewatering, excavation and anchoring along with construction of basement structure and destressing of the anchors has been specified by the geotechnical engineer and will be communicated with Sydney Metro and carefully monitored during construction.

1. Install 1st level top-down slab at the north-west and south-west corners of PRW.
2. Install 1st Anchor row along the East Secant Pile wall through capping beam.
3. Dewater the excavation to RL -1m AHD
4. Excavate to RL 0.0 m
5. Install 1st row anchors & waler beam at RL 1.0 m along North D-wall, West D-Wall
6. Complete dewatering to RL -4.5 m
7. Excavate to RL -3.5 m
8. Install 2nd row anchors & waler beam at RL -2.5 m along East Secant Pile Wall
9. Complete dewatering to RL -7.5 m.
10. Excavate to RL -6.5 m AHD and destress Sydney Metro anchors when accessible.
11. Install 2nd row of anchors and waler beam at RL -5.5 m along North D-Wall and West D-Wall.

12. Complete dewatering to RL -10.05
13. Excavate to the bulk excavation level at RL -9.05m.
14. Dewater within 10m of Metro Station box to RL -14.2m
15. Excavate around Metro entrance to RL -14.2 m
16. Install working platforms, foundation piles and sub-slab services.
17. Complete final trim and install blinding slab at RL -8.25 m
18. Construct hydrostatic slab (B03) to RL -7.05m and to RL -12.7m at the Metro Entrance

The following items are part of the overall construction sequence but are excluded from the scope of this document.

19. Install permanent wall along East wall, lift core walls and columns to B02 slab level
20. Install B02 slab at RL -3.5 m
21. De-stress 2nd row of anchors along North D-wall and West D-wall and remove waler beams
22. De-stress 2nd row of anchors along East walls and remove waler beam.
23. Install Permanent wall along East wall, lift core walls and columns to GF level.
24. Install Ground Floor structural slab at RL +3.3 m propped against the PRW
25. Destress 1st row anchors at 1.0 m along North D-Wall, West D-wall.
26. Destress 1st row anchors at capping beam level along East Wall.
27. Turn-off dewatering.

NB: Only when the Ground Floor slabs have been constructed in their entirety and all temporary anchors are destressed, can the dewatering systems on both sites be turned off allowing long term groundwater levels on the retained side of the PRW to return to natural heights.

A.6 Foundation Piling

Upon reaching final bulk excavation levels, approximately 450 no. foundation piles will be constructed across the footprint of the basement and the above ground buildings. Piles are situated to support vertical loads from building columns, shear walls, lift cores, stair wells and other heavy infrastructure as well as hydrostatic uplift loads.

It is anticipated that Continuous Flight Augur (CFA) piles will be utilised due to the soft, water charged soils likely to be encountered across the site. Prior to piling commencement, dewatering will continue to ensure the groundwater table is lowered below the base of the excavation and a piling pad will be constructed by either in-situ stabilisation with lime / cement, or placing imported basecourse materials and tensile grid mesh, or a combination of both.

The construction sequence can be summarised as follows:

1. Drilling Phase – The CFA piling rig is moved into position with the tip of the mast over the survey marks. Augur is screwed into the ground while continuously monitoring depth and verticality. Augur is advanced to full depth without removing soil from the ground to maintain side support. Torque and penetration rates are measured to provide data on soil conditions and rock depth.
2. Concreting Phase – When founding material and depth is reached, concrete is pumped through the hollow augur stem. Continuous concrete pressure is maintained to ensure pile stability while the augur is slowly extracted, and the bore is filled from the base upwards. When the augur is fully extracted, the excavated soil and excess concrete is removed with an excavator leaving a clean pile top.
3. Reinforcement Installation – A prefabricated reinforcement cage with spacers is immediately lifted vertically with an auxiliary crane or winch rope on the piling rig and inserted into the wet concrete. The cage is lowered under gravity or pushed into the concrete with mechanical assistance.
4. Pile cage or starter bars project from the top of the pile for connection to columns or pile caps.
5. Upon curing of the piles will be tops will be trimmed to at the correct cut-off level to remove any laitance.

Along with the building foundations, piles will also be constructed to support the tower cranes that will be erected during the building construction phases.

A.7 Detail Excavation and In-ground Services

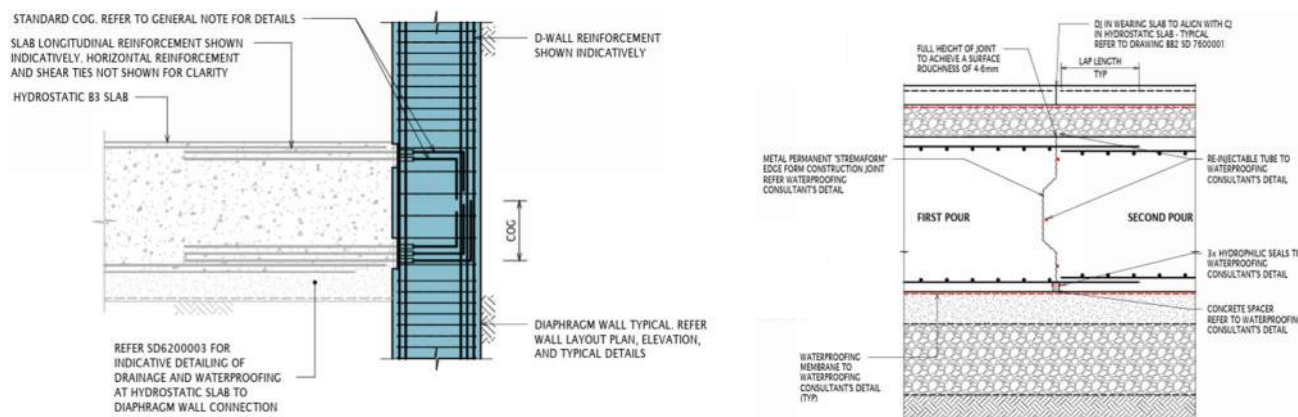
Following installation of the foundation piles, detail excavation is carried out to facilitate construction of pile caps, strip footings, lift pits and escalator pits. In-ground concrete elements are constructed and backfilled as required. Trenching is also completed for sub-slab services such as a drainage. All pipework and conduits are installed, backfilled and compacted before final trimming is completed.

When all in-ground elements are completed, a reinforced concrete blinding slab will be poured to protect the surface of the excavation and provide a level, stable base for the installation of the impermeable waterproofing liner and construction of the Hydrostatic foundation slab.

A.8 Hydrostatic B3 Basement Slab

Construction of the Hydrostatic Basement Slab will commence at the northern end of the site at the interface with the Barangaroo Metro Station. The individual pours will be divided into manageable sections that will be limited by the logistics of the concrete delivery and the maximum no. of loads that can be delivered in a shift. It is estimated that each pour will be approximately 500m³ and will therefore be divided into 6 no. sections from east to west and 7 no. sections from north to south (42 no. separate pours in total).

Construction joints will be formed between the pours, and the perimeter of the basement slab will be keyed into the PRW with couplers as per the detail below. Waterproofing details are documented for slab joints and PRW connections.



The reinforcing steel for the slab will be installed within the formwork shutters with appropriate lapping and couplers installed for development of the reinforcement to adjacent slab sections in accordance with the design details. Slab sections will be poured in a continuous operation with two mobile boom pumps transferring concrete from the delivery trucks to the pour area. Concrete will be finished with power floats.

APPENDIX B – CONSTRUCTION TRAFFIC AND PEDESTRIAN MANAGEMENT PLAN

APPENDIX C – CONSTRUCTION NOISE AND VIBRATION MANAGEMENT PLAN

APPENDIX D – AIR QUALITY MANAGEMENT PLAN

APPENDIX E – CONSTRUCTION WASTE MANAGEMENT PLAN

APPENDIX F – CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN

APPENDIX G – UNEXPECTED FINDS PROCEDURE