5 EXISTING ENVIRONMENT, POTENTIAL IMPACTS AND MITIGATION MEASURES

5.1 Topography. Geology, Soils and Drainage

5.1.1 Topography and Geology

The main elevation of the site is 8-10 m Australian Height Datum (AHD). The site has a slight slope downwards from south to north with a higher elevation of 10 m on the east and west side of Horwood Place.

The 1:100,000 Sydney Region Geological Map (Department of Mineral Resources and Energy, 1991) states that the regional geology is part of the Wianamatta Group, Rwa, consisting of black to dark-grey shale and laminate.

5.1.2 Soil Landscapes

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) eSpade portal indicates that bg Birrong Fluvial soils occur within the site. It describes these as occurring on floodplains of watercourses that drain into the Wianamatta Group shales, on the Cumberland Lowlands. These are dominated by silt and clay sized alluvial materials derived from the Wianamatta Group. Most drainage lines have been artificially lined with concrete preventing most erosion. Minor streambank erosion has occurred along remaining natural drainage lines. There are no natural drainage lines in the study area.

5.1.3 Acid Sulphate Soils (ASS)

Acid sulphate soils (ASS) and potential acid sulphate soils are naturally occurring soils containing iron sulfides. On exposure to air, iron sulfides oxidise and create sulfuric acid. This increase in acidity can result in the release of aluminium, iron, and manganese from the soils.

The DCCEEW ASS mapping indicates that the project site has a risk of ASS. These ASS are considered Class 4 (Figure 5-1). The ASS are likely to be found beyond 2 metres below the natural ground surface.

The proposed works are already in disturbed terrain so excavation is unlikely to disturb acid sulphate soils. The proposed construction is proposed to excavate down to 2 metres only.

5.1.4 Salinity

Salinity has the potential to damage foundations of infrastructure, make soils unsuitable for re-use as fill, and may affect landscaping. Saline soil and water has the potential to damage concrete and metal structures, including bridge piers and foundations.

A review of the NSW DCCEEW e-Spade mapping tool shows that within the site there is a low potential for salinity.

5.1.5 Surface Water

Surface water passes through pipes from Parramatta's road gutters, present in George Street, Horwood Place, Phillip Street and the surrounding streets. The stormwater drains into Parramatta River. In intense rainfall events the capacity of the underground pipe network is exceeded and excess stormwater flows down Horwood Place to Phillip Street and through Dirrabarri Lane into the Parramatta River.

The riparian zone in this area is generally defined by manmade concrete structures. Water quality in Parramatta River is poor due to stormwater pollution and wet weather sewer overflows.

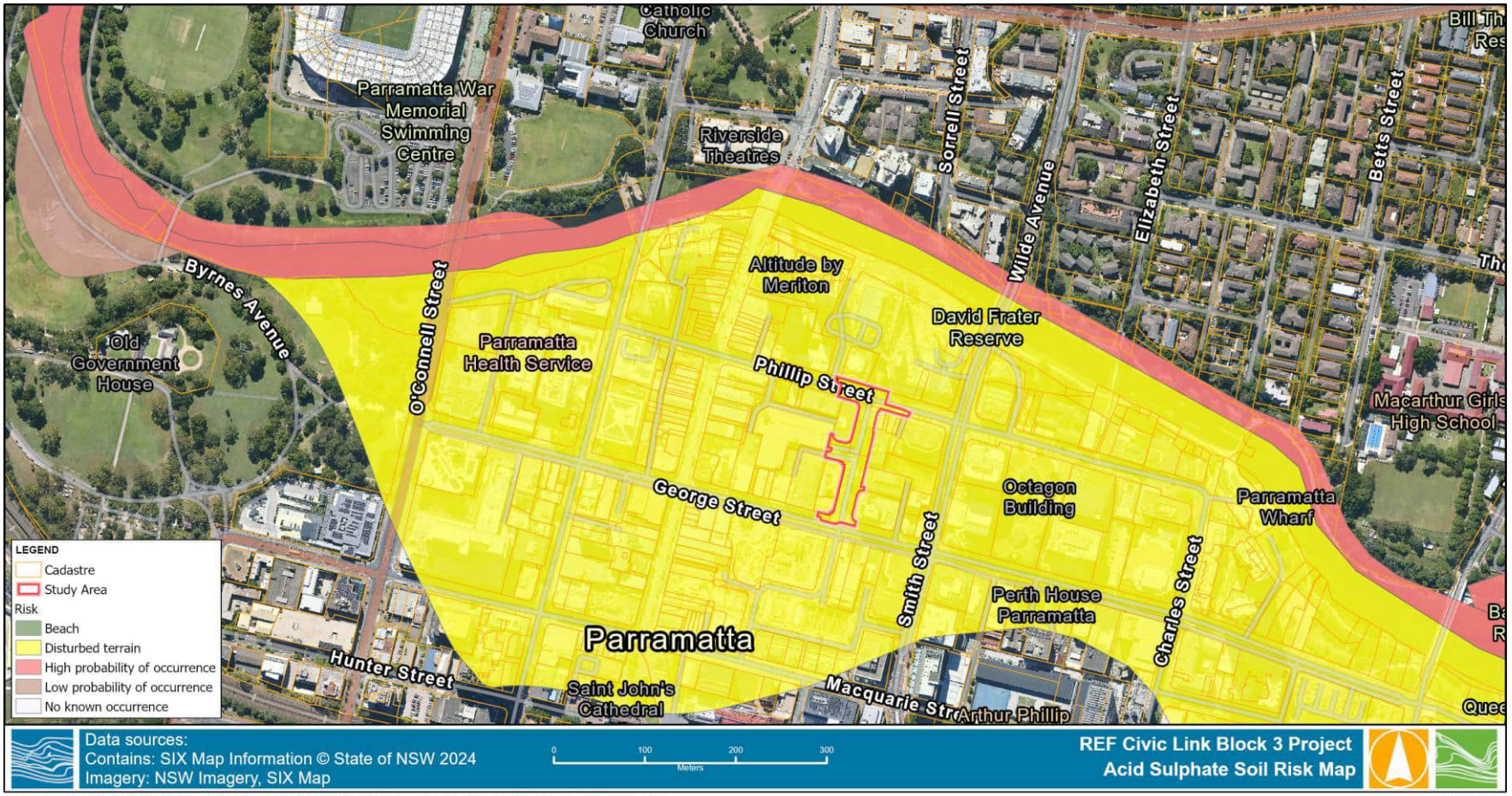

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Figure 5-1 Acid Sulfate Soils

Pollutants include; sediments, litter, oils and other petroleum products from roadways, chemicals, sewage, nutrients from fertilisers and biocides from gardens. This proposal aims to incorporate Water Sensitive Urban Design (WSUD) to reduce pollution entering Parramatta River. This includes using a biofiltration method under all the new surfaces, around trees and in swales.

5.1.6 Groundwater

Based on information contained within the design plans for the development, the depth of excavations are anticipated to be 2 metres deep for the new road and pedestrian structure. A geotechnical investigation report is yet to be produced for the site so the groundwater level was not known.

5.1.7 Flooding

A review of the Council Flood Risk Map (Figure 5-2) indicates that the project site has a Low to Medium Risk of flooding. Flooding will be rare and is most likely from overland flows making their way to the Parramatta River. A flood rarer than a 1 in 1,000 chance per year would be necessary for the Parramatta River to rise to the level of Phillip Street and an even rarer flood would be needed to flood most of Horwood Place. Such a flood has the potential for deep and fast flowing water but is so rare and the construction period so short that it does not pose a significant risk to construction.

A detailed stormwater management investigation (Appendix E) showed that the proposed works would not have an adverse impact on flood or overland flow levels on properties outside of the road reserve. The changed ground levels associated with moving the pedestrian crossing will increase overland flow levels slightly within the road in the vicinity of the proposed crossing. It was found that augmenting underground drainage within the extent of the works area would not have any significant benefit in reducing existing overland flow levels within the site because of the controlling impact of water levels in the Parramatta River.

5.1.8 Construction Impacts

Construction would temporarily expose the natural ground surface and sub-surface through the removal and construction of hardstand surfaces etc. Excavation and ground disturbance activities would expose and disturb soils which, if not managed adequately, could result in:

- Exposure of the natural ground surface and subsurface increasing the risk of soil to water runoff and erosion
- Generation of sediment laden water entering the local drainage line which flows into the Parramatta River, resulting in potential adverse impacts to aquatic fauna
- Water runoff from the project site containing other pollutants such as asbestos, concrete particles/slurry, hydrocarbons and other contaminants
- Dust generation resulting in air quality impacts
- Mud tracking onto public roads causing community complaints and sediment laden water runoff into the stormwater system

This construction phase of the project has the potential to have detrimental impacts on soil. However, provided controls are in place and well managed any impacts are not anticipated to be significant.

5.1.9 Operational Impacts

There is not expected be any adverse operational impacts on soil and water. Areas disturbed during construction will be adequately stabilised by using mitigation measures outlined in Table 5-1. Drainage infrastructure will be designed and installed to manage any surface water flows and there will be improvements in water quality.

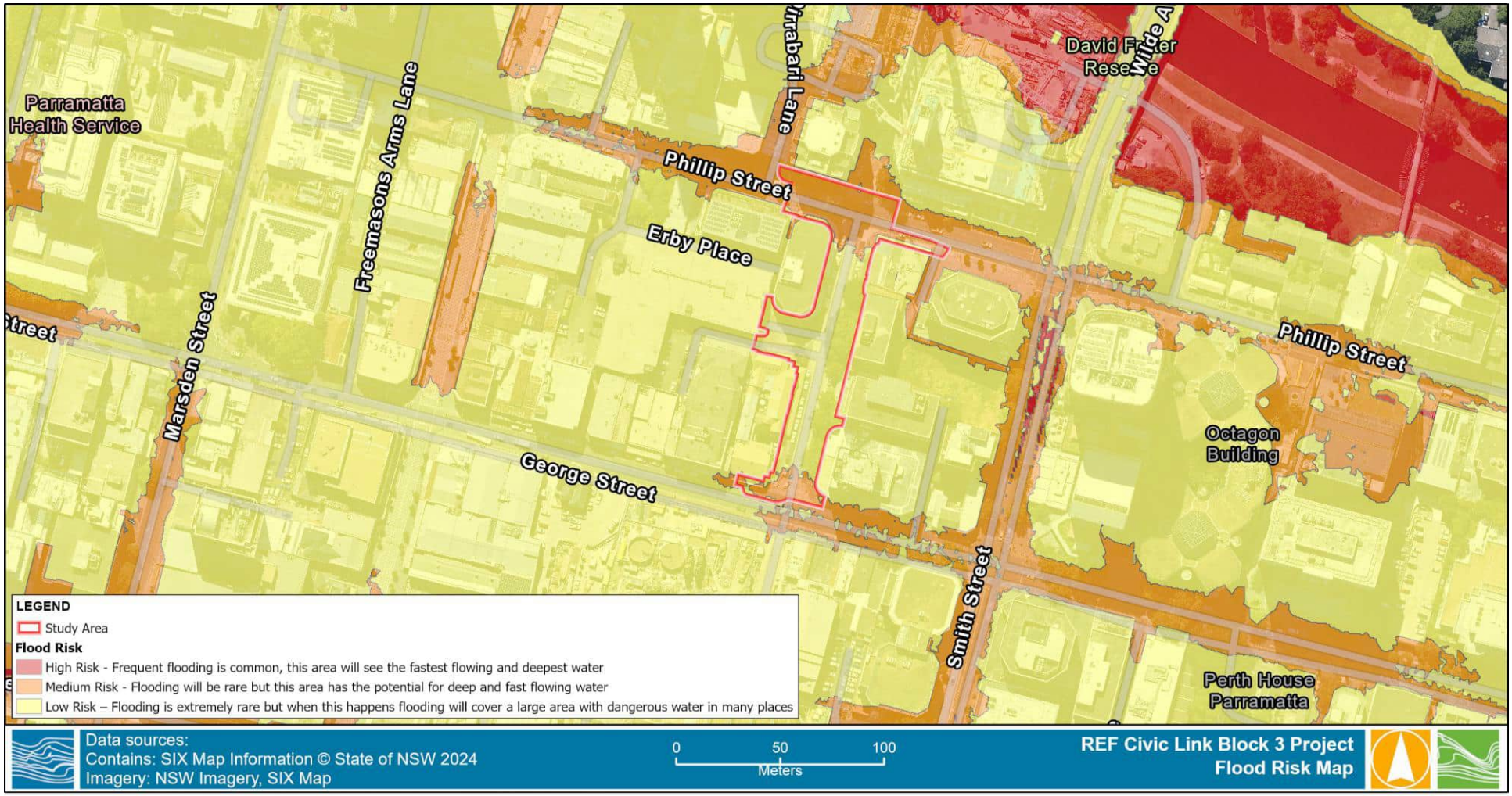

Figure 5-2 Flood risk map

5.1.10 Mitigation Measures

Measures that will be implemented to address potential contamination and soils impacts are listed in Table 5-1.

Table 5-1 Mitigation measures for soil and water (SW)

Ref	Mitigation Measure	Timing
SW1	A Construction Soil and Water Management Plan (SWMP) will be prepared and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including potential impacts associated with the presence of stockpile management, erosion and sediment controls, water discharge requirements, monitoring requirements and any other relevant areas. The SWMP will need to be prepared by the contractor (once appointed) and submitted to the City of Parramatta Council for written approval prior to construction. The SWMP will be prepared in accordance with relevant guidelines and standards, including Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom, 2004) Volume 2B Waste landfills (DECC, 2008a) and Volume 2D (DECC, 2008b) (the Blue Book).	Pre-construction
SW2	An Erosion and Sedimentation Control Plan (ESCP) will be developed and maintained for the site in accordance with Managing Urban Stormwater, Soils and Construction Guidelines (Landcom, 2004). The plan would include site access controls preventing tracking of sediment from site, limiting the removal of groundcover and ensuring that the excavation works do not block natural drains or create undrained areas.	Pre-construction / construction
SW3	Measures for erosion and sediment control are to be installed prior to commencement of construction activities. They are to be regularly monitored throughout construction to ensure effectiveness, particularly following significant rainfall, and remain in place until the site is stabilised post-construction.	Pre-construction / construction/ Post - construction
SW4	Any offsite water discharges from the project (either by sediment basin or other) will be managed to ensure compliance with Section 120 of the *Protection of the Environment Operations Act 1997* (POEO Act). Discharge processes should be detailed in the SWMP.	Construction
SW5	Any cleared areas are to be revegetated/stabilised as soon as possible to prevent erosion of soil surfaces. Vegetation is to be maintained until it is established.	Construction/ Post - construction
SW6	All chemicals must be stored in appropriately bunded and secure areas in accordance with relevant Australian Standards and Environmental Protection Authority (EPA) guidelines. These areas should not be located within, or directly adjacent to, drainage channels or pits.	Construction
SW7	Any designated refuelling areas are to be appropriately contained to prevent any soil contamination from spills.	Construction
SW8	Spill kits are to be present throughout the site in relevant areas.	Construction
SW9	Spill response procedures should be developed to ensure any spills are appropriately managed to minimise the risk of impact on the environment.	Construction

5.2 Contaminated Soils

5.2.1 Existing Environment

Construction work can expose contaminated soils and groundwater in areas where previously contaminating activities or land uses have been undertaken. Exposing contaminated soils can mobilise contaminants, potentially leading to environmental, health and safety risks. It is important that such risks are identified and planned for during project development so that they can be avoided, minimised, and effectively managed through appropriate design and construction planning.

A Detailed Site Investigation (DSI) (Douglas Partners 2025a) detected asbestos in a representative fibre cement fragment (FCF) analysed from among a number of FCFs in stockpiled material sourced from the excavation of the upper 0.3 m of road base in 8 locations. The particular source location of the asbestos was not able to be determined.

A Contamination Interpretive Report (Appendix F) recommended that a Remedial Action Plan (RAP) be prepared and implemented to address potential asbestos contamination at the site and that the Construction Environmental Management Plan (CEMP) work in conjunction with the RAP during the redevelopment.

Accordingly, a RAP (Appendix G) was prepared to enable remedial works in the event that bonded asbestos is encountered (excluding non-bonded asbestos and other contaminants). It provides a list of procedures to undertake if further bonded asbestos is observed throughout construction, including administrative and remediation works. The addendum RAP (which is listed as Appendix C of the RAP, Appendix G) provides alternative management measures in the form of onsite capping and containing of asbestos containing material.

A Limited-CEMP (Appendix H) includes protocols for handling import fill and chemical spills and contingency plans for dealing with unexpected contamination finds. These measures will need to be incorporated into the construction contractor's CEMP.

A Waste Classification Report (Douglas Partners 2025b) for the approximately 20 m^3 stockpile of excavated material from which the asbestos fragments had come from reported that the stockpile had tested positive for asbestos. The stockpile was therefore classified as General Solid Waste (non-putrescible) – Special Waste (Asbestos).

In addition, two Waste Classification Reports (EHO Consulting, 2025a and 2025b) were prepared for two 10 m^3 stockpiles originating from the 11 archaeological test pits. No staining, odours or potential asbestos containing material were observed on or within the stockpiles. Both stockpiles were classified as General Solid Waste (non-putrescible).

All of the test excavation materials were disposed of at a landfill licensed to accept that class of waste. If any further contamination is discovered throughout the construction process, the mitigation measures in Table 5-2 will be followed.

5.2.2 Operational Impacts

Operation of the proposal would not generate contaminated soils. Refer to section 5.7 for more details on Waste and Resource management.

5.2.3 Mitigation Measures

Measures that will be implemented to address potential contamination and soils impacts are listed in Table 5-2.

Table 5-2 Mitigation measures for contamination (C)

Ref	Mitigation Measure	Timing
C1	Prior to the commencement of project activities, all site personnel (including sub-contractors) will attend a site induction regarding the requirements of the L-CEMP, environmental awareness including guidance on the identification of suspected asbestos material, the unexpected finds protocol and the responsibilities and accountabilities of all site personnel.	Pre-construction
C2	Fencing will be installed and maintained around the perimeter of the site and the remediation area will also be secured from entry outside of remediation works occurring. Maintenance of exclusion zones around remediation areas.	Construction
C3	Prior to any plant or personnel leaving the exclusion zone, decontamination must be undertaken. The following decontamination procedure will apply to all persons existing the remediation work area/s: ■ Cleaning of protective footwear, including removal of potentially contaminated material from the soles of the footwear, ■ Washing of hands (including prior to eating, drinking or smoking). ■ Decontamination will involve hosing / removal of soil from the tracks and bucket as far as reasonably practicable by the Principal Contractor, or their nominated representative. ■ Tools used shall be hosed down / wiped clean with a damp cloth. ■ Upon completion of works boots and clothing will be wiped down with a damp cloth. Disposable PPE will be disposed as asbestos waste.	Construction
C4	If there is a requirement for surplus material to be temporarily stockpiled onsite, the following stockpile management procedures should be implemented: ■ A stockpile register should be maintained detailing the supplier and source location of the stockpiled material, location identification (documented on a site plan), material type, estimated volume and date the material was stockpiled. ■ Stockpiles of materials from different suppliers and/or different material types are to be segregated. ■ Stockpiled material of unknown contamination status and awaiting sampling must be bunded and kept segregated from other material until sampling and classification has occurred. ■ Sediment and erosion control measures are to be implemented in accordance with the 'Blue Book' and the Site's Construction Environmental Management Plan (CEMP). ■ Dust control measures are to be implemented including the use of material covers and/or dust suppressants on stockpiles and during transport of stockpile material. ■ Site inductions are to be undertaken to ensure workers are aware of the requirements of stockpile management.	

Ref	Mitigation Measure	Timing
C5	Haulage of plant must occur in accordance with the following procedure: ■ Vehicles, plant and equipment on the Site will be kept to a practical minimum. ■ Dedicated plant will be located within the proposed excavation/placement and haulage areas. ■ No soils being transported are permitted to spill or leak from the transporting vehicle. ■ Dedicated haul road with exclusion zones will be dedicated for the haulage and onsite relocation of asbestos materials. ■ Plant will be subject to full decontamination and asbestos clearance prior leaving the leaving the exclusion zone	Construction
C6	Should excavations require water to be pumped out water must be sampled and analysed by a suitably qualified environmental consultant. If the laboratory analytical results are less than the relevant aquatic ecosystem freshwater levels set out in ANZG (2018), then the excavation water may be discharged to the local stormwater system, subject to approval by the planning authority. Typically, if the laboratory analytical results are greater than the relevant aquatic ecosystem 95% freshwater levels (ANZG, 2018), then other options for the excavation water will be considered, including: ■ Used for dust suppression onsite, ■ Assessment of proposed receiving waters, in the context of the contaminant concentrations found in the excavation water, ■ Removal and offsite disposal by a liquid waste contractor; and ■ Discharge to sewer under an approval obtained from the relevant sewerage infrastructure operator. In the event the site requires dewatering, development consent from the relevant planning authority and/or approvals from the state water authority, will be obtained (if required).	
C7	Should any unexpected contamination be discovered, all works should cease and notify the City of Parramatta representative, and any other relevant regulatory bodies immediately.	Construction
C8	Any spills, leaks or other contamination events will be managed in accordance with spill management procedures to minimise and contain any further contamination.	Construction
C9	If bonded ACM is observed to be widespread across the site and at depth and/or if potentially friable asbestos is identified, the Unexpected Finds Protocol in Section 6.4.10 in the RAP must be followed.	Construction
C10	Preparation of a site validation report after remedial works are completed prior to operation with a structure as stated within the addendum RAP.	Construction
C11	Ongoing management measures will be implemented for any areas where contamination remains following construction and has the potential to cause an ongoing risk to maintenance works, the community and/or the receiving environment. These management measures will be documented in an Operational Environmental Management Plan or other appropriate mechanism.	Operation

5.3 Biodiversity

5.3.1 Existing Environment

5.3.1.1 Desktop search

Prior to undertaking the ecological field survey, desktop searches were conducted to provide a context of the surrounding environment

5.3.1.2 Vegetation communities

A review of the vegetation mapping databases using the NSW Government The Central Resource for Sharing and Enabling Environmental Data in NSW (SEED) portal was undertaken to identify Plant Community Types (PCTs) present within the area. As indicated in Figure 5-3 no PCT's were mapped as being present within the project site and its surroundings areas. The closest mapped PCT is 4025 which is upstream of the site and is not likely to be impacted by the proposed works in any way.

The proposed work has no native vegetation clearing associated with it, and the majority of the building works will minimise negative impact on biodiversity values in the area. Therefore, no offsetting is required. No impacts on threatened native flora and fauna species or threatened ecological communities species are anticipated

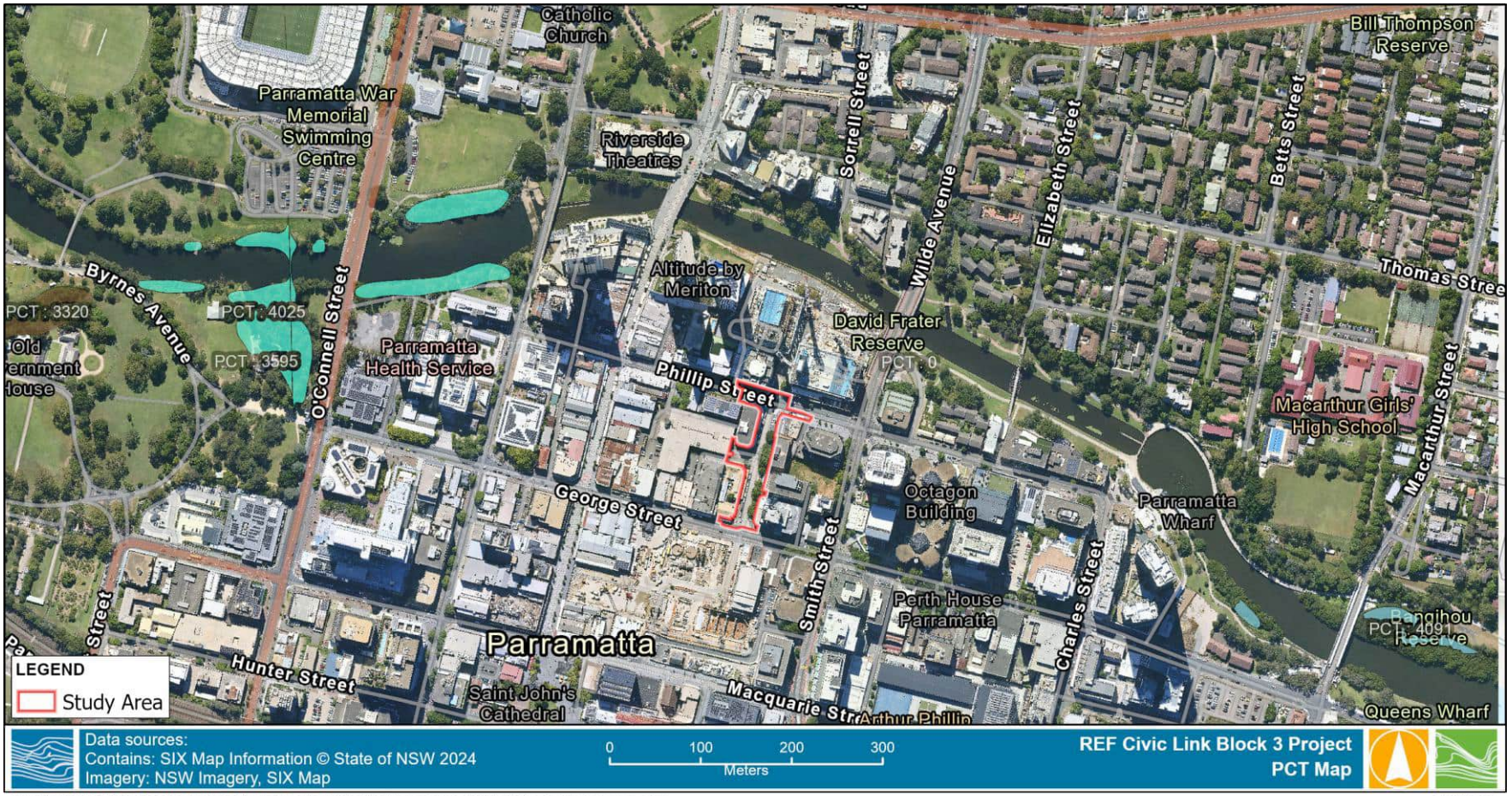

Figure 5-3 Plant Community Types (PCTs)

5.3.1.3 Threatened Species

A desktop search of threatened species was done with the DCCEEW BioNet Atlas for an area which included the study site and a 10 km radius around the site. A search was also undertaken using the Protected Matters Search tool (Appendix I) within a 1 km radius of the site. The results of the Protected Matters Search included 7 threatened ecological communities, 70 listed threatened species and 40 listed migratory species.

A Likelihood of Occurrence assessment has been completed and is included in Appendix J. The DCCEEW BioNet Atlas search returned 1,705 records of 72 species. Most commonly occurring in the area were the Grey Headed Flying Fox (*Pteropus poliocephalus*) 889 sightings, the Green and Golden Bell Frog (*Litoria aurea*) 207 sightings, and the Powerful Owl (*Ninox strenua*) 138 sightings.

Due to sparse vegetation primarily comprising exotic street trees, the probability of encountering species like the Green and Golden Bell Frog, and the Powerful Owl at the study site has a low likelihood. Due to the number of sightings the Grey Headed Flying Fox has a medium likelihood.

While other threatened species have previously been identified nearby, these are considered unlikely to occur within the immediate project site due to the absence of any suitable habitat, shown in Figure 5-4. Based on the available information, it can be stated that no further action is required regarding threatened species as no trees are being removed nor the drainage line disturbed.

5.3.1.4 Site Visit

The following flora species were observed during a site visit on 31 May 2024, the only vegetation observed were the street trees. The following table shows the vegetation sited in the subject site and surrounding area including both Stages 1 and 2 (Table 5-3).

Table 5-3 Flora species list of the subject site and surrounding area

Common Name	Scientific Name
NATIVE SPECIES	
Blueberry Ash	*Elaeocarpus reticulatus*
Mistletoe	*Amyema miquelii*
Crow's Ash	*Flindersia australis*
Golden Tea Tree	*Melaleuca bracteata 'Revolution Gold'*
EXOTIC SPECIES	
Japanese Elm	*Zelkova serrata*
Liquidambar	*Liquidambar styraciflua*
London Plane Tree	*Platanus × acerifolia*
Nandina 'Nana'	*Nandina domestica 'Nana'*
Oriental Plane Tree	*Platanus orientalis digitata*
Shore Juniper	*Juniperus conferta*
Pine Tree	*Pinus radiata*

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Figure 5-4 Threatened species

The fauna survey involved both searching for threatened species and assessing the value of the site as habitat for fauna. Searches for species present included visual survey, searches for proxy evidence of fauna activity such as tree scratches and scats, and searches for bird nests and tree hollows. No remote survey techniques such as camera trapping were conducted.

No native fauna, including any threatened species, were identified during the site inspection. The terrestrial flora and fauna survey was limited to less than one hour. The field survey was restricted to the area of impact of the proposed works.

As many faunal species likely to occur within the project area are cryptic and/or nocturnal, they are unlikely to be detected even during seasonal surveys. The fauna assessment is, accordingly, largely an assessment of the potential of the project site as habitat for various fauna species. Therefore, it is important to adopt the precautionary principle such that it is assumed that any threatened species is likely to occur at the site if suitable habitat exists. The existing vegetation is mainly exotic and provides limited habitat for native species.

5.3.2 Construction Impacts

The following is a summary of the potential direct and indirect construction impacts to biodiversity.

Eight trees will be removed as part of this proposal. Four exotic trees including: one Liquidambar (*Liquidambar styraciflua*), two London Plane Trees (*Platanus × acerifolia*) and one Oriental Plane Tree (*Platanus orientalis digitata*). Four native trees, two Golden Tea Trees (*Melaleuca bracteata*) and two Crow's Ash (Flindersia australis) will also be removed (Figure 5-5). Several other trees will be retained and approximately 30 new trees planted this will not have a detrimental effect on the landscape. The trees to be retained and proposed protection methods are detailed in an arborist's report (Appendix K).

As the study site is predominantly hard stand, the proposed works should not result in any further vegetation removal or damage. Where activities are scheduled to take place within the Tree Protection Zone (TPZ), excavation will be undertaken by hand under the direction of the arborist so that no more than 10% of the structural root zone and TPZ of mature trees that are to be retained will be disturbed. The estimated TPZs of existing trees that will remain are shown in Figure 5-5.

In order to reduce any significant impacts, it is recommended that the Parramatta City Council's Arborist is to attend to the removal of the trees. Also, if roots greater than 50mm diameter of trees to be retained are encountered or if any trees are to be removed or significantly pruned an arborist will monitor and evaluate the remaining trees. An arborist will be engaged prior to construction to provide a Tree Protection Plan.

Since only four native trees will be removed and they will be replaced by over 30 new trees, primarily native species, the proposal is expected to enhance canopy cover and improve native fauna habitats. The table below lists the tree species to be planted in Horwood Place and Phillip Street (Table 6 4).

Table 5-4 Tree Planting Palette

Common Name	Scientific Name
NATIVE	
Luscious Water Gum/ Kanooka	Tristaniopsis laurina 'Luscious'
Sydney Red Gum	*Angophora costata*
Flame Tree	*Brachychiton acerifolius*
Native Frangipani	*Hymenosporum flavum*
EXOTIC	
Japanese Elm	*Zelkova serrata*

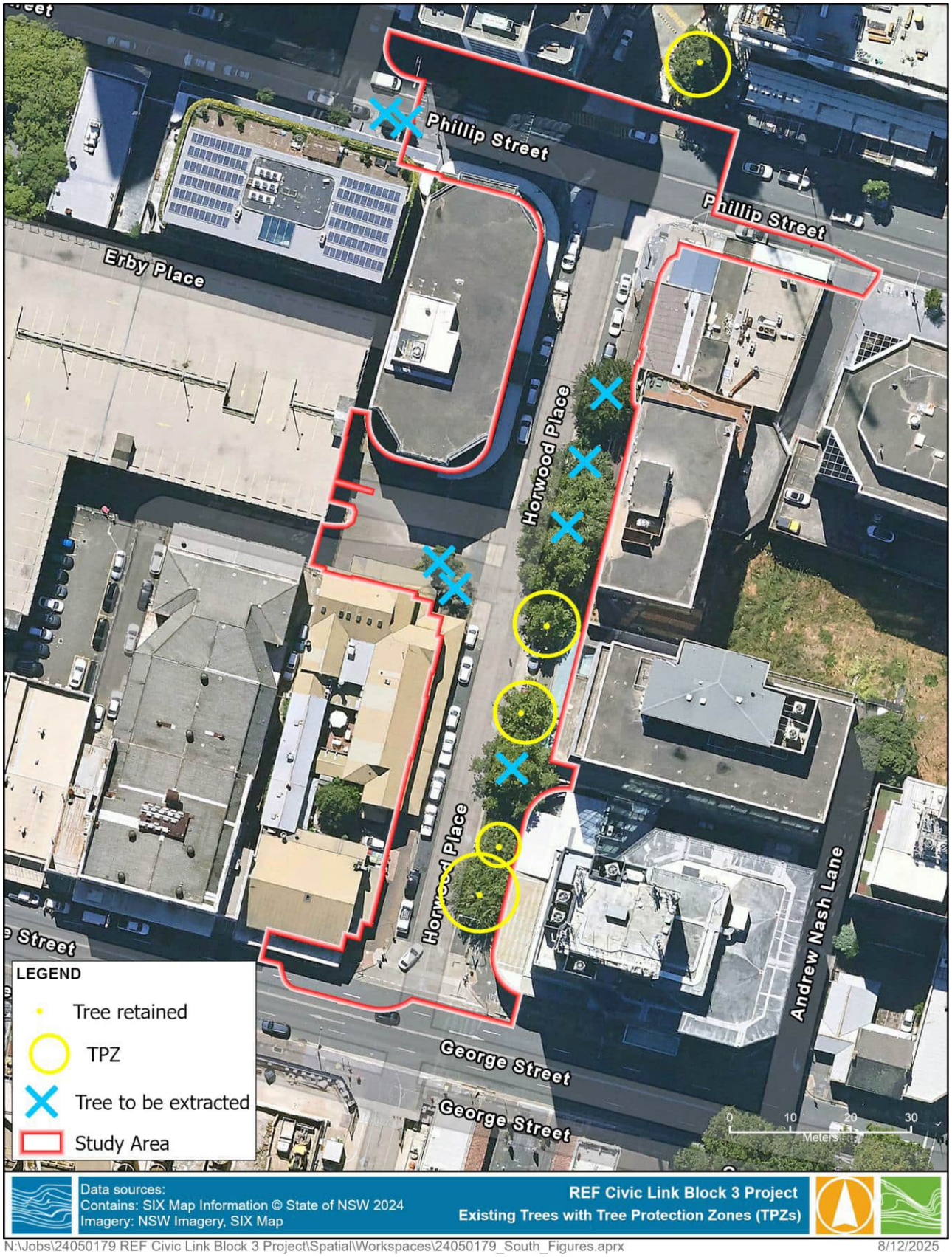

Figure 5-5 Tree Protection Zone (TPZ)

5.3.3 Operational Impacts

No operational impacts to flora and fauna are anticipated as a result of the proposal.

5.3.4 Mitigation Measures

Measures that will be implemented to address potential construction impacts are listed in Table 5-5.

Table 5-5 Mitigation measures for construction impacts (CI)

Ref	Mitigation Measure	Timing
CI1	Tree Protection Zones (TPZs) will be maintained around vegetation to be retained. TPZs will be maintained in accordance with Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970). No activities are to take place within the Structural Root Zones (SRZs) of mature trees to be retained. No works, stockpiling of materials, excavation, parking or any other potentially harmful activities will be undertaken within TPZs unless a Level 5 Arborist has provided confirmation that the works will not impact the tree.	Pre-Construction/ Construction
CI2	Prior to vegetation clearing, trees to be retained should be clearly demarcated. Trees should be fenced off and protected if necessary.	Pre-construction/ Construction
CI3	Induction of all contractors and staff outlining the ecological sensitivity of the site, no-go areas, the need to minimise ecological impact, and all other required mitigation measures is to be undertaken.	All stages
CI4	Basic hygiene protocols to prevent the spread of pathogens may be necessary when introducing new trees and vegetation to the area.	Construction

5.4 Air Quality

5.4.1 Existing Environment

Ambient air quality throughout the Sydney Basin is influenced by several factors, including topography, prevailing meteorological conditions, such as wind and temperature, which vary seasonally, and local and regional air pollution sources, such as motor vehicles, industrial facilities, and bushfires. Consequently, regional air quality can be highly variable and impacted by events occurring a significant distance away. Local emission sources, the existing air quality environment, and sensitive receivers are described below.

A search of the National Pollutant Inventory (NPI), and a desktop review, identified that there are a few commercial and industrial facilities approximately 2.3 kms to the east and 1.2 kms northwest of the project site that report air emissions. Based upon current site knowledge, no other air monitoring is considered necessary during works on the site.

5.4.2 Construction Impacts

During construction, potential air quality impacts could arise from asbestos exposure if it is present on site. If asbestos is found during the geotechnical investigations, a site-specific Remediation Action Plan should be written regarding asbestos mitigation.

Dust and exhaust emissions from the operation of on-site machinery, excavation works, materials handling and material storage/stockpiling can cause air pollution. Operational Impacts

5.4.3 Operational Impacts

The project is not expected to result in additional emissions or other negative air quality impacts during the operational phase of the project.

5.4.4 Mitigation Measures

Measures that will be implemented to address potential air quality impacts are listed in Table 5-6.

Table 5-6 Mitigation measures for air quality (AQ)

Ref	Mitigation Measure	Timing
AQ1	Dust suppression of asbestos: (if required) • Regular dampening of areas using heavy machinery where excavations, spreading/compactions is taking place • Vehicle operations within asbestos containing material areas should be minimised. Vehicle routes should be covered with impermeable material • Protecting stockpiled material with tarps, consolidation, erection of wind breaks and if these measures cannot be reached, then wetting down of the material • Ceasing work in heavy wind events • Loading of materials into trucks as close to stockpile or in-situ location as possible • Trucks should have their loads covered when not being loaded, including movement on the site	Construction
AQ2	Manage exposed surfaces which have the potential to generate dust. Examples which may be used include: • Covering with geofabric • Stabilising with mulch • Applying a cover crop • Use of water carts for dust suppression • Application of polymer	Construction
AQ3	During earthworks, visual inspections for dust in windy or dry periods would be undertaken. Dust generating activities should be avoided or minimised, or methodologies reviewed during these periods. Appropriate water suppression measures would be used on exposed surfaces and equipment that may be generating dust.	Construction
AQ4	Dust suppression techniques such as ventilation during cutting, grinding, or sawing activities would be used where required.	Construction
AQ5	Water assisted dust sweepers to be used on the access and local roads to remove any material tracked out by the trucks.	Construction
AQ6	Ensure all dust generating loads are covered except for when loading and unloading.	Construction
AQ7	Construction plant and equipment to be well maintained to ensure no exhaust particulates are visible for more than 10 continuous seconds.	Construction
AQ8	Vehicles will not be left idling when not in use.	Construction
AQ9	Odour or air pollutant emission complaints will be dealt with promptly and the source will be appropriately managed.	Construction

Ref	Mitigation Measure	Timing
AQ10	Airborne asbestos monitoring will be undertaken on site by a suitably competent person during friable asbestos removal or handling. Monitoring during bonded asbestos removal, will be undertaken, subject to advice provided by the occupational hygienist appointed to the project.	Construction
AQ11	Dust generated from onsite activities should be monitored and assessed in accordance with NSW EPA (2016) Approved Methods for Modelling and Assessment of Air Pollution in NSW. Continuous monitoring of dust deposition levels should be undertaken at all boundaries of the Site in conjunction with real-time visual assessment to ensure effective management.	Construction

5.5 Noise and Vibration

5.5.1 Existing Receivers

The project site is surrounded by commercial and residential receivers as shown in Figure 5-6. They include:

- Commercial – There are approximately 195 commercial receivers located along Horwood Place, Phillip Street, Auctioneer Lane, and George Street which are closest to the project site. These are largely local businesses including commercial offices, shops, cafes, restaurants, beauty salons and brokers.
- Residential – There are approximately 64 residential receivers located at 66-74 Phillip Street. These are apartment blocks. The Altitude by Meriton at 330 Church Street with approximately 200 apartments. was also considered a receiver.

5.5.2 Construction Impacts

The nearest sensitive receivers are the residential receivers along Phillip Street with the nearest dwelling is located approximately 140 m away from the start of the proposed works.

The proposed works will result in elevated noise and vibration levels particularly during the civil works phase of the project. As road and footpath needs to be excavated, noise levels will be elevated. However, as the work will be undertaken during daylight hours there will be no evening or night work and hence no disruption to local residences at this time. The excavation is also likely to be the noisiest activity as it will require the breaking of bitumen or asphalt in this location.

Plant and equipment which will generate noise and vibration throughout daylight hours of the project may include excavators, rollers, skid steers, trucks, light vehicles, hand tools, power tools, concrete trucks etc.

Construction and delivery of the infrastructure would take approximately 12 months. Most of the impacts listed would be only for the duration of construction and the site would be returned to the previously existing environment. Temporary impacts to the community would be managed through consultation as provided in the safeguards below.

5.5.3 Operational Impacts

The project is not expected to result in additional noise and vibration impacts during the operational phase of the project.

5.5.4 Mitigation Measures

Measures that will be implemented to address potential noise and vibration management are listed Table 5-7.

Table 5-7 Mitigation measures for noise and vibration management (NV)

Ref	Mitigation Measure	Timing
NV1	The project's Construction Management Plan (CEMP) will include detailed processes, responsibilities, and measures to manage noise and vibration and minimise the potential for impacts during construction, consistent with the management approach and mitigation measures in the *EPA Interim Noise Construction Guidelines (ICNG)*.	Pre-construction
NV2	Work will be undertaken during standard working hours between 7:00 am and 6:00 pm, Monday to Friday inclusive, and between 8:00 am and 1:00 pm on Saturdays. No work is to be carried out on Sundays and public holidays unless further approvals from the City of Parramatta Council are obtained.	Construction
NV3	All machinery and plant to be fitted with residential class mufflers to keep noise levels to a minimum.	Construction
NV4	Vehicles will not be left idling when not in use.	Construction
NV5	A general notification will be provided to the wider community with adequate notice prior to commencement of works. A complaints register will be established to record noise complaints from local residents, and local residents will be informed of the process for registering a complaint.	Construction
NV6	Specific notification (door knock, phone calls etc.) will be made to residents located in proximity to the project site on Phillip Street and Horwood Place. This consultation should seek to identify any sensitive days and/or times, and schedule works outside those days and/or times where feasible and reasonable.	Construction
NV7	Where it is necessary to use bitumen, concrete and rock breaking equipment this should not be undertaken continuously for more than 3hrs hours with no less than a 1hr respite period between and not before 8am or after 5pm.	Construction
NV8	If vibration intensive plant and equipment are working in close proximity (within minimum working distances) to other structures, additional vibration assessments may be required.	Construction
NV9	Vehicle access roads will be designed to minimise the need for vehicles and mobile plant to reverse during travel (e.g. creation of turning circles in the immediate vicinity of remediation work area/s).	Construction

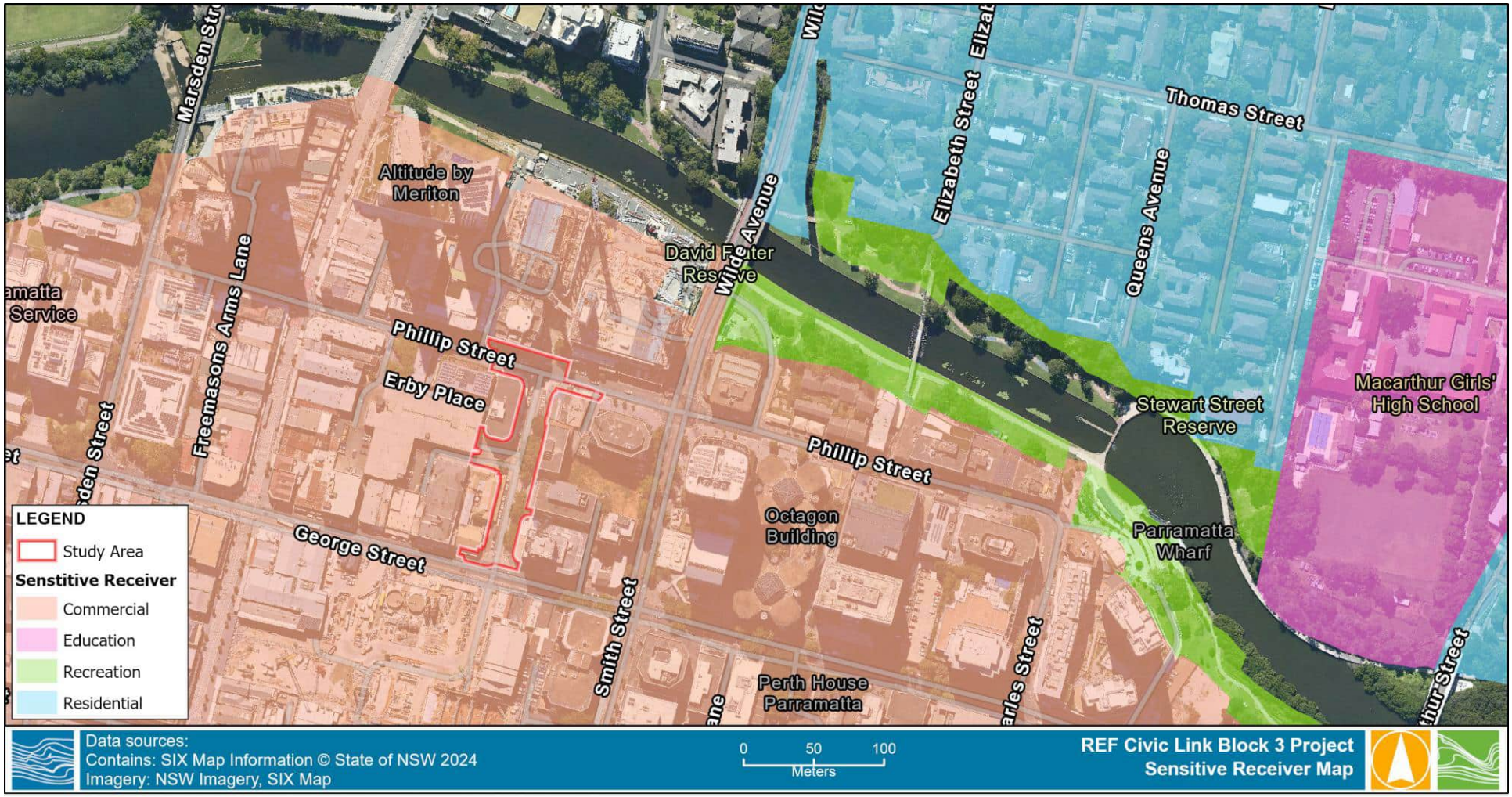

Figure 5-6 Sensitive Receiver Map

5.6 Aboriginal and Non-Aboriginal Heritage

Aboriginal Due Diligence and Historical Archaeological Assessment reports were written by Extent Heritage in 2023 and comprise Appendix M and Appendix O respectively. According to the Aboriginal Due Diligence report, one registered Aboriginal Object was identified within the study area, however it is designated 'not a site' by the National Parks and Wildlife Act 1974 within an AHIMS search. The due diligence assessment site inspection identified no new Aboriginal Object recordings within the study area. However, the area contained landscape features likely indicating the presence of Aboriginal Objects, particularly given its proximity to a waterway and potential location within the Parramatta Geological Sand Body. Both a desktop assessment and site inspection indicated the potential existence of Aboriginal objects within the proposed site.

In accordance with the risk management process, an Aboriginal Cultural Heritage Assessment Report (ACHAR) was prepared (Appendix L). This report assessed the risk of harm to Aboriginal heritage and establishes impact minimisation or mitigation measures.

Extent Heritage's historical archaeological assessment of the subject site (Appendix J) identified it as a significant location in Parramatta's urban development. It was determined to be the site of Parramatta's first gaol, previously thought to be located elsewhere. The assessment revealed a sequence of residential occupation and subdivision from approximately 1830 until 1967, when the site was cleared for Horwood Place. Archaeological investigations suggested the presence of various artefacts associated with these historical activities, necessitating further study to assess preservation and potential impacts from future construction.

Recommendations included a programme of archaeological testing to evaluate historical preservation depths and the application for a Heritage Council of NSW permit under Section 140 of the Heritage Act. A historical archaeological research design has been prepared (Appendix N) and has been followed prior to construction commencing.

Coordination with Aboriginal archaeology investigations was advised, potentially requiring an Aboriginal Heritage Impact Permit (AHIP) under Section 90 of the National Parks and Wildlife Act to ensure comprehensive data recovery and informed development guidance (Extent Heritage, 2023).

A Heritage Interpretation Strategy was prepared (Appendix P) so that the known Aboriginal and non-Aboriginal history of the area as well as any discoveries during testing and excavation could be interpreted and incorporated into the design of the public space.

A Statement of Heritage Impact was prepared (Appendix Q), which found the proposed development does not have adverse impacts to heritage items, does not involve impacts to any significant fabric or spatial arrangements associated with the heritage items, and that it alters the immediate setting of the heritage items; however, this is considered to have a positive impact on their significance by improving the amenity and awareness.

AHIP 5340 was issued on 5 November 2024 authorising subsurface investigations within areas of the study area due to the potential for evidence of contact archaeology. Aboriginal Archaeological Test Excavation Report (Appendix R) details the results of the test excavations permitted by AHIP 5340.

Test excavations at the site were undertaken between 7 January 2025 and 7 February 2025. Eight locations were tested, only one revealed a remnant soil profile with the potential to contain Aboriginal cultural heritage. Excavation at this location recovered 14 lithic (stone) artefacts. An isolated artefact was also found amongst some historical fill in another pit.

Through the completion of background research, database searches, field survey, and test excavations, it is established that; there are two Aboriginal sites within the study area— Horwood Place PAD & AS 1 (AHIMS 45-6-4123) and Horwood Place IA 1 (AHIMS 45-6-4161). The proposed works may impact a portion of

Horwood Place PAD & AS 1 (AHIMS 45-6-4123), resulting in a partial loss of value. The isolated artefact has been collected through test excavation.

5.6.1 Mitigation Measures

Measures that will be implemented to address potential heritage impacts are listed in Table 5-8.

Table 5-8 Mitigation measures for heritage items (H)

Ref	Mitigation Measure	Timing
H1	Where impacts to the extent of AHIMS 45-6-4123 cannot be avoided, an AHIP will for harm will be required. A study area wide AHIP is recommended to guide management of for any other isolated finds. The AHIP application must be supported by an ACHAR. Prepare an Aboriginal Cultural Heritage Assessment Report (ACHAR) prior to the commencement of works. This report should include detailed archaeological site assessments, potential test excavations, and formal consultations with Registered Aboriginal Parties (RAPs) to evaluate risks and implement necessary impact minimisation or mitigation measures before starting any construction activities.	Pre-construction
H2	Long term arrangements for the management of excavated artefacts should be further discussed within the ACHAR and in consultation with registered Aboriginal parties.	Pre-construction
H3	To keep consultation current, the RAPs should continue to be sent an update on the project everything six months, until the AHIP has been approved.	Pre-construction
H4	If changes are made to the proposed works which could impact locations outside of the current study area, or alter the location, depth or nature of impacts, further archaeological investigation may be required.	Pre-construction
H5	Implement a programme of archaeological testing to evaluate historical preservation depths. Apply for a Heritage Council of NSW permit under Section 140 of the Heritage Act. Coordinate with Aboriginal archaeology investigations.	Pre-construction
H6	If, during the works, any unexpected archaeological deposits are uncovered, all work in the vicinity of that deposit must cease immediately and advice be sought from a suitably qualified archaeologist.	Construction
H7	Stop work if human remains are found and contact NSW Police.	Construction
H8	In accordance with Section 146 of the NSW Heritage Act 1977, the accidental discovery of relics must be reported immediately to the Heritage Council and construction work must cease until the Heritage Council has provided clearance to recommence.	Construction

5.7 Waste & Resource Management

5.7.1 Construction Impacts

5.7.1.1 Material selection and use

The project would require a wide range of materials during construction including granite, composite, asphalt, bitumen steel, paints, concrete, cabling, timber etc. Plants and mulch would also be required for landscaping throughout the site.

5.7.1.2 Energy and fuel use

Construction of the project would require the use of energy and fuels to power equipment and transport vehicles. Fuels would include non-renewable sources such as petroleum, diesel, natural gas and liquefied natural gas.

5.7.1.3 Water

Water would be required during construction for dust suppression, compaction, road and pavement stabilisation, washing of plant and equipment.

5.7.1.4 Waste

The project may generate various types of waste, some of which would be reused or recycled, while others would require disposal. Construction waste associated with the project would be managed in accordance with *the Waste Avoidance and Resource Recovery Act 2001*. Typical waste generated during construction would include:

- excess spoil from excavations works
- construction waste, including packaging, concrete, bricks, bitumen, asphalt, steel, timber
- general litter from site personnel such as food scraps, plastic and glass containers and packages
- liquid waste such as oils and chemicals from equipment maintenance, in addition to sewage from construction site facilities

The incorrect disposal of construction wastes could potentially result in contamination of local soils and water resources. Prior to the disposal of any waste material, it would be classified in accordance with NSW Waste Classification Guidelines (EPA 2014) and taken to an appropriately licensed waste management facility.

If asbestos is detected it would be remediated in accordance with a site specific Remediation Action Plan. Further validation reporting and waste management and disposal will need to be considered.

It is anticipated that construction works would not require the use of, or result in the production of, any hazardous materials apart from standard machinery fuel and oil. Opportunities to reduce, recycle and reuse on this project would be sought with the contractor and documented in the Waste Management Plan or CEMP.

5.7.2 Operational Impacts

There is expected to be an increased litter and rubbish dumping by the public in addition to the current level as the site becomes more accessible.

5.7.3 Mitigation Measures

Measures that will be implemented to address potential waste impacts are listed in Table 5-9.

Table 5-9 Mitigation measures for waste and resource management items (WR)

Ref	Mitigation Measure	Timing
WR1	Construction waste would be managed through the waste hierarchy established under the *Waste Avoidance and Recovery Act 2001*, which is as follows: Avoidance of waste – minimise the amount of waste generated during construction by avoiding unnecessary resource consumption Resource recovery – Reuse, reprocess, and recycle waste products generated during construction to minimise the amount of waste requiring disposal Disposal – Where resources cannot be recovered, dispose of them appropriately to minimise the potential adverse environmental impacts.	Construction
WR2	Where possible construction wastes would be diverted from landfill and recycled or reused within the project areas or with an appropriate recycling contractor.	Construction
WR3	Refuse receptacles must be used at the compound to enable the site to be kept tidy and for waste to be sorted and disposed of correctly. Waste bins must be used at the contractor's compound for office waste and general putrescible waste. Waste bins must also be provided within the construction site but be located such that no water pollution can occur from litter.	Construction
WR4	The contractor will be required to dispose of any waste materials not able to be reused or recycled onsite to an approved waste disposal facility and in accordance with the relevant statutory provisions.	Construction
WR5	All waste, including soil, is to be classified in accordance with the *NSW EPA Waste Classification Guidelines* prior to removal offsite.	Construction
WR6	Waste to be disposed at suitably licensed waste facilities. All waste material taken offsite is to be tracked (through disposal dockets) to ensure it is disposed at the designated destination. The following information is required: ■ The date and time the waste was removed from the site, ■ The location the waste was generated from, ■ The classification of the waste, ■ The vehicle registration number of the waste transport vehicle, ■ The quantity of the load of waste removed from site, ■ Waste receipt docket from the waste receiving facility, and ■ Weighbridge docket from the waste receiving facility.	Construction
WR7	Any fill material brought on site for the works must be verified as virgin excavated natural material or excavated natural material before its use. No contaminated or potentially contaminated materials are to be used.	Construction
WR8	A Construction Waste Management Plan (CWMP) is to be developed to detail how waste will be adequately managed throughout the project. The CWMP is to be approved by the City of Parramatta Council prior to construction. The CWMP may be incorporated into the CEMP.	Pre-construction
WR9	An operational litter management plan will be implemented.	Construction

5.8 Traffic and Parking

5.8.1 Construction Impacts

The proposed works will result in an increase in traffic due to construction machinery, workers' vehicles, and trucks carting materials. This is expected to have a local impact on traffic for the duration of the construction during standard working hours. The construction period is currently estimated to be 12 months but a detailed construction program will be developed by the contractor once appointed by the City of Parramatta Council.

The removal of 32 parking spaces as part of the project will have notable impacts on local parking availability. These impacts will first be noticeable during the construction phase when the spaces first become unavailable. Similarly, the permanent closure of Horwood Place to Phillip Street is likely to first occur near the beginning of the construction phase. Implementing effective mitigation measures will be essential to minimise disruptions and maintain accessibility for all stakeholders. Further consultation with affected parties and continuous monitoring of the situation will ensure that any unforeseen issues are promptly addressed.

While roadworks are taking place in George Street, Phillip Street, Auctioneer Lane and the section of Horwood Place which is to remain open to vehicular traffic, there may be times when temporary lane closures, traffic diversions and/or traffic controls are required. The Indicative Construction Traffic Management Plan (Appendix S) identifies mitigation measures which are listed within Table 5-10 of this REF.

5.8.2 Operational Impacts

The objective of the works is to reduce motor vehicle traffic and increase cycle traffic in Horwood Place by closing it to through traffic and to encourage pedestrian usage by increasing the footpath widths and creating public gathering spaces. Accordingly, an operational Traffic Management Plan (TMP) has been prepared (Appendix T) and approved by TfNSW (Appendix U), to manage the impacts of the changed traffic arrangements, on local traffic during operation. In summary Horwood Place will remain open to through traffic from George Street to maintain entry to the Erby Place Carpark from George Street. Direct access to this multi-storey carpark adjacent to the project site is considered sufficient amelioration for the loss of the 32 on-street carparking spaces (2 of which are loading zones that are relocated nearby).

New loading zones will be provided on Phillip Street near the corner of Horwood Place to replace the two which will be removed from Horwood Place.

The proposed road closure will not impact current or future developments within the precinct and will have no impact on adjacent or adjoining Council areas. Comprehensive public consultation was conducted from 11 March to 15 April 2024, including direct consultation with businesses, drop-in sessions, online feedback, and advertisements. Public feedback addressed concerns regarding block circumnavigation, on-street parking loss, loading zone relocation, and immediate pedestrianisation of Horwood Place.

5.8.3 Mitigation Measures

Measures that will be implemented to address potential traffic impacts are listed in Table 5-10.

Table 5-10 Mitigation measures for traffic management (T)

Ref	Mitigation Measure	Timing
T1	A Traffic Management Plan has been prepared with details of active and passive measures to control pedestrian and vehicle traffic and on and off street parking (Appendix T).	Operation

Ref	Mitigation Measure	Timing
T2	All workers and subcontractors engaged on-site are to complete a site induction. The induction should include permitted access routes to and from the construction site for all vehicles, as well as standard environmental, work, health and safety (WHS), driver protocols and emergency procedures.	Pre-Construction
T3	Access to the heavy vehicle turning paths for maintenance and emergency vehicles are to be secured at all times.	Construction, Operational
T4	Where possible, current traffic movements and property access are to be maintained during the works. Any disturbance is to be minimised to prevent unnecessary traffic delays.	Construction
T5	Notify residents in advance of any access restrictions and driveway works.	Pre-Construction
T6	Signage will be used to advise pedestrians and motorists of the worksite. Appropriate measures would be implemented to direct people around and through the work site.	Pre-Construction
T7	Comply with Council requirements regarding traffic control, access and road/ pedestrian access.	Construction
T8	Erect signs regarding proposed works, temporary road closures, diversions etc. From 1 month prior to closure, and 1 month after closure, the construction contractor is to install a minimum of 3 variable messaging systems (VMS) on Wilde Avenue, Smith Street and George Street.	Construction
T9	Delivery of material, equipment, machinery, etc. will always occur within the site boundary. All work vehicles and machinery when not in actual use for the proposed activity will be stored off road.	Construction
T10	Operators to drive to conditions.	Construction
T11	A Traffic Management Plan (TMP) and Traffic Control Plans (TCP) prepared for the management of local traffic during construction.	Pre-construction
T12	Appropriate numbers of off-site and onsite carparking will be available to minimise the amount of public carpark being used by construction workers.	Construction
T13	Pedestrian and cyclist access and safety (including diversions) must be considered in the Traffic Management Plan.	Construction
T14	Authorised traffic controllers are to be present throughout construction hours when construction works are causing alterations or temporary lane closures at the Horwood Place / Phillip Street and Horwood Place / George Street intersections.	Construction
T15	Security measures must be put in place to ensure the safety of the public during the course of construction.	Construction
T16	Identify and communicate nearby public parking facilities or temporary arrangements.	Pre-construction, Construction
T17	Stage construction activities to minimise the impact on available parking spaces.	Pre-construction, Construction
T18	Replace the existing loading zone parking spaces with new ones on Phillip Street to maintain essential service access. Ensure clear signage and communication regarding the relocation to minimise disruption to businesses and visitors.	Pre-construction, Construction

Ref	Mitigation Measure	Timing
T19	Implement smart parking management systems to optimize the use of Erby Place carpark efficiently.	Construction

5.9 Urban Design and Visual Impacts

Urban design for the project has been considered as detailed below:

- Granite footpath
- Non bitumen surface carriageway
- Retention of existing trees
- New trees
- Native mix of plants
- Signage
- Lighting
- Artwork

5.9.1 Construction Impacts

Further details are provided in the design plans for the proposal. During construction, some short-term visual impacts will be present for nearby sensitive receivers. The aesthetics of the site will be diminished during construction, with excavation and stockpiled material visible, as well as construction material and equipment. However, this visual impact, will only be temporary during construction.

While some of the areas will be closed to the public during construction, there are still footpaths and other accessways in the vicinity which will require diversions or other active management during construction. Security measures will be put in place to ensure the safety of the public during the construction period. Signage will be used on the fencing including contact details for the Council's Project Manager for the project.

During construction, works are anticipated to be completed during daylight hours; therefore, additional construction lighting is not expected to be required.

5.9.2 Operational Impacts

Upon completion, the project aims to enhance visual amenity through improved landscaping, new plantings, and aesthetic upgrades, resulting in a more attractive and greener environment compared to current conditions (Appendix V).

During operation, security (crime prevention) is considered to be low risk given the short pathway lengths and overall passive surveillance of public areas (pathways, grass areas, carparks etc).

An accessibility design review (Appendix W) has found that the proposed design will meet the accessibility needs of those with disabilities.

Council is developing a Heritage Interpretation Plan with the Dharug Cultural Custodian Panel which will result in a number of small artworks and interpretation devices to be present in the landscape. These will add a positive visual impact and contribute to the unique stories of Parramatta. It is expected that the proposed works will achieve the expectations of the local community as a high quality cultural and scenic destination, so any artworks will have minimal intrusive visual impact.

The proposed installation of lighting and lit signage will have a visual impact on the subject site. The proposal includes integrated lighting, community/event messaging, digital signage, and Additional Variable Message Signage.

The proposed works are in a built-up commercial area, so the addition of extra lighting will not increase the lumens beyond the current background level.

5.9.3 Mitigation Measures

Measures that will be implemented to address potential public amenity impacts are listed in Table 5-11.

Table 5-11 Mitigation measures for public amenity management items (PA)

Ref	Mitigation Measure	Timing
PA1	Exclusion fencing must be used to ensure members of the public are kept out of the construction area. Shade cloth or similar should be used on perimeter fencing to improve visual amenity.	Construction
PA2	Signage must be used on the fencing including contact details of the City of Parramatta Council's Project Manager for anyone who needs to make contact regarding the project.	Construction
PA3	If mobile/temporary lighting towers are required, they will be positioned in a downward facing position to minimise light spill to any nearby sensitive receivers.	Construction
PA4	Operational lighting is to be installed in accordance with *AS4282:2019 – Control of the obtrusive effect of outdoor lighting*. This will minimise any light spill impacts to nearby sensitive receivers.	Operation

5.10 Cumulative Impacts

The proposed works are not anticipated to have any significant cumulative impacts and is not considered to inhibit the ability of future generations to use or enjoy the site.