Part B

Clyde stabling and maintenance facility and Rosehill services facility

17

17.0 Clyde stabling and maintenance facility and Rosehill services facility

This chapter provides a description of Clyde stabling and maintenance facility and Rosehill services facility during operation and construction of this proposal. This chapter also provides an assessment of potential impacts during operation and construction that relate to the Clyde and Rosehill facilities and identifies mitigation measures to address these impacts.

17.1 Overview

Clyde stabling and maintenance facility would be located in the Clyde industrial area, to the north of the M4 Western Motorway and to the east of James Ruse Drive. Duck Creek sits north and east of the site. Rosehill services facility would be located to the north of Duck Creek and the stabling and maintenance facility, and south of Rosehill Gardens racecourse. Unwin Street is located to the north of the services facility and Shirley Street is located to the east.

In addition to the Rosehill Gardens racecourse, the area around Clyde stabling and maintenance facility and Rosehill services facility is generally made up of industrial uses. Local strategic planning strategies identify the area around Clyde stabling and maintenance facility and Rosehill services facility as continuing to provide its existing land use as key urban services. Design development for the Clyde stabling and maintenance facility and Rosehill services facility would consider integration with strategic planning for the precinct.

17.1.1 Operation

When operational, Clyde stabling and maintenance facility and Rosehill services facility would sit within, and would be compatible with, the surrounding industrial land use.

Opportunities for landscaping have been identified around the facility to provide improved visual amenity and tree canopy cover. While the facility is essentially to support operation of the rail line and would not support public access, it would still support key movement and place elements, including delivery of an active transport link within the former T6 Carlingford Line corridor (the ‘Wilderline’), safeguarding the opportunity for future active transport corridors including adjacent to Duck River and Duck Creek, and landscaping around the site.

New permanent pedestrian access would also be provided to Rosehill Gardens racecourse from James Ruse Drive to replace the previous access over the former Rosehill Station footbridge (which would be removed as part of work under the previous Sydney Metro West planning application). This permanent access would likely be located to the north of the Sydney Metro West infrastructure, potentially through the formalisation of the temporary construction phase access point.

Localised rehabilitation of Duck Creek and A’Beckett’s Creek would be carried out where they run through or adjacent to the Sydney Metro site. This would provide substantial ongoing biodiversity and public benefits.

Key potential impacts anticipated during operation of Clyde stabling and maintenance facility and Rosehill services facility are generally limited, for example:

- the Clyde stabling and maintenance facility and Rosehill services facility would result in minimal impacts on the surrounding road network
- predicted noise levels for the facilities and the section of aboveground track connecting to the mainline tunnels would be compliant with the applicable noise criteria at the nearest residential receivers. Ongoing consultation with Rosehill Gardens racecourse would continue to better understand how potential impacts from operational noise at nearby horse stables can be feasibly and reasonably managed
- any groundwater collected in the stations and ancillary infrastructure would be transferred to a permanent water treatment plant at Clyde stabling and maintenance facility prior to discharge to stormwater. The discharge water quality level would be determined in consultation with the NSW Environment Protection Authority during detailed design, taking into consideration the current water quality of the receiving watercourse
- due to the industrial setting of these facilities, visual, social and business impacts would generally be negligible to low.

17.1.2 Construction

Major civil construction including levelling of the site, tunnelling work, and the excavation of a services shaft and tunnel dive structure at Clyde and Rosehill was assessed and approved under a previous Sydney Metro West planning application and does not form part of this proposal. This proposal includes the construction activities required to complete the Clyde stabling and maintenance facility and Rosehill services facility ready for the operation of Sydney Metro West.

Construction activities at this site would require the continued use of much of the construction sites used under the previous Sydney Metro West planning application. The previous work at the site will have raised the stabling yard above the Probable Maximum Flood (PMF) level and diverted Kay and Unwin Street over the site. The proposed work for this proposal is expected to have a total duration of about four years.

Potential flood hazard to people and vehicles accessing the construction site would need to be managed as part of construction planning as the area surrounding the construction site is vulnerable to flooding. This would be through the continuation of arrangements in place as part of the previous Sydney Metro West planning application.

Construction impacts on traffic, parking, public transport, pedestrians and cyclists would be minimal, including during major events at Rosehill Gardens racecourse. The Construction Traffic Management Framework (CTMF) outlines mitigation measures to minimise potential impacts, including during special events.

'Low' temporary construction noise impacts are predicted at the nearest residential receivers during rail system access shaft construction, when material is being supplied through the tunnel portal of the outdoor dive structure. 'Low' temporary impacts are also predicted at one horse stable at Rosehill Gardens racecourse that is adjacent to a gap in the acoustic hoarding to allow for the realigned Unwin Street. Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed. 'Low' temporary sleep disturbance impacts are predicted at some of the nearest residential receivers west of James Ruse Drive. The Sydney Metro Construction Noise and Vibration Standard (CNVS) would be implemented to manage these temporary impacts and further investigation of minimising sleep disturbance would be completed as detailed construction planning information becomes available.

With respect to vibration, the cosmetic damage screening criterion is predicted to be exceeded at the local heritage listed RTA depot façade located on Unwin Street. A more detailed assessment of the structure and attended vibration monitoring would be carried out so that vibration levels remain below appropriate limits for that structure.

Similar to the operational phase, potential visual, social and business impacts during construction would generally be negligible to low due to the industrial setting.

Potential impacts would be managed through the implementation of the Sydney Metro management frameworks and standard mitigation measures including the Construction Environmental Management Framework (CEMF), Overarching Community Communications Strategy (OCCS), CTMF and CNVS.

17.2 Clyde stabling and maintenance facility and Rosehill services facility description

17.2.1 Design development

Development of the design has involved ongoing consultation with stakeholders and the Design Advisory Panel. This has included:

- feedback as part of submissions and consultation associated with the *Sydney Metro West Environmental Impact Statement Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a)
- ongoing meetings and design workshops held with the City of Parramatta Council since exhibition of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a)
- meetings and advice from the Design Advisory Panel.

Key features or changes to the design to avoid or minimise impacts, and respond to feedback from stakeholders and the Design Advisory Panel include:

- delivery of a section of the 'Wilderline' (an active transport connection along the former T6 Carlingford Line corridor), based on feedback provided by the City of Parramatta Council

- rehabilitation of Duck Creek and A'Beckett's Creek where they run through or are adjacent to the Sydney Metro site, based on feedback provided by the City of Parramatta Council.

17.2.2 Clyde stabling and maintenance facility description

Clyde stabling and maintenance facility would be an integrated facility incorporating most operational and maintenance functions for Sydney Metro West, including the operations control centre and infrastructure required to maintain the train fleet.

The stabling and maintenance facility layout has been configured to allow for metro train access/egress from a dive structure (an open-air structure leading to a tunnel portal where trains enter/exit the mainline tunnels) located to the north of the site, adjacent to James Ruse Drive. The dive structure would connect the facility into the mainline tunnels. Vehicular access would be provided via separate access/egress points from Wentworth Street (delivery, contractors and visitor access) and Unwin Street (for general staff access). Large vehicle access to the stabling and maintenance facility would be via Wentworth Street. An internal access road network would provide for general circulation while being appropriately separated from train movements. The site would also be fenced from general public access and lighting would be used at night for safety and security of the site.

The operation of the stabling and maintenance facility would include the following components:

- stabling tracks to store trains
- a train maintenance centre, sidings and depot
- workshops for the maintenance of railway infrastructure components
- vehicle equipment measurement systems building
- train wash/bio wash and graffiti removal facility
- wheel lathe and heavy wash building
- test track to undertake training, testing, commissioning and maintenance
- operations control centre and administration building
- dangerous goods building
- cleaners building
- train servicing and maintenance equipment
- fire control and security building, including the provision of fire hydrants, hoses and other firefighting equipment within the building
- operational water treatment plant to treat wastewater pumped from the tunnels, stations and other underground facilities. Sydney Metro is investigating options for the location of the water treatment plant within the Clyde stabling and maintenance facility and Rosehill services facility site, including locations closer to the Rosehill services facility
- offices, staff car parks, storage, and internal vehicular and pedestrian access roads.

Given the available roof space, Sydney Metro would investigate options for the inclusion of a solar array.

This proposal would also include rehabilitation and renaturalisation of parts of Duck Creek, and site landscaping (as required by Concept condition of approval C-B2) (refer to Section 17.3).

The facility would operate 24 hours a day, seven days a week. An indicative layout and key design elements of the stabling and maintenance facility are shown in Figure 17-1 and Figure 17-5. The design of the stabling and maintenance facility is subject to further detailed design development.

New pedestrian access would be provided to the Rosehill Gardens racecourse from James Ruse Drive to replace the previous access over the former Rosehill Station footbridge (which would be removed as part of work under the previous Sydney Metro West planning application). This access would likely be located to the north of the Sydney Metro West infrastructure, potentially through the formalisation of the temporary construction phase access point. Active transport connections to the surrounding area would be also provided, including delivery of part of the Wilderline within the site, which is a pedestrian network initiative by the City of Parramatta Council.

Appendix A (Assessment requirements) provides an overview of how the design of this proposal has addressed the relevant Concept conditions of approval at the Clyde stabling and maintenance facility.

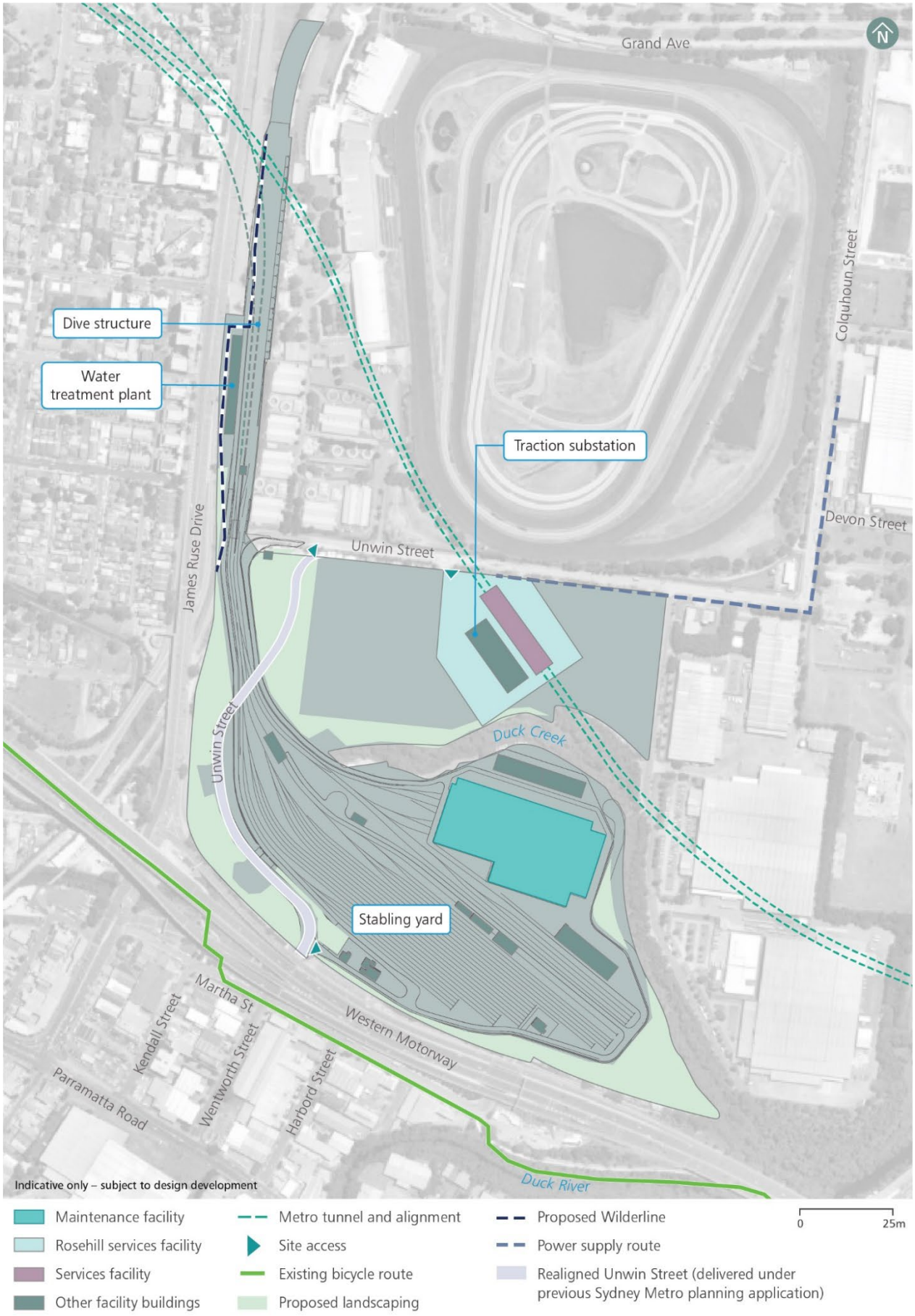

Figure 17-1 Indicative layout – Clyde stabling and maintenance facility and Rosehill services facility

Stabling activities

Trains not in operation would be stored in the stabling facility. Trains would normally be shut down after they have been stabled and the interior cleaned. They would need to be powered up about one hour before their scheduled departure time. The stabling and maintenance facility could be used to store a powered standby train for use in the event that a train needs to be withdrawn from service at short notice, if required.

The installation of stabling tracks would be undertaken progressively throughout the life of this proposal. About nine stabling tracks would be provided at the stabling and maintenance facility initially, with additional capacity (including select fill layers) provided for about thirteen additional stabling tracks. Where relevant, this Environmental Impact Statement has assessed both the at-opening and ultimate capacity of the facility.

Train maintenance activities

The infrastructure maintenance building would provide for both general and more substantial periodic maintenance activities (such as bogie/underframe inspections and other major equipment replacement).

The maintenance building would include workshops and storage areas, inspection pits and elevated walkways (for inspection of the train fleet), and crane lifting facilities. Maintenance operations would also include carrying out inspections, maintenance and component exchange on the train fleet.

Rail maintenance vehicles would use the metro network and provide access for maintenance crews. The types of maintenance activities that would be required are detailed in Section 5.6.6 (Maintenance activities) of this Environmental Impact Statement.

The water used for spot cleaning would be collected and treated onsite at the operational water treatment plant for reuse onsite.

Administration and staff facilities, as well as the operations control centre for the metro network, would be provided at the stabling and maintenance facility.

Car parking for staff and visitor use (about 170 spaces) would be provided within the site, including maintenance vehicle parking.

17.2.3 Rosehill services facility description

Rosehill services facility would include a services facility building and traction substation building. Access to the services facility would be provided via Unwin Street. An internal road would provide access for inspection and maintenance for the services facility building and adjacent substation building. This internal road would be appropriately separated from train movements associated with the stabling and maintenance facility. The site would also be fenced from general public access and lighting would be used at night for safety and security of the site.

The services facility building would include tunnel ventilation plant rooms and associated air distribution equipment, as well as a central open shaft over a track crossover to allow for open air ventilation. A portion of the aboveground structures would be for inserting and extracting mechanical equipment and for access to the track crossover. The building would be about six storeys at the northern end, stepping down to about four storeys in the south. The key features of the services facility is provided in Section 5.5.2 (Ancillary facilities and associated work) of this Environmental Impact Statement.

The traction substation would supply power to Sydney Metro West during operation and would be located adjacent to the services facility building. The structure would be about five to six storeys in height. The key features of the proposed traction substations are provided in Section 5.5 (Operational ancillary infrastructure) of this Environmental Impact Statement.

A permanent power supply route would be provided between traction substation at the Rosehill services facility and Camellia substation, generally within road reserves along Unwin Street and Colquhoun Street (refer to Figure 17-1).

The use of residual land required for construction surrounding the services facility (within the vicinity of the stabling and maintenance facility) following completion of construction would be investigated during further design development and in consultation with relevant stakeholders.

Rosehill services facility would be an unmanned facility that forms part of the tunnel ventilation system when required to provide additional heat removal, particularly during peak summer conditions. However, the facility would not be expected to operate during normal operating conditions. The adjacent traction substation would operate 24 hours a day, seven days a week.

The indicative layout of Rosehill services facility is shown in Figure 17-1. A long-section of Rosehill services facility is shown in Figure 17-2. The design of the services facility is subject to further detailed design development.

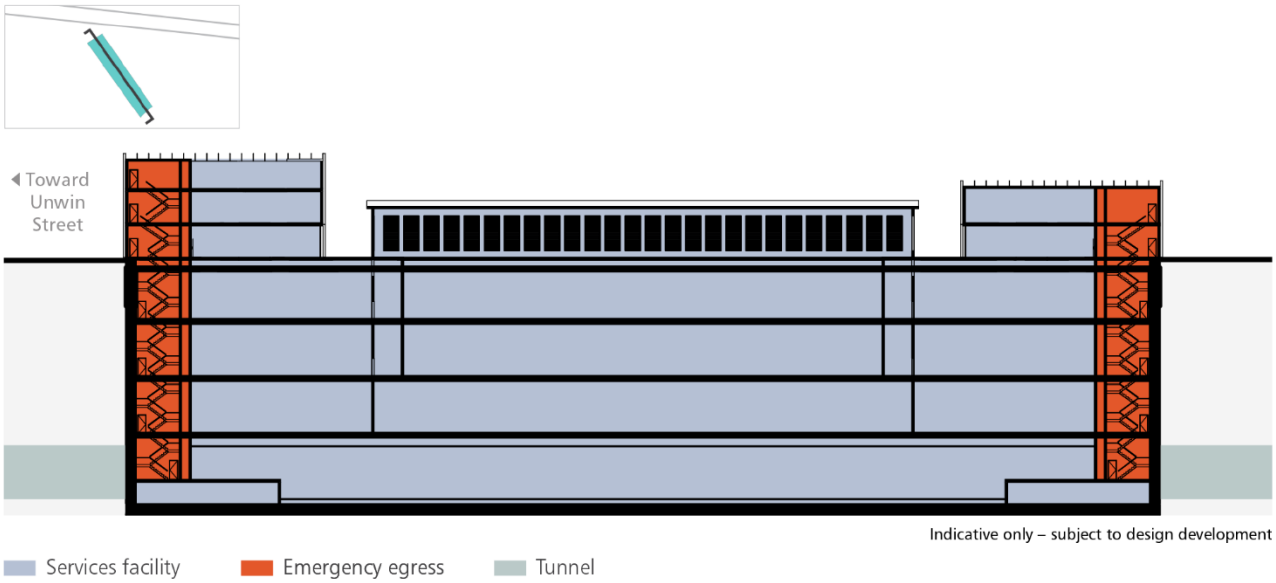

Figure 17-2 Indicative long-section – Rosehill services facility

17.3 Placemaking

The vision for Clyde stabling and maintenance facility, Rosehill services facility and its surrounds would be developed in consultation with the NSW Department of Planning and Environment, with regard to the Camellia-Rosehill Place Strategy.

17.3.1 Integration with strategic planning

Design development for the Clyde stabling and maintenance facility and Rosehill services facility would consider integration with strategic planning for the precinct. An overview of key strategic plans which have and would continue to be taken into consideration is included below, in accordance with the requirements of Concept condition of approval C-B2(d).

This proposal has considered the objectives of *Better Placed* (Government Architect NSW, 2017) as outlined in Section 5.2 (Placemaking and design) of this Environmental Impact Statement. An overview of how this proposal meets the relevant transport and connectivity outcomes of the Healthy Built Environment Checklist (NSW Government, 2020a) is also provided in Appendix I (Healthy Built Environment Checklist).

Parramatta Local Strategic Planning Statement City Plan 2036

The Parramatta Local Strategic Planning Statement City Plan 2036 (City of Parramatta, 2020) identifies the area around Clyde stabling and maintenance facility and Rosehill services facility as continuing to provide its existing land use as key urban services. The proposed Sydney Metro West facilities in this area align with and support the continuation of this land use.

Sydney Green Grid

The Sydney Green Grid identifies two project opportunities in the vicinity of Clyde stabling and maintenance facility and Rosehill services facility:

- The Duck River project would run adjacent to Duck River to the east of Clyde stabling and maintenance facility. The facility would not impact the ability to realise this project, and would safeguard the ability to provide future connections, such as adjacent to Duck Creek
- The Carlingford Rail Line project (within the former rail line) would run partly through the site, alongside the aboveground connecting track to Clyde stabling and maintenance facility. Sydney Metro would deliver part of this active transport corridor within this proposal's operational footprint.

Draft Camellia-Rosehill Place Strategy

The Draft Camelia-Rosehill Place Strategy was released in December 2021, (NSW Department of Planning, Industry and Environment, 2021f) and provides a 20-year plan for the development of Camellia-Rosehill. The strategy builds on previous work published by the NSW Department of Planning and Environment for the precinct, including the Draft Camellia Town Centre Master Plan (2018) and Camellia Land Use and Infrastructure Strategy (2015).

The Draft Camellia–Rosehill Place Strategy sets out an approach to create a 'vibrant 18-hour entertainment precinct, a thriving residential town centre with supporting retail outlets, and a new urban services precinct'.

The draft strategy includes a master plan which provides a land use framework for future development in the precinct. It illustrates the primary land use, open space, and access and movement layout, and aims to strike a balance between the need for urban development while retaining strategically significant industrial land. The master plan identifies the need for the Sydney Metro West stabling and maintenance facility in this location.

The Camellia–Rosehill precinct is divided into three sub-precincts. The Rosehill services facility site is included in the southern area of the town centre sub-precinct, south of Unwin Street, bordered by two investigation sites for future use. The Clyde stabling and maintenance facility site is located in the western part of the urban services sub-precinct, between two areas of linear open space along James Ruse Drive and Duck Creek.

17.3.2 Place and design principles

Place and design principles for Clyde stabling and maintenance facility and Rosehill services facility were identified in Section 7.10.9 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The principles build on the five Sydney Metro-wide design objectives and have considered relevant local council strategies and *Better Placed* design objectives (refer to Section 5.2 (Placemaking and design) of this Environmental Impact Statement). Table 17-1 outlines how these principles have been achieved in Clyde stabling and maintenance facility and Rosehill services facility design.

Table 17-1 Design responses to Clyde stabling and maintenance facility and Rosehill services facility place and design principles

Place and design principle	Design response
Provide a well-designed stabling and maintenance facility to support operations and integrate into its surrounding context including strategic planning for the Camellia-Rosehill peninsula	• the design of stabling and maintenance facility provides for the efficient operation of the metro rail line • the facility sits within, and is compatible with, the surrounding industrial land use • opportunities for landscaping have been identified around the facility to provide improved visual amenity and tree canopy cover.
Provide for the safe and legible staff pedestrian movement within site	• the facility has been, and would continue to be, designed to provide for safe staff pedestrian movements within the site, including dedicated pedestrian walkways • the design would also facilitate active transport connections, including provision of a section of the 'Wilderline' and through safeguarding the ability for future active transport corridors within the vicinity of the site
Minimise impact to Duck Creek and support rehabilitation to the riparian corridor adjacent to the site	• work directly interfacing with the waterways has been minimised as far as practical • Sydney Metro would carry out rehabilitation of Duck Creek where it runs through or is adjacent to the Sydney Metro site as outlined in Section 17.3.3.
Maintain industrial uses on residual land (construction site), including access and integration with the surrounding uses	• the potential future use of residual land is subject to ongoing consultation with the City of Parramatta Council in accordance with the Concept condition of approval C-B2(b) and the NSW Department of Planning and Environment. This would include consideration of the existing zoning of the land, the nature of the surrounding uses, the recreational needs of the local population, and the necessary work and remediation to make the land suitable for potential public use. Sydney Metro is also considering the potential use of this land to provide flood storage to meet the requirements of condition of approval D10 of SSI 10038. Further information regarding considerations for the future of residual land at Clyde is provided in Section 18.2 (Property). Residual land would remain suitable for industrial use.

The key urban design strategies to support the implementation of the place and design principles are illustrated in Figure 17-3 and Figure 17-4.

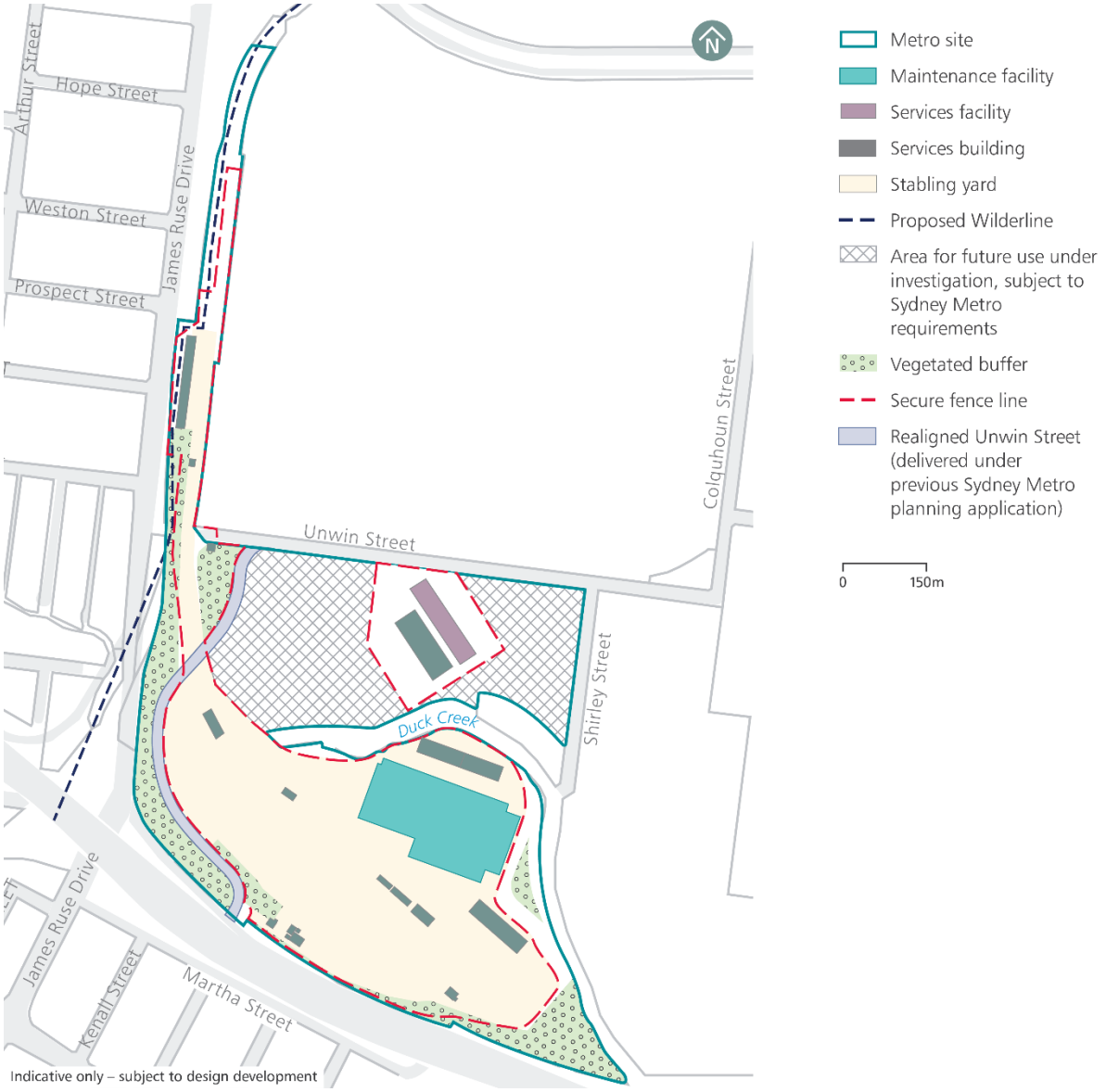

Figure 17-3 Land use and function urban design strategies – Clyde stabling and maintenance facility and Rosehill services facility

Figure 17-4 Access and connectivity urban design strategies – Clyde stabling and maintenance facility and Rosehill services facility

Clyde stabling and maintenance facility and Rosehill services facility would be secure facilities to support operation of the rail line and would not be publicly accessible. Notwithstanding, the design includes the following key movement and place features:

- provision of a section of the 'Wilderline' – a City of Parramatta Council proposed north-south active transport corridor within the former T6 Carlingford Line (in accordance with Concept condition of approval C-B2(a))
- provision of new pedestrian access to Rosehill Gardens racecourse from James Ruse Drive to replace the previous access over the former Rosehill Station footbridge (which would be removed as part of work under the previous Sydney Metro West planning application)
- landscaping around the boundary of the site to provide improved visual amenity and tree canopy cover
- rehabilitation of the waterways and riparian corridor to provide improved ecological function (as outlined in Section 17.3.3)
- safeguarding the ability for future active transport corridors within the vicinity of the site, including adjacent to Duck River and Duck Creek
- maintenance of a key (B-Double capable) heavy vehicle access route to the Camellia/Rosehill peninsula through the realigned Unwin Street over the rail tracks (carried out under the previous Sydney Metro West planning application).

17.3.3 Riparian rehabilitation

In the vicinity of the site, Duck Creek and A'Beckett's Creek are heavily weed infested in places, with other sections retaining some native vegetation. As part of this proposal, Sydney Metro would carry out localised rehabilitation of Duck Creek and A'Beckett's Creek where they run through or are adjacent to the Sydney Metro site. This would satisfy the requirements of the Concept conditions of approval related to renaturalisation and rehabilitation of these waterways (conditions of approval C-B2(c) and C-B10).

The overarching vision and objectives, and indicative rehabilitation approach are outlined below.

Vision and objectives

Sydney Metro's vision for the waterways is:

A healthy urban waterway able to be sustainably managed for the ongoing benefit of biodiversity and the public.

The objectives of the riparian rehabilitation are to:

- facilitate the expansion of mangroves (Plant Community Type 920) as needed to fill their full potential as an ecological niche within the site
- improve the ecological condition of vegetation surrounding the mangroves, including composition, structure and maturity
- improve the quantity and quality of fauna habitat throughout the site
- provide for manageable levels of ongoing effort and cost in maintaining the site's ecological integrity in perpetuity
- involve the local community where possible to encourage ownership and stewardship, with a view to maintaining future interest in sustaining the improved ecological condition
- satisfy Sydney Metro West Concept conditions of approval C-B2(c) and C-B10.

Indicative rehabilitation approach

The indicative approach to riparian rehabilitation is outlined in Table 17-2. The approach has been developed based on the overarching objectives and to:

- avoid heavy works or mass disturbance within the riparian area to avoid or minimise any potential impacts to the existing environmental values (particularly existing mangroves and native seedbank)
- avoid dredging or other substantial disturbance of the existing beds of the waterways to maintain their natural state and avoid disturbance of potentially contaminated soils.

A Rehabilitation Management Plan would be prepared to guide the riparian rehabilitation and provide further detail on the approach to rehabilitation, building on the indicative approach outlined in Table 17-2.

Sydney Metro West Concept condition of approval C-B10 currently restricts revegetation of the riparian zone to the use of species that are representative of Plant Community Type 920 (Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion). This would limit revegetation to the use of:

- Grey mangrove (*Avicennia marina subsp. australasica*)
- River mangrove (*Aegiceras corniculatum*)
- Beaded samphire (*Sarcocornia quinqueflora*).

Other species are likely to be relevant and important within the broader riparian zone and to provide for the success of the revegetation. As such, Sydney Metro proposes to supplement the revegetation with a number of additional species as outlined in the table below.

Table 17-2 Indicative approach to riparian rehabilitation

Aspect	Indicative approach
Detailed ecological survey and vegetation and heritage mapping	• carry out on-ground ecological survey including an audit of habitat values for threatened and non-threatened native flora and fauna • identify and refine opportunities for improvement of ecological condition and values.

Aspect	Indicative approach
Access	• plan and construct permanent access tracks (minimal width for on-foot maintenance access and to discourage public access to any sensitive areas), including consideration of potential active transport corridors. Additional public access in this area would be considered in consultation with relevant stakeholders, with regard to the draft Camellia-Rosehill Place Strategy • consider enhancement of suitable nearby parking areas for access by maintenance staff, and the potential for some parking to be provided within the facility.
Weed control	• weed control works would use typical bush regeneration methods where practical, such as physical removal and bagging, cut and paint, smothering with weed suppression matting or foliar application of herbicide • implement weed-mat, mulch or similar, to suppress weed regrowth, in tandem with targeted revegetation, and supported by ongoing weed removal.
Litter / rubbish removal	• remove existing litter/rubbish throughout the site • install gross pollutant traps such a pit baskets, stormwater outlet trash netting, sediment traps and trash racks (where possible and subject to access constraints) to minimise the continued introduction of litter and rubbish.
Habitat interventions	• installation of appropriate nest boxes • targeted revegetation with view to enhancing particular types of habitat.
Revegetation	• the scope of revegetation would be limited in favour of natural regeneration where feasible • revegetation should be used where necessary to rapidly suppress weeds and where it provides long-term benefits • only local native species would be used • urban-resilient species such as *Casuarina*, *Lomandra* and *Eucalyptus* would be used • prioritise species that would provide long-term habitat value as a foraging or roosting resource for target fauna • transplant mangrove suckers to extend presence of mangroves into exposed tidal flats (where possible).
Community involvement and information	Community involvement in rehabilitation programs can encourage people to value the site and maintain an interest in its ongoing protection and enhancement. Community involvement would include: • engagement with the local Aboriginal community and knowledge holders • identification and engagement with any local interest groups • ongoing engagement with City of Parramatta Council and relevant NSW Government agencies. Provision of community information regarding the site could include: • interpretive signage at strategic locations • plant species identification including their role in the local ecosystem • the role of mangroves including water quality and habitat associations • fauna species present and how they use the area • management of weeds • general issues associated with urban waterways such as water quality and flooding.

Aspect	Indicative approach
Governance	Governance arrangements would be required to establish the roles and responsibilities of the different parties, including Sydney Metro, the City of Parramatta Council, other NSW Government agencies, Aboriginal groups and any other community groups. This would include the responsibility for ongoing management and maintenance of the site.

17.4 Construction description

This section provides a description of the construction activities required to complete the Clyde stabling and maintenance facility and Rosehill services facility ready for the operation of Sydney Metro West.

17.4.1 Stabling and maintenance facility

Overview

The construction site for Clyde stabling and maintenance facility would be located between the M4 Western Motorway, James Ruse Drive and Rosehill Gardens racecourse in the suburbs of Clyde and Rosehill.

Construction activities at this site for this proposal would require the continued use of much of the construction site used for work carried out under the previous Sydney Metro West planning application.

The stabling and maintenance facility construction site would also be levelled as a result of activities associated with the work carried out under the previous Sydney Metro West planning application prior to the commencement of this proposal.

The location and indicative construction layout of Clyde stabling and maintenance facility is shown in Figure 17-5.

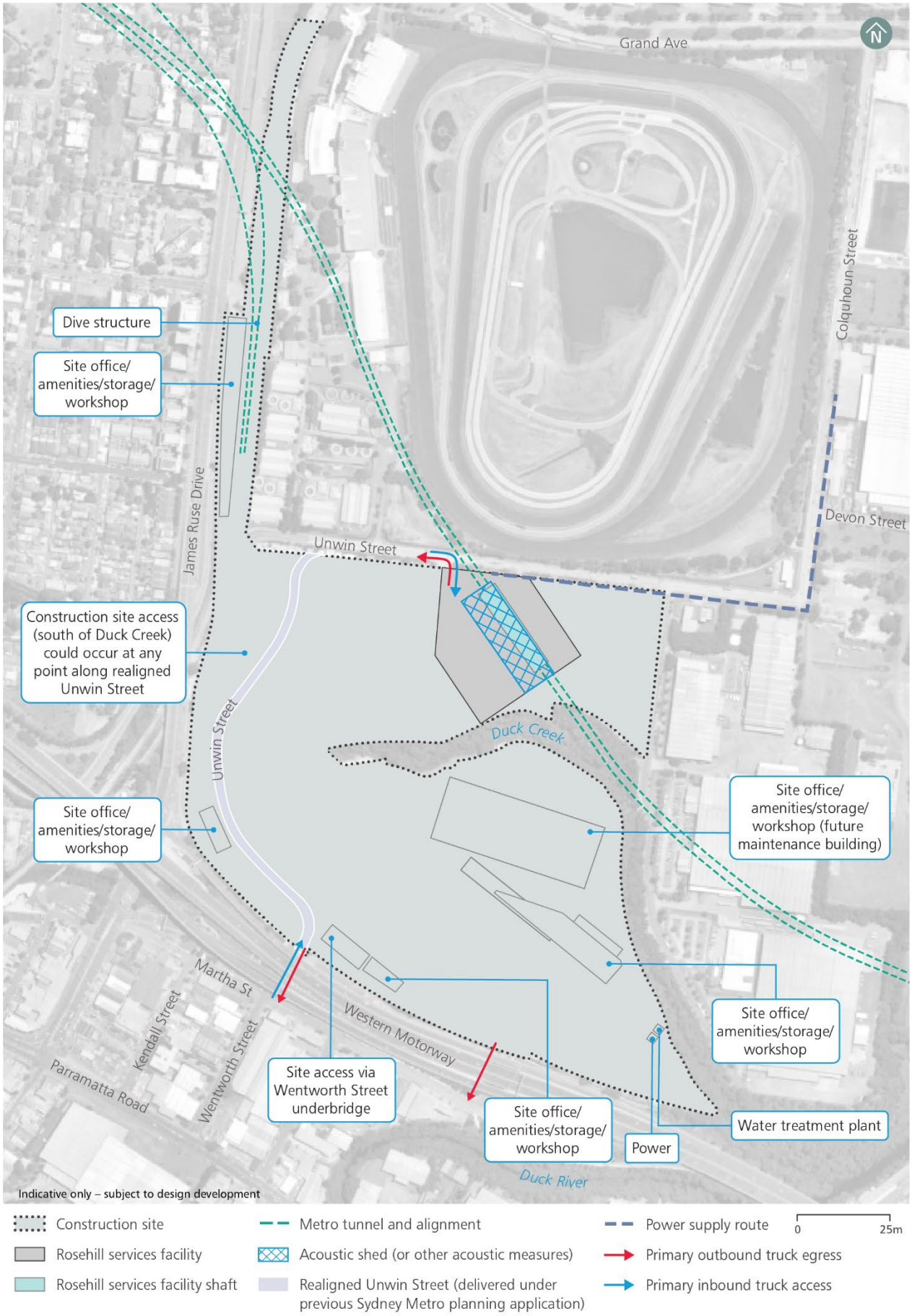

Figure 17-5 Indicative construction site layout – Clyde stabling and maintenance facility and Rosehill services facility

Construction work

Key construction work at Clyde stabling and maintenance facility as part of this proposal would include:

- enabling and site establishment work
- placement of select material to final design levels
- construction of access roads and car parking, including kerb and guttering, localised drainage work, surfacing including asphalt, concrete or pavers, line marking, signage and other finishes
- building and facility construction and fit-out, including maintenance buildings, the operations control centre, administration, cleaning facilities, security and fire control buildings, a train wash facility and an operational water treatment plant
- construction and fit-out of the stabling yard to accommodate the stabling of trains, including:
  - construction of rail entry/exit structures to the facility from the mainline tunnels
  - surface rail track installation (refer to Section 6.4.6 (Tunnel fit-out and rail systems work))
  - electrical fit-out
  - signalling and communications works
- rehabilitation and revegetation work within the Duck Creek and A'Beckett's Creek riparian zone as outlined in Section 17.3.3
- finishing work, testing and commissioning.

The indicative construction program for Clyde stabling and maintenance facility is shown in Figure 17-6. Creek rehabilitation works are likely to commence in early 2023.

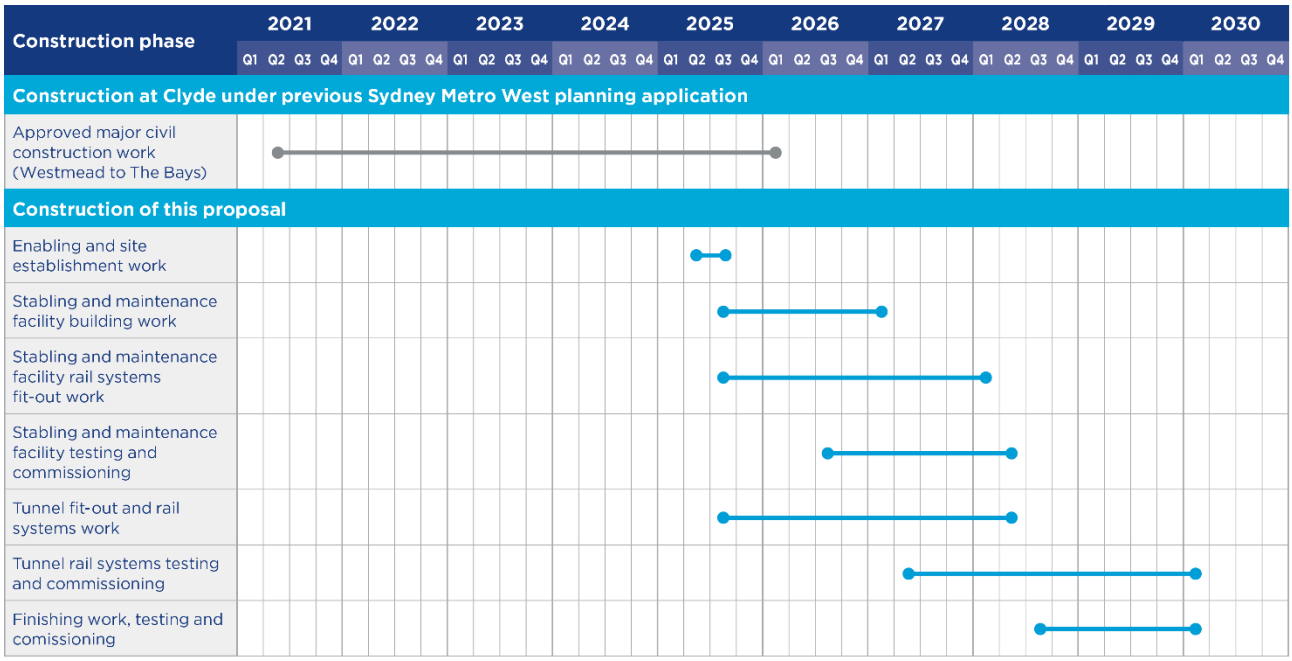

Figure 17-6 Indicative construction program – Clyde stabling and maintenance facility

Other construction elements specific to Clyde stabling and maintenance facility are provided in Table 17-3. Indicative construction hours, plant and equipment and workforce for Clyde stabling and maintenance facility construction site are provided in Section 6.5 (Other construction elements). Key elements specific to Clyde stabling and maintenance facility as described in the table below, are also depicted on Figure 17-5.

Table 17-3 Other construction elements – Clyde stabling and maintenance facility

Construction element	Description
Construction traffic access and egress	Continued access and egress arrangements established under the previous Sydney Metro West planning application that would likely be maintained during construction include: • access to and egress from the southern side of the construction site via Wentworth Street.
	Additional and/or new access and egress arrangements likely to be required for construction of this proposal include: • potential secondary egress from the southern side of the construction site via Martha Street • access to and egress from the northern side of the construction site via right-in from and left-out onto the realigned Unwin Street.
Peak daily traffic movements	• about 408 daily light vehicle movements • about 320 daily heavy vehicle movements. Note: Movement refers to a one-way movement. A vehicle entering and then leaving a construction site represents two movements.
Transport network modifications	Continued transport network modifications that would be established under the previous Sydney Metro West planning application that include the permanent realignment of Unwin Street.
	No new temporary network modifications or loss of parking would be required to facilitate construction of Clyde stabling and maintenance facility for this proposal.

17.4.2 Rosehill services facility

Overview

Construction of Rosehill services facility would require the continued use of a portion of the Clyde stabling and maintenance facility construction site as described in Section 17.4.1. The Rosehill services facility construction site would be used for the work carried out under the previous Sydney Metro West planning application.

Civil works to excavate the services facility shaft and levelling of the site will be carried out under the previous Sydney Metro West planning application.

This proposal would also include the construction of a permanent power supply route between the traction substation at the Rosehill services facility and Camellia substation, generally within road reserves along Unwin Street and Colquhoun Street. Construction of the power supply route would generally be carried out by open trench within the road reserve. Construction contractors would be required to meet the requirements of the CEMF.

The location and indicative layout of the Rosehill services facility construction site is shown in Figure 17-5.

Construction work

Key construction work at Rosehill services facility would include:

- enabling and site establishment work, including:
  - delivery of tunnel ventilation fans, substation transformers, precast concrete elements and structural steel
  - temporary installation of an acoustic shed (or other acoustic measures) above the services facility
- construction of aboveground and underground structures for the services facility
- access for tunnel fit-out and rail systems work
- construction and fit-out of a traction substation
- construction of a permanent power supply route between Rosehill services facility and Camellia substation
- finishing work, testing and commissioning.

The indicative construction program for Rosehill services facility is shown in Figure 17-7.

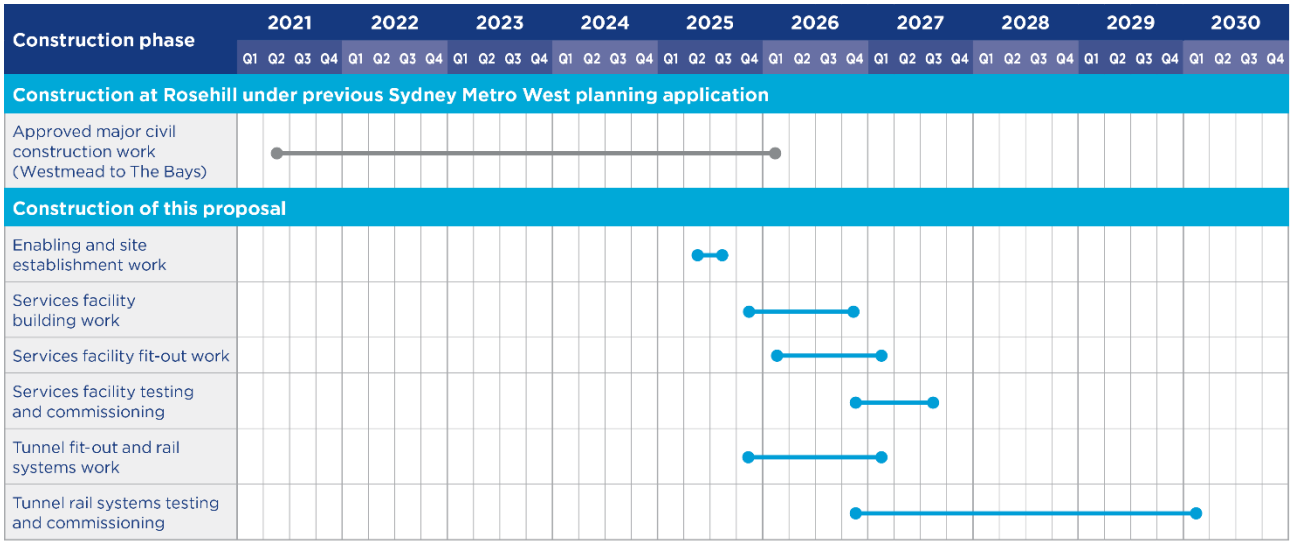

Figure 17-7 Indicative construction program – Rosehill services facility

Other construction elements specific to Rosehill services facility are provided in Table 17-4. Indicative construction hours, plant and equipment and workforce for Rosehill services facility (as part of the Clyde stabling and maintenance facility construction site) are provided in Section 6.5 (Other construction elements). Key elements specific to Rosehill services facility as described in the table below, are also depicted on Figure 17-5.

Table 17-4 Other construction elements – Rosehill services facility

Construction element	Description
Construction traffic access and egress	Proposed access and egress arrangements likely to be required for construction of this proposal include: • access to and egress from the construction site via right-in from and left-out onto the realigned Unwin Street.
Peak daily traffic movements	• about 100 daily light vehicle movements • about 132 daily heavy vehicle movements. Note: Movement refers to a one-way movement. A vehicle entering and then leaving a construction site represents two movements.
Transport network modifications	No temporary network modifications would be required to facilitate construction of Rosehill services facility.

17.5 Transport

Further details of the operational and construction transport assessment, including the approach and methodology, is provided in in Technical Paper 1 (Operational transport) and Technical Paper 2 (Construction transport). This includes an explanation of terminology, relevant guidelines and the transport modelling carried out.

Potential impacts (including benefits) at a regional level or where impacts are common across precincts are assessed in Chapter 18 (Proposal-wide) of this Environmental Impact Statement. This includes strategic transport benefits during operation, and potential impacts in relation to road user safety, construction worker parking, emergency vehicles and road condition during construction.

17.5.1 Baseline environment

The baseline transport environment described for Clyde stabling and maintenance facility and Rosehill services facility includes the existing transport environment as well as adjustments made under the previous Sydney Metro West planning application.

Active transport network

The pedestrian network around Clyde stabling and maintenance facility and Rosehill services facility is limited given the industrial land uses to the east and south of Rosehill Gardens racecourse and north of Duck River. Footpaths are located on Wentworth Street south of Kay Street, Martha Street, James Ruse Drive and Parramatta Road. Unwin Street and Kay Street will be realigned under the previous Sydney Metro West planning application, with provision of pedestrian and cyclist facilities.

The former Rosehill Station footbridge is currently informally used to access Rosehill Gardens racecourse from the associated car park during events. The former Rosehill Station and footbridge will be permanently removed as part of work under the previous Sydney Metro West planning application, and provision will be made for an alternative crossing of the former T6 Carlingford Line to maintain access to Rosehill Gardens racecourse.

Given the limited pedestrian infrastructure and the industrial nature of the area, typical pedestrian volumes within the immediate vicinity of the construction site are low. Exceptions are during events held at Rosehill Gardens racecourse, where pedestrian volumes are concentrated around car parks and access gates.

There are limited cycling facilities throughout the area. Near the southern boundary of Clyde stabling and maintenance facility and Rosehill services facility there is the M4 Motorway cycleway, which is a 15-kilometre shared path between South Wentworthville and Sydney Olympic Park, generally following the M4 Western Motorway alignment. A shared path that runs along the northern side of Parramatta Road connects to the M4 Motorway cycleway via Kendall Street and Martha Street. There is also a short section of Alfred Street between Prospect Street and Virginia Street that is also designated as an on-road cycle route.

Public transport network

A summary of the public transport services around Clyde stabling and maintenance facility and Rosehill services facility is provided in Table 17-5.

Table 17-5 Public transport services – Clyde stabling and maintenance facility and Rosehill services facility

Mode	Description
Rail	The nearest rail services are accessible from Clyde Station on the Sydney Trains network, located about one kilometre from Clyde stabling and maintenance facility and Rosehill services facility.
Bus	• 4 bus routes including 2 NightRide bus routes • 5 school bus routes.

Parking, loading, servicing and pick-up arrangements

Unrestricted on-street parking is provided on Unwin Street and Wentworth Street. Parking is prohibited on James Ruse Drive, with clearways in operation at all times. Similarly, parking is prohibited on Parramatta Road, with clearways in operation seven days a week during daytime hours (6am to 7pm Monday to Friday, 8am to 8pm Saturday and Sunday). On-street parking currently provided on Kay Street and near the Wentworth Street / Kay Street intersection will be permanently removed due to the realignment of Unwin Street and Kay Street under the previous Sydney Metro West planning application.

There are no kiss and ride, loading or taxi zones on roads immediately surrounding Clyde stabling and maintenance facility and Rosehill services facility.

Traffic volumes and patterns

Road network changes under the previous Sydney Metro West planning application have been incorporated into the construction traffic modelling assessment and include the realignment of Unwin Street and Kay Street around the site (B-Double designated).

Approximate peak hour midblock volumes on key access roads surrounding Clyde stabling and maintenance facility and Rosehill services facility are shown in Table 17-6. The key access roads carry traffic volumes generally commensurate with their function.

Table 17-6 Existing peak hour traffic volumes (mid-block) by direction – Clyde stabling and maintenance facility and Rosehill services facility (2021)

Road	Direction	AM peak hour volume (vehicles per hour)	PM peak hour volume (vehicles per hour)
Parramatta Road west of Wentworth Street	Eastbound	2,050	2,130
	Westbound	1,890	1,720
Martha Street east of Wentworth Street	Eastbound	40	20
	Westbound	30	30
Wentworth Street north of Parramatta Road	Eastbound	250	100
	Westbound	140	110

Intersection performance

Modelled intersection performance during the AM and PM peak hours for key intersections in the vicinity of Clyde stabling and maintenance facility and Rosehill services facility is shown in Table 17-7.

Modelled intersection performance indicates that all intersections perform at level of service A or B during the AM and PM peak hours.

Table 17-7 Modelled peak hour baseline intersection performance (2021) – Clyde stabling and maintenance facility and Rosehill services facility

Intersection and peak hour	Demand flow (vehicles per hour)	Average delay (seconds per vehicle)	Level of service	Maximum queue length by directional approaches (metres)	
Parramatta Road / Wentworth Street (signalised)					
AM peak	4,458	15	B	NB	-
				EB	400
				SB	55
				WB	165
PM peak	4,235	10	A	NB	-
				EB	345
				SB	35
				WB	130
Wentworth Street / Martha Street (priority controlled)					
AM peak	481	11	A	NB	<5
				EB	<5l
				SB	<5
				WB	<5
PM peak	271	9	A	NB	<5
				EB	<5
				SB	<5
				WB	<5

17.5.2 Operational impact assessment

This section outlines the anticipated operational transport impacts as they relate to Clyde stabling and maintenance facility and Rosehill services facility.

Active transport network

The City of Parramatta Council have developed plans for an active transport link (referred to as the 'Wilderline') along the former T6 Carlingford Line corridor, providing a connection between Parramatta Road in the south and existing cycle paths along Parramatta River in the north. As part of this proposal, a section of the Wilderline would be delivered by Sydney Metro as shown in Figure 17-1.

In addition, new permanent pedestrian access would be provided to Rosehill Gardens racecourse from James Ruse Drive to replace the previous access over the former Rosehill Station footbridge (which would be removed as part of work under the previous Sydney Metro West planning application). This permanent access would likely be located to the north of the Sydney Metro West infrastructure, potentially through the formalisation of the temporary construction phase access point which would have been established as part of the work carried out under the previous Sydney Metro West planning application.

Road network performance

Prior to commencement of Sydney Metro West, the site was used for light and heavy industrial purposes, accommodating a range of business, including, but not limited to, concrete and aggregate suppliers, equipment suppliers, distribution and logistics businesses, and storage buildings.

Given the current and former use of the site for multiple light and heavy industrial purposes, low traffic volumes are experienced on roads in the vicinity of the site, including Unwin Street, Kay Street and Wentworth Street, with fewer than 280 vehicles per hour observed in each direction during peak periods.

The Clyde stabling and maintenance facility and Rosehill services facility would generate around 33 vehicle movements distributed across the primary and secondary accesses to the north and south of the site respectively during network peak periods. This would result in minimal impacts on the surrounding road network.

Given the low number of vehicles required to access Clyde stabling and maintenance facility during operation and the minimal impacts on the surrounding road network, detailed intersection performance assessment was not necessary.

Parking and property access

Worker parking facilities would be provided as part of this proposal at a number of locations, including at the entrance security buildings, administration and operations control centre building, maintenance building and cleaning building.

Given the proposed change of use of the site and the fact that all vehicular traffic generated by the stabling and maintenance facility would park within the site, there would be no impacts associated with parking on the surrounding road network.

Access to all nearby properties would be maintained during operation. As identified above, a new permanent pedestrian access would be provided to Rosehill Gardens racecourse from James Ruse Drive.

17.5.3 Construction impact assessment

This section outlines the anticipated construction transport impacts as they relate to Clyde stabling and maintenance facility and Rosehill services facility.

Construction haul routes

The primary construction haul routes for the Clyde stabling and maintenance facility and Rosehill services facility are show in Figure 17-8. Construction site access and egress locations, as well as the number of daily traffic movements anticipated at the Clyde stabling and maintenance facility and Rosehill services facility construction sites, are outlined in Section 17.4.

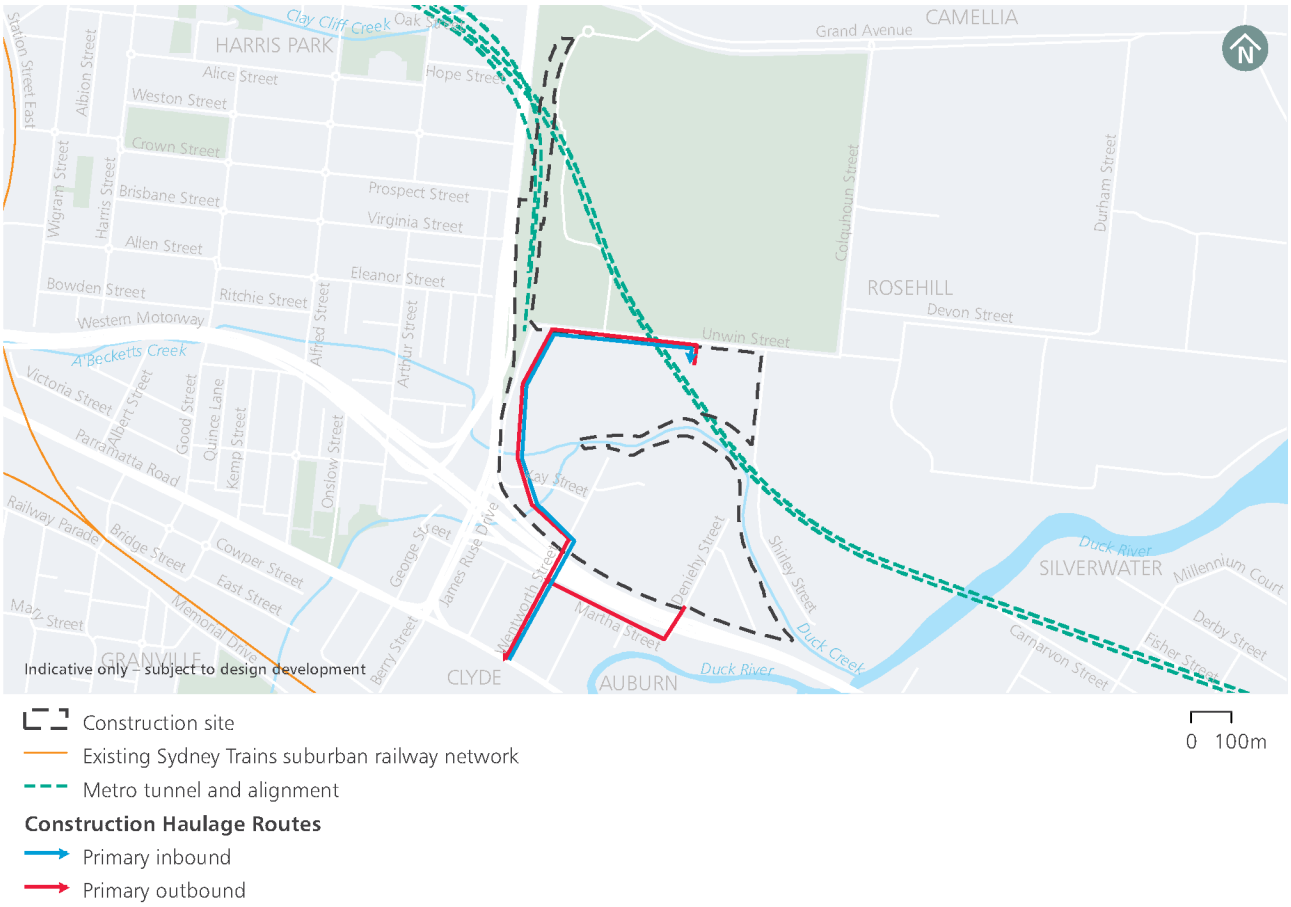

Figure 17-8 Primary construction haul routes – Clyde stabling and maintenance facility and Rosehill services facility

Active transport network

During the work carried out under the previous Sydney Metro West planning application, the former Rosehill Station and footbridge will be permanently removed, and provisions will be made for an alternative crossing of the former T6 Carlingford Line to maintain access to Rosehill Gardens racecourse. This alternative crossing would be maintained during construction of this proposal.

Other existing pedestrian and cycle routes surrounding the Clyde stabling and maintenance facility and Rosehill services facility construction sites would be maintained throughout construction.

Construction vehicles would travel adjacent to or across shared paths along Parramatta Road and Martha Street. Impacts on cyclists would be minor given that cyclists would be interacting with a low number of additional heavy vehicles. The shared path interface at the Martha Street / Deniehy Street intersection would be managed through the Construction Traffic Management Plan process.

Public transport network

Bus services operate on Parramatta Road, which also forms part of the Clyde stabling and maintenance facility and Rosehill services facility construction vehicle routes. Minimal impacts on buses are expected and would be limited to a potential minor increase in travel time due to the additional construction vehicle routes on the road network. No impacts are anticipated on the operation of bus stops.

No impacts on the existing Sydney Trains suburban rail network are anticipated during construction.

Parking and property access

No impacts on parking and property access are anticipated during construction.

Road network performance

During the AM peak hour (7:15am to 8:15am) and PM peak hour (6pm to 7pm), it is anticipated that the Clyde stabling and maintenance facility construction site would generate a total of 88 light vehicle movements (44 light vehicles travelling to and from the construction site) and 46 heavy vehicle movements (23 heavy vehicles travelling to and from the construction site). The Rosehill services facility construction site would generate a total of 16 light vehicle movements (eight light vehicles travelling to and from the construction site) and 18 heavy vehicle movements (nine heavy vehicles travelling to and from the construction site). There is potential for the heavy vehicle movements to and from the Clyde stabling and maintenance facility construction site and the Rosehill services facility construction site to coincide and, as such, they have been assessed together.

These vehicle movement forecasts were assumed for the intersection performance modelling. The peak hours presented in this assessment were selected to represent the times when background traffic demand is at its greatest.

Modelled intersection performance during construction indicates the Parramatta Road / Wentworth Street intersection would deteriorate in the AM and PM peak hours from level of service B to C and A to B, respectively. This intersection would still operate with spare capacity with the addition of construction traffic.

The Wentworth Street / Martha Street intersection would perform at level of service A with and without construction traffic.

Figure 17-9 Construction site intersection performance – Clyde stabling and maintenance facility and Rosehill services facility (2026)

Power supply route

Trenching work within the road reserve to construct the power supply route would result in temporary changes to traffic arrangements, potentially including the occupation of parking areas or the footpath. Two-way traffic would be maintained during the work. Where pedestrian footpaths are impacted, a suitable alternative route around the work area would be provided and signposted.

In addition, the work may result in reduced access to some properties for short periods of time (typically less than one day). In this event, suitable alternative arrangements would be discussed with the landowner.

As the works would progress along the power supply route alignment, the potential impacts in a particular location would be short-lived, typically occurring for up to two weeks.

Special events

Events are held throughout the year at Rosehill Gardens racecourse. Primary pedestrian and vehicle access points to Rosehill Gardens racecourse, and the majority of pedestrian and vehicle movements, are concentrated on Grand Avenue and James Ruse Drive. A secondary vehicle access point is located on Unwin Street, used to enter and exit the centre field car park during events. These pedestrian and vehicle access points to Rosehill Gardens racecourse would be maintained during construction of this proposal. Given the majority of pedestrian and vehicle movements during special events are located outside the immediate vicinity of the Clyde stabling and maintenance facility and Rosehill services facility construction sites, there is minimal potential for conflict between pedestrians, general traffic and construction vehicles, and minimal potential for impacts on pedestrian and vehicle movements and accessibility. Therefore, precinct-specific construction transport mitigation measures are not required.

The CTMF outlines mitigation measures that would be implemented to minimise impacts during special events, which would be detailed in future Construction Traffic Management Plans.

As part of the previous Sydney Metro West planning application, changes to existing pedestrian access to the racecourse from the west may be required. These alternative access points to the racecourse would continue to be provided during construction of this proposal. This temporary alternative access may also be formalised to provide a new permanent pedestrian access during operation.

17.5.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

The approach to transport and traffic management during the construction phase, including the process for the development of all construction traffic management plans is outlined in the CTMF provided in Appendix G.

The CTMF provides the overall strategy and approach for construction traffic management for Sydney Metro West, and an outline of the traffic management requirements, mitigation measures and processes that would be common to each of the proposed construction sites. It establishes the traffic management processes and acceptable criteria to be considered and followed in managing roads and footpaths adjacent to construction sites.

17.6 Noise and vibration

Further details on the operational and construction noise and vibration assessment, including the approach and methodology, are provided in Technical Paper 3 (Operational noise and vibration) and Technical Paper 4 (Construction Noise and Vibration).

17.6.1 Baseline environment

Existing noise levels around Clyde stabling and maintenance facility and Rosehill services facility are controlled by road traffic noise on the surrounding road network. The area surrounding the site are generally suburban residential to the west (across James Ruse Drive) and commercial and industrial to the east.

Racehorses are stabled at Rosehill Gardens racecourse north of the site and those premises are considered as an area specifically reserved for passive recreation, as defined in the *Noise Policy for Industry* (NPfI) (NSW Environment Protection Authority, 2017).

This precinct has been divided into four noise catchment areas (NCAs) for the construction noise assessment – NCA04 to NCA07. The site and NCAs are shown in Figure 17-10.

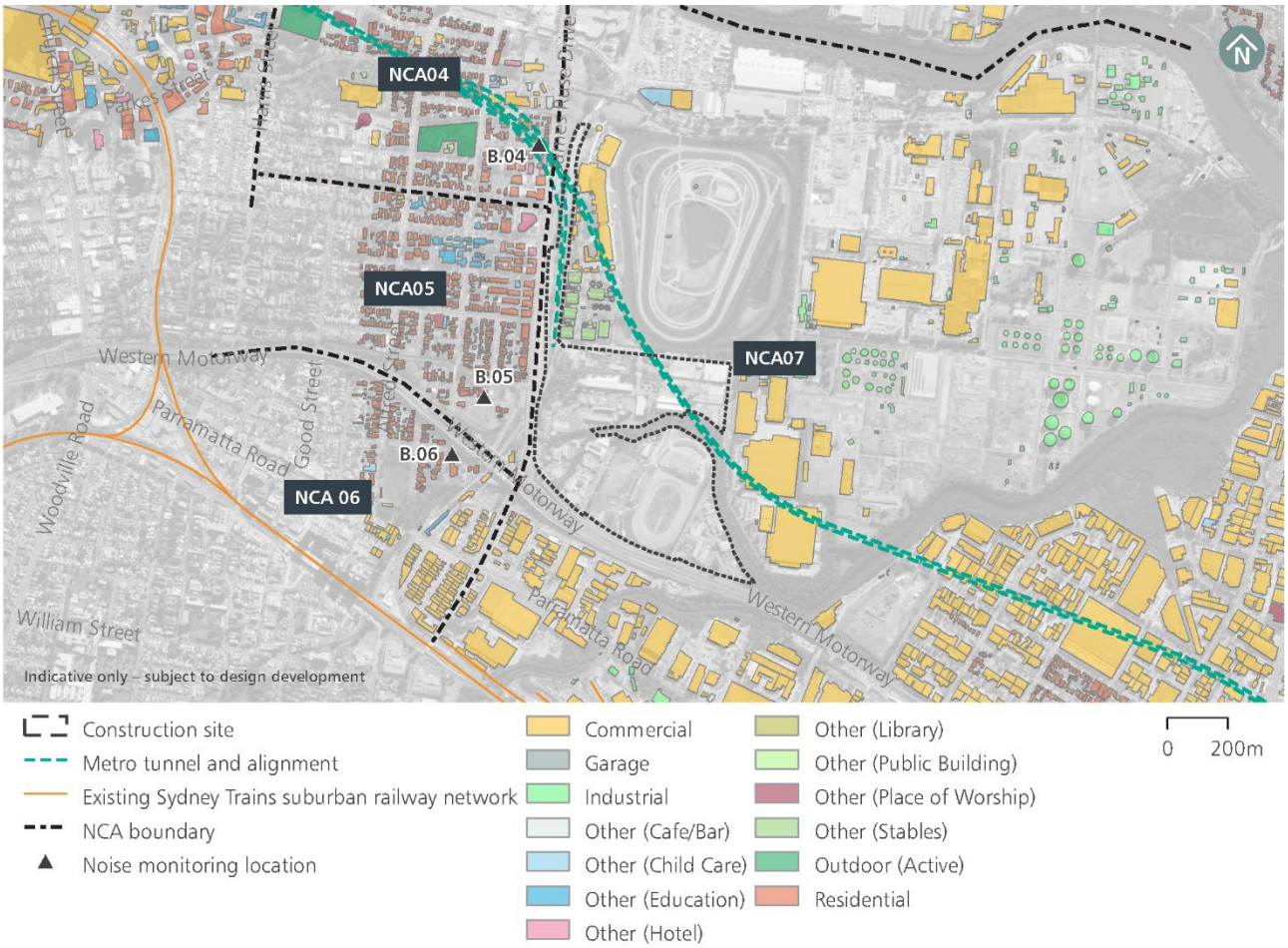

Figure 17-10 Location of sensitive receivers near Clyde stabling and maintenance facility and Rosehill services facility and NCAs

Unattended noise monitoring was carried out at sensitive receiver locations near Clyde stabling and maintenance facility and Rosehill services facility between March and July 2019 as part of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). This data represents the noise environment prior to the commencement of the work carried out under the previous Sydney Metro West planning application and was used to inform this assessment. The noise logger locations (B.04, B.05 and B.06) used for unattended noise monitoring are shown on Figure 17-10. The noise logger location B.07 is located to the south-east of the map view at 10 Carnarvon Street, Silverwater.

The results of the unattended noise monitoring are summarised in Table 17-8 and indicate that background noise levels generally reflect the residential, commercial and recreational nature of the area.

Short-term attended noise monitoring was also carried out at Clyde stabling and maintenance facility and Rosehill services facility between March and July 2019. The results were generally found to be consistent with the unattended noise monitoring. Detailed observations from the attended monitoring are provided in Technical Paper 4 (Construction noise and vibration).

Table 17-8 Summary of unattended noise monitoring – Clyde stabling and maintenance facility and Rosehill services facility

Location ID	Noise logger location	Noise level (dBA)[1,2]					
		Background noise (RBL)			Average noise level (L_{Aeq})		
		Day	Evening	Night	Day	Evening	Night
B.04	5 Hope Street, Rosehill	51	48	41	61	58	57
B.05	9 A'Beckett Street, Granville	50	49	45	56	55	53
B.06	4B Gray Street, Granville	52	51	44	58	57	55
B.07	10 Carnarvon Street, Silverwater	46	44	41	60	57	55

Notes:
1. The RBL and L_{Aeq} noise levels have been determined with reference to the procedures in the NPfI
2. Daytime is 7am to 6pm, evening is 6pm to 10pm, and night-time is 10pm to 7am

17.6.2 Operational impact assessment

The assessment of Clyde stabling and maintenance facility and Rosehill services facility considers the following two aspects:

- operational noise generated from the fixed facilities
- the airborne rail noise associated with aboveground track about 530 metres long that connects the mainline tunnels to Clyde stabling and maintenance facility.

Fixed facility noise

The operational noise associated with Clyde stabling and maintenance facility and Rosehill services facility has been assessed for the nearest and most noise affected commercial and residential sensitive receivers for each source type as presented in Table 17-9. Two scenarios have been assessed, the year of opening (2030), and the design year (2040) 10 years after opening.

Rosehill Gardens racecourse has been treated as a passive recreation area for which no sleep disturbance criteria exist. As an indicative assessment for the maximum noise impacts on horses, L_{max} sleep disturbance criteria from the NPfI have been used for this assessment and is presented in Table 17-10.

The results indicate that the predicted noise levels would be compliant with the applicable noise criteria at the nearest sensitive receivers during all periods for the year of opening and the year of design, apart from a minor 2 dB exceedance of the applicable noise criteria at the Rosehill Gardens racecourse.

Noise attenuation has been incorporated into the design to determine the predicted noise levels. These measures would be further developed throughout the detailed design phase so that compliance with the environmental noise criteria is achieved, including the identification of appropriate noise mitigation measures to mitigate the potential exceedance to the racecourse.

Table 17-9 Operational noise levels – Clyde stabling and maintenance facility and Rosehill services facility

Receiver	Criteria[1], dB(A)	Predicted noise level ($L_{Aeq,15min}$)	
		Year of opening (2030)	Year of design (2040)
4 A'Beckett Street, Granville (residential)	48	43	45
65 Penelope Lucas Lane, Granville (residential)	48	44	46
Rosehill Gardens racecourse stables	45 (50[2])	**46**	**47**

Notes:
1. Criteria differs between operational noise source type (refer Technical Paper 3 (Operational noise and vibration))
2. Where the amenity target level is the controlling criterion and cannot reasonably be achieved, the lower of the intrusive or amenity acceptance noise level is used
3. Noise levels in bold identify predicted noise levels over the amenity target level

Table 17-10 L_{max} noise impacts – Clyde stabling and maintenance facility and Rosehill services facility

Receiver	Criteria[1], dB(A)	Predicted noise level ($L_{Aeq,15min}$)	
		Year of opening (2030)	Year of design (2040)
4 A'Beckett Street, Granville (residential)	60	35	37
65 Penelope Lucas Lane, Granville (residential)	60	36	38
Rosehill Gardens racecourse stables	60	36	37

Notes:
1. Criteria differs between operational noise source type (refer Technical Paper 3 (Operational noise and vibration))

Airborne rail noise

Operational airborne noise levels have been predicted for aboveground track that connects the mainline tunnels to Clyde stabling and maintenance facility. Two scenarios have been assessed, with the following assumptions for a 15 minute scenario:

- the year of opening (2030) – two trains undergoing preparation or shutdown and two trains leaving or entering the stabling facility
- the design year (2040) 10 years after opening – three trains undergoing preparation or shutdown and three trains leaving or entering the stabling facility.

This assessment is presented in Table 17-11 and Table 17-12.

Table 17-11 Year of opening (2030) airborne rail noise – Clyde stabling and maintenance facility

Receiver	$L_{Aeq,15hr}$, dB(A)		$L_{Aeq,9hr}$, dB(A)		L_{AFmax}, dB(A)		Complies?
	Criteria	Prediction	Criteria	Prediction	Criteria	Prediction	
65 Penelope Lucas Lane, Rosehill (residential)	65	21	60	27	85	48	Yes
35-43 Penelope Lucas Lane, Rosehill (residential)	65	27	60	33	85	56	Yes
Nesuto Parramatta Apartment Hotel, 110-114 James Ruse Drive, Rosehill	65	28	60	34	85	56	Yes
Rydges Parramatta Hotel, 116-118 James Ruse Drive, Rosehill	65	23	60	29	85	53	Yes
Rosehill Gardens racecourse	65	35	-	42	-	67	Yes

Table 17-12 Year of design (2040) airborne rail noise – Clyde stabling and maintenance facility

Receiver	$L_{Aeq,15hr}$, dB(A)		$L_{Aeq,9hr}$, dB(A)		L_{AFmax}, dB(A)		Complies?
	Criteria	Prediction	Criteria	Prediction	Criteria	Prediction	
65 Penelope Lucas Lane, Rosehill (residential)	65	28	60	29	85	48	Yes
35-43 Penelope Lucas Lane, Rosehill (residential)	65	33	60	35	85	56	Yes
Nesuto Parramatta Apartment Hotel, 110-114 James Ruse Drive, Rosehill	65	35	60	37	85	56	Yes
Rydges Parramatta Hotel, 116-118 James Ruse Drive, Rosehill	65	30	60	31	85	53	Yes
Rosehill Gardens racecourse	65	42	-	44	-	67	Yes

The operational rail noise levels are predicted to comply with the relevant noise trigger levels at all noise sensitive receiver locations. Operational rail noise is expected to be relatively low given:

- as the rail line emerges from the portals within the dive structure, it would be below the local ground level
- the sides of the dive structure would provide noise attenuation to nearby sensitive receivers
- a relatively low volume of rail traffic would travel to and from Clyde stabling and maintenance facility and trains would decelerate into the facility.

As the noise levels are predicted to comply with the relevant noise trigger levels, further consideration of noise mitigation is not required.

17.6.3 Construction impact assessment

The construction scenarios and anticipated working hours at the Clyde stabling and maintenance facility and Rosehill services facility construction sites are shown in Table 17-13. The estimated duration of each activity is also provided, noting that most activities would be intermittent and would not occur on a continual basis during every day of the activity.

The proposed work is anticipated to have a total duration of about four and a half years. Refer to Figure 17-6 and Figure 17-7 for the indicative construction program at Clyde stabling and maintenance facility and Rosehill services facility, respectively.

Temporary construction noise and vibration impacts would be managed through the implementation of standard and additional mitigation measures in accordance with the Sydney Metro CNVS.

Table 17-13 Construction activities and working hours – Clyde stabling and maintenance facility and Rosehill services facility

Scenario	Activity		Indicative duration (months)	Hours of work[1]			
				Std. day	Out of hours works		
					Day OOH	Evening	Night
Site establishment and public domain work	Typical	Deliveries and general work	6	✓	✓	-	-
	Peak	Construction/decommissioning of facilities and hoarding		✓	✓	-	-
Piling	Typical	Supporting work	6	✓	✓	-	-
	Peak	Bored piling with support plant		✓	✓	-	-
Facility construction	Typical	Internal construction and fit-out	21	✓	✓	✓	✓
	Peak 1	Installation of framing and structure		✓	✓	✓	-
	Peak 2	Concrete work		✓	✓	✓	-
Rail systems access shafts	Typical	Surface support	36	✓	✓	✓	✓
	Peak	Deliveries and tunnel access		✓	✓	✓	✓
Earthwork	Typical	Stockpiling and support	18	✓	✓	-	-
	Peak	Excavation and compacting		✓	✓	-	-
Above-ground rail	Typical	Track installation	33	✓	✓	-	-
	Peak	Track subgrade, capping and tamping		✓	✓	-	-

Notes:
1. OOH = out-of-hours

Airborne construction noise

The predicted airborne NML exceedances from the Clyde stabling and maintenance facility and Rosehill services facility construction sites are summarised in Table 17-14 for all residential receivers and in Table 17-15 for commercial and other sensitive receivers. The predictions are representative of the highest noise levels that would be experienced when the works are nearest to the sensitive receiver.

The number of receivers predicted to experience exceedances of the NMLs are summarised in bands of 10 dB and are separated into day, evening and night-time periods, as appropriate.

During the daytime, the highest construction noise impacts are predicted during aboveground rail construction when noise-intensive equipment such as a rail saw would be in use. The highest impact work is expected to last for around eight months; however, ballast tampers would only be used intermittently as required.

During the night-time, the highest construction noise impacts are predicted during rail system access shaft construction. The majority of this work would occur inside an acoustic shed (or with other acoustic measures present) or the built facility structure and does not require noise-intensive equipment. This work is expected to last for around 36 months.

Table 17-14 Overview of NML exceedances (residential receivers) – Clyde stabling and maintenance facility and Rosehill services facility

Scenario	Activity	Indicative duration (weeks)	Number of receivers exceeding NML														
			Standard hours daytime			Out of hours											
						Daytime out of hours			Evening			Night time			Sleep disturbance		
			1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB
Site establishment & public domain work	Typical	6	5	-	-	14	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		16	-	-	46	5	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Piling	Typical	6	5	-	-	14	1	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		14	1	-	52	5	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Facility construction	Typical	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak 1		-	-	-	-	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a
	Peak 2		9	-	-	54	-	-	75	-	-	n/a	n/a	n/a	n/a	n/a	n/a
Rail systems access shaft	Typical	36	-	-	-	5	-	-	5	-	-	10	-	-	10	-	-
	Peak		-	-	-	5	-	-	7	-	-	14	-	-	14	-	-
Earthwork	Typical	18	18	4	-	76	8	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		31	5	-	107	13	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Above-ground rail	Typical	33	4	-	-	7	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
	Peak		70	7	-	163	17	4	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 17-15 Overview of NML exceedances (other sensitive receivers) – Clyde stabling and maintenance facility and Rosehill services facility

Scenario	Activity	Indicative duration (months)	Number of receivers exceeding NML														
			Commercial			Child care			Educational			Hotel			Stables		
			1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB	1 10 dB	10 20 dB	>20 dB
Site establishment & public domain work	Typical	6	4	-	-	1	-	-	-	-	-	-	-	-	8	-	-
	Peak		7	-	-	2	-	-	-	-	-	-	-	-	9	2	-
Piling	Typical	6	4	-	-	2	-	-	-	-	-	-	-	-	5	-	-
	Peak		5	1	-	3	-	-	1	-	-	-	-	-	12	-	-
Facility construction	Typical	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak 1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak 2		-	-	-	4	-	-	1	-	-	-	-	-	3	-	-
Rail systems access shaft	Typical	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak		-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
Earthwork	Typical	18	5	1	-	3	-	-	1	-	-	-	-	-	15	-	-
	Peak		4	3	-	4	1	-	1	-	-	1	-	-	14	3	-
Above-ground rail	Typical	33	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Peak		7	4	-	8	2	-	11	-	-	2	-	-	21	5	-

The findings of the worst-case construction noise impact assessment at the Clyde stabling and maintenance facility and Rosehill services facility construction sites during the daytime indicate:

- the nearest receivers to the site include residential receivers to the west across James Ruse Drive and 'other sensitive' receivers at Rosehill Gardens racecourse (i.e. stables). 'Moderate' impacts are predicted at these receivers when noise-intensive equipment such as rail tampers and vibratory rollers are being used during aboveground rail works and earthworks
- impacts during 'typical' work, which does not require noise-intensive equipment or is inside the structures on site, are predicted to substantially reduce, with noise levels generally predicted to comply with the noise management levels or result in 'moderate' or 'low' impacts at receivers
- the noise levels during work associated with rail systems access shafts are generally expected to comply with noise management levels
- the 'peak' scenarios would generate more noise and result in more exceedances than the 'typical' scenarios, which would result from the 'peak' scenarios using noise-intensive (or noisier) equipment
- the nearest 'other sensitive' receivers are predicted to be impacted during some of the noisier work activities. The highest impacts at these receivers are predicted when ballast tampers or other noisy items of equipment are being used as part of site establishment and public domain work, earthwork and aboveground rail work. 'Moderate' worst-case impacts are predicted at:
    - Rosehill Gardens racecourse stables
    - Explore & Develop Parramatta Early Learning Centre on Grand Avenue.

The findings of the worst-case construction noise impact assessment at the Clyde stabling and maintenance facility and Rosehill services facility construction sites during the night-time indicate:

- noise levels at the majority of receivers are predicted to comply with the noise management levels
- 'low' impacts are predicted at the nearest residential receivers to the west during rail system access shaft construction, when material is being supplied through the tunnel portal of the outdoor dive structure
- 'low' impacts are also predicted at one stable at Rosehill Gardens racecourse that is adjacent to a gap in the acoustic hoarding to allow for the realigned Unwin Street.

Based on current construction planning access points for tunnel fit-out and rail systems work would likely be via the Parramatta metro station, Clyde stabling and maintenance facility (including Rosehill services facility), Burwood North Station and The Bays Station construction sites. However, depending on construction staging, other construction sites would be used to access the tunnels to carry out tunnel fit-out and rail systems work.

The impacts presented above are based on all equipment working simultaneously in each assessed scenario. There would be periods when construction noise levels are much lower than the worst-case levels predicted and there would be times when no equipment is in use and no impacts occur. Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed (refer to Section 17.6.4 for further detail on mitigation measures).

Noise impacts associated with the construction of the power supply route from Rosehill services facility to Camellia substation would be temporary and would move progressively along the route. The excavation work is anticipated to progress at about 30 metres per day and it is therefore likely that any individual receiver would be affected by the highest noise levels for up to two consecutive days at most. The receivers adjacent to the power supply route have been categorised as commercial with a noise management level of 70 dBA. These receivers are about 15 metres from the road and noise levels between 80 to 90 dBA are possible when noise intensive equipment is in use which would result in worst-case exceedances of around 10 to 20 dB above the noise management level.

Highly affected residential receivers

Four residential receivers are expected to be highly noise affected during aboveground rail work during the daytime, evening and night-time, when ballast tampers are being used. These receivers are located to the west of the site across James Ruse Drive.

Sleep disturbance

A sleep disturbance screening assessment has been completed for the construction work and is summarised in Table 17-14.

'Low' sleep disturbance impacts are predicted at some of the nearest residential receivers west of James Ruse Drive. These impacts mainly result from heavy vehicles movements within the site and supply of materials for rail systems fit-out through the dive structure within the site.

The number of potential night-time awakenings would depend on several factors, including the number of heavy vehicles accessing the site during the night-time, the way in which vehicles are operated, the type of equipment being used, and the duration of noisy work. The number of night-time heavy vehicles at this construction site is expected to be around four trucks per hour.

Further investigation of potential instances of sleep disturbance would be completed during detailed construction planning when further information becomes available.

Vibration impacts

The predicted impacts during vibration-intensive excavation indicate that:

- the cosmetic damage screening criteria are predicted to be exceeded at:
  - one heritage listed structure (RTA Depot) at 1 Unwin Street, Rosehill
  - two stables and two commercial buildings at Rosehill Gardens racecourse
- the human comfort criteria are also predicted to be exceeded at the nearest commercial buildings located to the north of the site and the nearest residential buildings to the west across James Ruse Drive. Occupants of affected buildings may be able to perceive vibration impacts at times when vibration intensive equipment is in use nearby
- there are no predicted exceedances of the sensitive equipment screening criteria.

These predictions represent a worst-case situation where a large vibratory roller is in use at the boundary of the site and is in close proximity to the affected buildings. In reality, smaller equipment or alternative methodologies would likely be used as the work gets near to adjacent structures, which would control the potential impacts.

Where vibration levels are predicted to exceed the cosmetic damage screening criteria, a more detailed assessment of the structure and attended vibration monitoring would be carried out so that vibration levels remain below appropriate limits for that structure.

Ground-borne noise

Vibration intensive earthwork at the Clyde stabling and maintenance facility construction site would be completed outdoors, meaning airborne noise levels at the nearest receivers would likely be higher than the corresponding internal ground-borne noise levels. Where airborne noise levels are higher than ground-borne noise levels assessment of potential ground-borne noise impacts is not required.

Construction traffic noise

Construction related traffic has the potential to temporarily increase road traffic noise levels at receivers that are adjacent to the construction sites and haul routes. The forecast construction traffic volumes outlined in Technical Paper 2 (Construction transport) have been used to determine where potentially noticeable increases in road traffic noise (i.e. a greater than 2 dB increase above the existing noise level) is likely. Roads anticipated to have a greater than 2 dB increase would include:

- Wentworth Street north of Parramatta Road – 3 dB increase during the day
- Martha Street east of Wentworth Street – 4 dB increase during the day.

This is associated with the increased construction traffic and proportion of heavy vehicles during the daytime and the low volume of existing heavy vehicles, although there are no residential receivers along these roads. The increase represents the worst-case predicted increase in any period.

Further assessment of construction traffic would be completed during detailed design for this proposal, including consideration of the potential for exceedances of the NSW Road Noise Policy base criteria (where greater than 2 dB increases are predicted). Measures outlined in the CEMF would be implemented to manage potential impacts.

17.6.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

The approach to noise and vibration management during the construction phase, including the process for the development of all construction noise and vibration statements is outlined in the CNVS (Appendix H).

The CNVS provides the overall strategy and approach for construction noise and vibration management for Sydney Metro West, and an outline of the noise and vibration management requirements and processes that would be common to each of the proposed construction sites.

In addition, the Sydney Metro CEMF (Appendix F) outlines the construction noise and vibration mitigation measures to minimise impacts as relevant to this proposal as a whole.

The CNVS and CEMF are discussed further in Chapter 20 (Synthesis) of this Environmental Impact Statement.

Mitigation measures that are specific to address the operation and construction of Clyde stabling and maintenance facility and Rosehill services facility are listed in Table 17-16.

Table 17-16 Noise and vibration mitigation measures – Clyde stabling and maintenance facility and Rosehill services facility

Ref	Impact/issue	Proposed mitigation measure	Timing
Noise and vibration			
EIS-NV2	Operational airborne noise	Aboveground track section connecting to Clyde stabling and maintenance facility would be designed to meet the relevant airborne noise criteria from the *Rail Infrastructure Noise Guidelines* (EPA, 2013).	Operation
EIS-NV4	Noise impacts to horses at Rosehill Gardens racecourse stables	Consultation with the owners and operators of the horse stables near the Clyde stabling and maintenance facility construction site would be carried out so that potential impacts to horses are appropriately managed.	Construction

17.7 Non-Aboriginal heritage

Further details on the non-Aboriginal heritage assessment, including the approach and methodology, are provided in Technical Paper 5 (Non-Aboriginal heritage).

17.7.1 Baseline environment

The assessment of non-Aboriginal heritage impacts associated in Chapter 12 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) included a description of the existing environment. The non-Aboriginal heritage assessment for this proposal has predominantly used the baseline environment that will be established following the completion of the work carried out under the previous Sydney Metro West planning application.

Areas within the Clyde stabling and maintenance facility and Rosehill services facility construction sites will have been cleared of existing structures and vegetation, with the site levelled and raised, and services facility shaft and dive structure excavated as part of work under the previous Sydney Metro West planning application. The footbridge over the former Rosehill Station (the footbridge is a heritage item listed on the RailCorp section 170 register), will also have been removed under the previous Sydney Metro West planning application. As such, this item has not been considered in this assessment.

Under the previous Sydney Metro West planning application, all archaeological investigations will have been carried out within the approved Clyde stabling and maintenance facility and Rosehill services facility construction sites.

For the purpose of this heritage assessment, the study area for Clyde stabling and maintenance facility and Rosehill services facility has been defined as a 50-metre buffer around the full extent of the site.

Existing setting

The study area comprises the land bounded by James Ruse Drive, Unwin Street, Shirley Street, and the M4 Western Motorway. The wider context surrounding the Clyde stabling and maintenance facility site is predominantly industrial, with Rosehill Gardens racecourse located to the north. The Clyde stabling and maintenance facility and Rosehill services facility study area and existing heritage items within the study area are shown in Figure 17-11.

Site history

In 1793, an early 100-acre land grant was used to establish Elizabeth Farm. The estate was further extended through additional land grants and purchasing of neighbouring lots reaching over 1,100 acres by 1816. Between 1883 and 1884, much of Elizabeth Farm was subdivided and sold off to allow for greater residential development. The planned residential development did not prove to be economically viable, and the majority of the land grants were purchased by industrial companies. On these properties, industrial yards and warehouses were developed during the late 19th and early 20th centuries. Another section of land directly north of the study area was developed for a racecourse and for recreational purposes. This became Rosehill Gardens racecourse, which opened in 1885. Most of the residential development in the area was for the workers of the local industries.

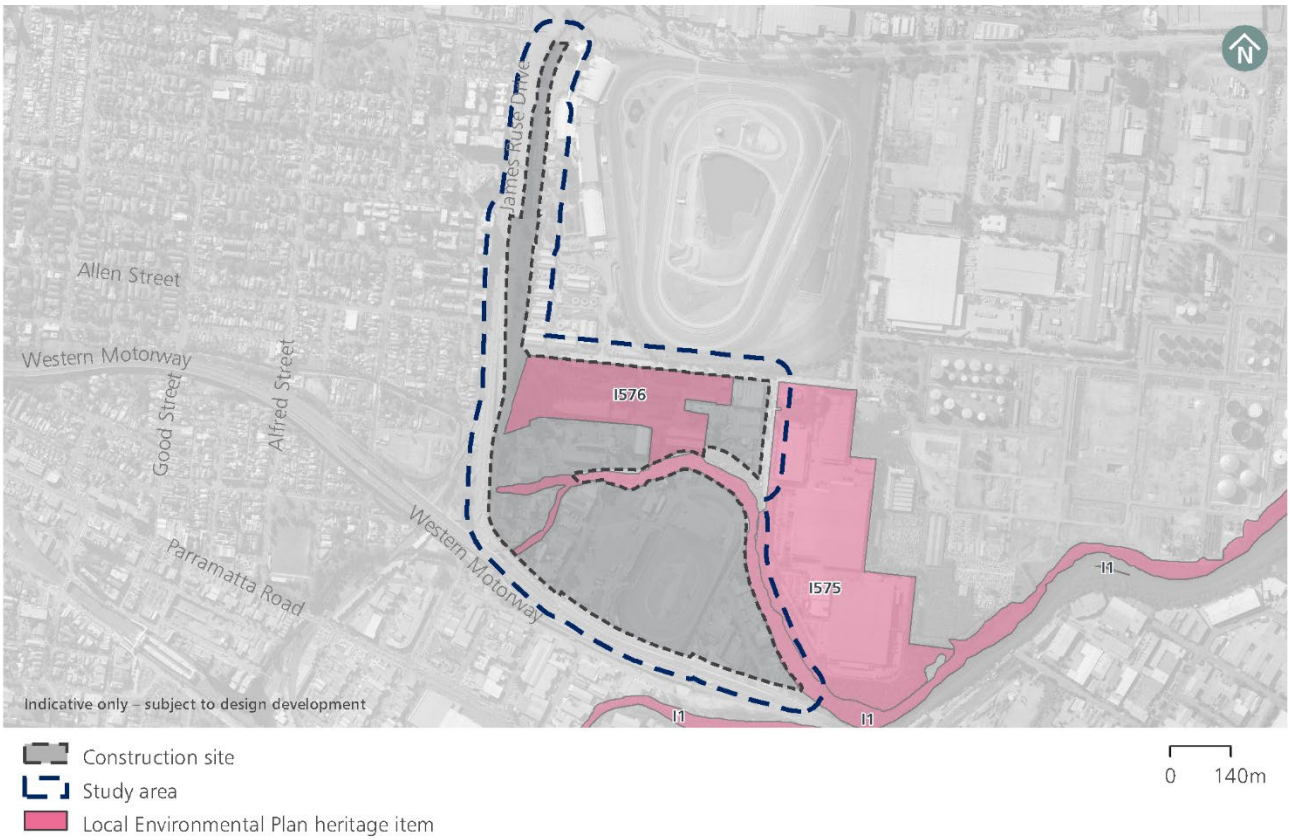

Figure 17-11 Heritage items within the study area – Clyde stabling and maintenance facility and Rosehill services facility

17.7.2 Impact assessment

Built heritage impact assessment

Table 17-17 summarises the potential impacts of construction and operation of this proposal on built heritage items within the study area at Clyde stabling and maintenance facility and Rosehill services facility.

Potential impacts to built heritage items in the Clyde stabling and maintenance facility and Rosehill services facility study area would generally be neutral or negligible, and up to moderate at one item. Management of potential impacts is outlined in Section 17.7.3. A draft Heritage Interpretation Strategy has been prepared for this proposal (refer to Appendix K). Where heritage items, including significant archaeology are impacted by this proposal, they would be considered for inclusion in the Heritage Interpretation Strategy or place specific interpretation plans prepared as part of this proposal.

Table 17-17 Impacts on significance of built heritage items – Clyde stabling and maintenance facility and Rosehill services facility

Item, listing and significance	Potential impact	Magnitude
Wetlands Parramatta LEP Item No. I1 Local	**Direct impacts** No native vegetation clearing would be carried out as part of this proposal. The scope of rehabilitation work for Duck Creek and A'Beckett's Creek is outlined in Section 17.3.3.	**Neutral**
	Settlement and vibration Significant elements of this item (wetland vegetation and ecological communities) would not be affected by ground vibration.	**Neutral**
	Temporary indirect (visual) impact The establishment of site hoarding, construction compounds, site amenities and facilities, and use of heavy machine plant would not obstruct any significant views of this heritage item in the vicinity of Duck Creek.	**Negligible**
	Permanent indirect (visual) impact During operation, the proposal would include new buildings and a stabling yard west and south of Duck Creek and a new building for Rosehill services facility and traction substation north of Duck Creek. However, as there are no heritage significant views of the remnant vegetation in the vicinity of Duck Creek due to decades of adjacent industrial development, the new facilities for this proposal would not impact the setting of the heritage item.	**Negligible**
RTA Depot Parramatta LEP Item No. I576 Local	**Direct impacts** Following the completion of the previous Sydney Metro West planning application, the only heritage significant fabric of this item would be the 1944-constructed brick workshop with signage on its pediment that faces Unwin Street. The 1944 building's façade would be protected under this proposal and would not be modified. This proposal would include work within the larger heritage curtilage of this item; however, it would not modify the remnant portion of heritage significant fabric.	**Neutral**
	Settlement and vibration This heritage item is located within the Clyde stabling and maintenance facility and Rosehill services facility construction site. Earthworks (placement of select fill) would be the closest source of potential construction vibration to this heritage item. Construction vibration levels are predicted to be above the cosmetic damage screening criteria. Potential direct impacts associated with vibration would be managed in accordance with standard mitigation measures outlined in the CEMF that include structural assessment, identification of applicable safe vibration levels and specific consideration of the heritage values of the structure in consultation with a heritage specialist to ensure sensitive heritage fabric is adequately monitored and managed.	**Minor to moderate**
	Temporary indirect (visual) impact Construction work within the vicinity of the item would not obstruct the heritage significant view of the brick depot building and its embossed façade on Unwin Street.	**Negligible**
	Permanent indirect (visual) impact The traction substation and stabling yard at Clyde stabling and maintenance facility and Rosehill services facility would be located to the south and east of the remnant brick depot building of this heritage item. These facilities would be largely underground and would be up to about six storeys in height for their aboveground portions. These buildings would be set back in excess of 200 metres from the 1944 brick depot building. As such, significant views of the Unwin Street façade of the building would not be obstructed by this proposal.	**Negligible**

Item, listing and significance	Potential impact	Magnitude
Capral Aluminium Parramatta LEP Item No. I575 Local	**Direct impacts** The item is located about 100 metres north-east of the Clyde stabling and maintenance facility construction site and about 150 metres east of Rosehill services facility. The proposed power supply route would be located on Unwin Street in the road reserve, directly outside of the heritage curtilage of the item. As no work would be carried out within the heritage curtilage of the item, there would be no direct (physical) impact.	**Neutral**
	Settlement and vibration Vibration levels from the surrounding construction works are predicted to be below the cosmetic damage screening criteria. Potential direct impacts associated with vibration are not anticipated.	**Neutral**
	Temporary indirect (visual) impact Construction facilities established under this proposal would be visible from the curtilage of this item but would not obscure or interrupt significant views of the Art Deco masonry building facing Shirley Street.	**Neutral**
	Permanent indirect (visual) impact There would be clear views between the traction substation north of A'Beckett's Creek and the item across Shirley Road; however, sight lines between the heritage significant building and proposed stabling facilities south of A'Beckett's Creek would be limited by intervening vegetation across the creek. Given its distance from the significant building, the traction substation would not obstruct or overshadow heritage significant views of the Art Deco brick building for this item.	**Neutral**

Archaeological impact assessment

The area within the Clyde stabling and maintenance facility and Rosehill services facility construction sites has been previously assessed under the previous Sydney Metro West planning application, and all archaeological investigations will be completed prior to the construction of this proposal.

The power supply route from Rosehill services facility to Camellia substation would be constructed by trenching within the road reserve along Unwin Street and Colquhoun Street. In the assessment of non-Aboriginal archaeological remains undertaken for the previous Sydney Metro West planning application, no identified archaeological remains were identified north of Duck Creek from before 1925. The road alignments for Unwin Street and Colquhoun Street were present by the early twentieth century. The previous assessment did not identify that any remnant industrial or infrastructural remains at the Clyde stabling and maintenance facility site would be of heritage significance. As such, the power supply route would not result in any adverse impacts to significant archaeological remains.

No further archaeological impacts are anticipated as a result of this proposal, as potential archaeological resources would be identified and managed during the work carried out under the previous Sydney Metro West planning application.

17.7.3 Management and mitigation measures

Environmental management for this proposal would be carried out through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal

During construction of this proposal, non-Aboriginal heritage would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes heritage management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

17.8 Aboriginal heritage

The approach and methodology for the Aboriginal heritage assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

17.8.1 Baseline environment

The previous Sydney Metro West planning application assessed the potential impacts of the establishment of the Clyde stabling and maintenance facility and Rosehill services facility construction sites. This section summarises the existing environment presented in *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) for context for this proposal. No additional footprint beyond that already assessed and approved under the previous Sydney Metro West planning application is required for this proposal at the Clyde stabling and maintenance facility and Rosehill services facility construction sites.

Three lots adjacent to the Clyde stabling and maintenance facility and Rosehill services facility construction sites are subject to an undetermined Aboriginal land claim (Lots 3, 5 and 6 of DP1116474). These lots do not fall within the construction sites. As such, impacts to the area subject to claim are not anticipated and have not been assessed further.

Landscape and archaeological context

The Clyde stabling and maintenance facility and Rosehill services facility are located within the Cumberland Lowlands physiographic region of the Cumberland Plain. Chapman & Murphy (1989) mapped Clyde stabling and maintenance facility and Rosehill services facility and environs as 'disturbed terrain', likely associated with the extensive industrial and commercial development in the vicinity and reclamation of swampy, marshy and/or estuarine flats. Available historical reference materials indicate that commercial and industrial development in the area resulted in the reclamation of swamp/marsh lands and ultimately the construction of buildings. The archaeological implication of these works is the potential disturbance or destruction of pre-existing Aboriginal sites and archaeological deposits.

Previous Aboriginal cultural heritage assessments

The following summarises key investigations undertaken in the local environs that are relevant to this proposal:

- AECOM Australia Pty Ltd (2013a) undertook an archaeological site inspection of the Viva Clyde Terminal Facility, located approximately 700 metres east of the Clyde stabling and maintenance facility and Rosehill services facility construction sites. No Aboriginal archaeological sites were identified during the field inspection. All proposed impact areas within the project's study area were classified as grossly disturbed, with all areas observed to consist of active or redundant components of the refinery operation. No site-specific cultural values or concerns were raised by the Registered Aboriginal Parties involved in the assessment. Registered Aboriginal Parties however, indicated that, regardless of levels of historic disturbance, the area remained a culturally significant and important part of Darug Country. Registered Aboriginal Parties also indicated that the area would have formed an important resource area for Darug people, with the waters of the bordering Parramatta and Duck Rivers, in particular, containing a wide range of edible fauna
- Artefact Heritage Pty Ltd undertook archaeological survey of the Clyde stabling and maintenance facility and Rosehill services facility construction sites as part of *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). The survey identified that the Clyde stabling and maintenance facility and Rosehill services facility construction sites are located across a mixed industrial and urban services environment including the Sydney Speedway site. The survey concluded that the majority of the site was comprised of a heavily disturbed industrial environment, noting however, that the former landform context of the Clyde stabling and maintenance facility and Rosehill services facility construction sites retain some archaeological sensitivity on the basis of proximity to Duck Creek and A'Becketts Creek. Artefact consequently registered an area of potential archaeological deposit (PAD) within the footprint of the Sydney Speedway (in the southern portion of the current Clyde stabling and maintenance facility construction site), in which the archaeological potential was identified as low-moderate. The remaining area, inclusive of the Clyde stabling and maintenance facility and Rosehill services facility construction sites was assessed as retaining low archaeological potential. The assessment did not identify any site-specific cultural values at the Clyde stabling and maintenance facility and Rosehill services facility construction sites, however Duck River is noted as having high cultural significance.

Recorded Aboriginal sites

The *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) did not identify any previously recorded Aboriginal sites within the Clyde stabling and maintenance facility and Rosehill services facility construction sites. Archaeological potential was assessed as low due to past disturbance.

A search of the AHIMS database was undertaken for this assessment on 21 August 2021 (Search ID 609567). There were no additional entries in the search results within 100 metres of Clyde stabling and maintenance facility and Rosehill services facility construction sites.

Aboriginal community consultation and cultural heritage values

Consultation undertaken with Aboriginal heritage knowledge holders under the previous Sydney Metro West planning application did not identify any site-specific cultural values at the Clyde stabling and maintenance facility and Rosehill services facility construction sites. However, the area is part of a wider cultural landscape of high cultural significance to the local Aboriginal community. In particular, major water sources including A'Becketts Creek were of particular cultural significance. The Duck River, located near the Clyde stabling and maintenance facility and Rosehill services facility construction sites, was known as the border between the Wangal and the Burramattagal peoples. and as such, retained high cultural significance for local Aboriginal peoples.

Ongoing consultation with Aboriginal heritage knowledge holders is underway as part of design development for this proposal, including for the purposes of better understanding cultural values and addressing the Connecting with Country framework.

Field investigation results

The *Sydney Metro West Environmental Impact Statement – Westmead to the Bays and Sydney CBD* (Sydney Metro, 2020a) included a survey of the Clyde stabling and maintenance facility and Rosehill services facility construction sites, undertaken with participation from a Registered Aboriginal Party from Deerubbin Local Aboriginal Land Council.

The Registered Aboriginal Party representative noted the potential for Aboriginal sites to be present in the southern portion of Clyde stabling and maintenance facility. Consequently, an area of Potential Archaeological Deposit, (ID #45-6-3827) was registered. If Aboriginal objects were to be present, these would retain cultural association and tangible Aboriginal cultural heritage value. Test excavation would be undertaken where intact natural profiles with the potential to contain significant archaeological deposits are encountered, in accordance with the methodology detailed in the revised Aboriginal Cultural Heritage Assessment Report (ACHAR) included in the *Sydney Metro West Westmead to The Bays and Sydney CBD - Submissions Report* (Sydney Metro, 2020b).

A field investigation has not been undertaken at the Clyde stabling and maintenance facility and Rosehill services facility construction sites as the land required for this proposal would be consistent with the site assessed and approved under the previous Sydney Metro West planning application.

17.8.2 Operational impact assessment

Direct impacts

No identified Aboriginal sites, objects and/or site-specific cultural values would be directly impacted during operation of this proposal at Clyde stabling and maintenance facility and Rosehill services facility.

Indirect impacts

No identified Aboriginal sites, objects and/or site-specific cultural values would be indirectly impacted during operation of this proposal at Clyde stabling and maintenance facility and Rosehill services facility.

During development of Sydney Metro West, consultation was undertaken with knowledge holders to inform the project development as part of the Connecting with Country Pilot program. This consultation will continue during further development of the project.

In accordance with Concept conditions of approval CB4, CB5, and CB6, a draft Heritage Interpretation Strategy has been prepared for this proposal (refer to Appendix K) that details how Aboriginal heritage values and reflected within the design of this proposal.

Further details regarding Sydney Metro's approach to Connecting with Country, and heritage and archaeology Design Guidelines are provided in the station and precinct Design Guidelines in Appendix E (Design Guidelines).

17.8.3 Construction impact assessment

Direct impacts

In accordance with condition of approval D21 for the previous Sydney Metro West planning application, archaeological test excavation in the area of the PAD (AHIMS ID#45-6-3827) will be undertaken prior to the commencement of work under the previous Sydney Metro West planning application to determine the presence and/or nature of archaeological deposits within the construction sites.

This proposal does not require any additional footprint at Clyde stabling and maintenance facility and Rosehill services facility construction sites. Any potential direct impacts or disturbance to Aboriginal heritage items or cultural values within the construction sites would occur during establishment of the construction sites under the previous Sydney Metro West planning application. Therefore, no identified Aboriginal sites, objects and/or site-specific cultural heritage values would be directly impacted during construction of this proposal within the Clyde stabling and maintenance facility and Rosehill services facility construction sites.

The power supply route from Rosehill services facility to Camellia substation would be largely located within existing road reserves. This area has undergone a high degree of disturbance or modification as a result on landform modification, road development and installation of existing services. This previous disturbance is likely to have removed intact natural soil deposits reducing the archaeological potential of these areas. Overall, the potential Aboriginal heritage potential and significance along the power supply route is considered to be low. Any potential impacts would be managed in accordance with the CEMF, which includes a measure to implement the Sydney Metro Unexpected Finds Procedure if unexpected Aboriginal objects are identified during construction work.

Indirect impacts

No identified Aboriginal sites, objects and/or site-specific cultural heritage values would be indirectly impacted during construction of this proposal at the Clyde stabling and maintenance facility and Rosehill services facility construction sites.

17.8.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal

During construction of this proposal, Aboriginal heritage would be managed in accordance with Sydney Metro's CEMF (refer to Appendix F). The CEMF management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

17.9 Landscape and visual amenity

Further details on the landscape and visual amenity assessment, including the approach and methodology, are provided in Technical Paper 6 (Landscape and visual amenity).

17.9.1 Baseline environment

Clyde stabling and maintenance facility and Rosehill services facility would be situated between Unwin Street, Shirley Street, the M4 Western Motorway and James Ruse Drive, in Clyde. The Clyde stabling and maintenance facility construction site is divided generally into north and south by A'Becketts Creek and Duck Creek which flows into the Duck River.

All buildings and vegetation within the approved Clyde stabling and maintenance facility and Rosehill services facility site will have been removed during work carried out under the previous Sydney Metro West planning application. The areas to the south of Duck Creek identified for future stabling will also have been raised by fill. Unwin Street will be diverted and would include a bridge over part of the future stabling site. The areas to the north of the site will have been modified for construction.

Rosehill Gardens racecourse, an entertainment precinct, is located immediately north of the site. The racecourse is contained to the east and south by vegetated embankments; however, there are elevated east and south-eastward views from the grandstand across the industrial areas of Rosehill and Clyde. These views would include distant views to the Parramatta Light Rail Stage 1 stabling facility (currently under construction), former Clyde Refinery and parts of the construction site for this proposal, filtered through the racecourse perimeter trees.

Unwin Street and Colquhoun Street, located to the north of the sites, have a predominantly industrial character in this location, with wide vehicle crossovers, overhead power lines and grassed verges. This vehicle-dominated streetscape has a high volume of heavy traffic movements with few footpaths and limited amenity for pedestrians and cyclists.

The former T6 Carlingford Line runs north-south, along the western boundary of the racecourse, and is located in a vegetated cutting. Rosehill Station and footbridge over the rail corridor would be removed under a previous Sydney Metro West planning application.

James Ruse Drive is located to the west of the former rail corridor. James Ruse Drive is a six-lane, heavily trafficked road. This corridor of road and rail infrastructure physically and visually separates Rosehill

Gardens racecourse from the residential areas of Rosehill, located further to the west. This area includes some medium- and high-density residential and hotel towers that face east, over James Ruse Drive. The landform rises to the north-west of Clyde, so that these properties are located on a locally prominent rise and have broad views across James Ruse Drive, the Rosehill Gardens racecourse and industrial areas of Rosehill and Clyde. The M4 Western Motorway would also be visible from these properties, including the grade-separated intersection at James Ruse Drive. The on-ramp for the M4 Western Motorway forms the south-western corner of the site and the M4 Western Motorway itself is elevated as it continues east, forming the southern boundary of the site.

Section 17.3 provides further discussion of the intended future character and local strategic plans relevant to Clyde and Rosehill. Further details of local planning guidance relevant to landscape and visual context is provided in Technical Paper 6 (Landscape and visual amenity).

Landscapes and public realm areas

The landscapes and public realm areas potentially impacted by this proposal, and the landscape sensitivity level for these areas, are outlined in Table 17-18.

Table 17-18 Landscapes and public realm areas – Clyde stabling and maintenance facility and Rosehill services facility

Location	Baseline environment	Landscape sensitivity level
Rosehill Gardens racecourse	Rosehill Gardens racecourse is a premier racing venue. The main venue facilities, including several spectator stands, are located in the north-western corner of the venue. These spectator stands offer elevated views across the racetrack, towards the winning post, which is the focus of views and main area of visual interest to users.	Regional
A'Becketts Creek and Duck Creek	A'Becketts Creek is a tributary of Duck Creek, which flows into the Duck River. These creeks flow in an easterly direction towards the Parramatta River and meet at a point within the centre of the site. Where they pass through the site, these creeks will have been realigned and channelised under the previous Sydney Metro West planning application. There is limited visibility to these creeks from public and pedestrian areas.	Neighbourhood
The site and streetscapes including Unwin, Kay, Wentworth and Shirley Streets	Unwin Street and Kay Street will have been realigned, and a ramping bridge structure will have been established over the rail corridor during work carried out under the previous Sydney Metro West planning application. Wentworth Street (north of the M4 Western Motorway) will have been closed under the previous Sydney Metro West planning application. Shirley Street provides access to industrial sites with wide driveway entries. Shirley Street, and areas of Unwin Street to the east of the construction site, are vehicle-dominated streets with a high volume of heavy vehicle movements and limited facilities and amenity for pedestrians and cyclists. The trees along Unwin Street, and adjacent to James Ruse Drive, will have been removed under the previous Sydney Metro West planning application.	Neighbourhood
Former T6 Carlingford Line and Rosehill Station	All vegetation within the site, will have been removed under the previous Sydney Metro West planning application. Rosehill Station footbridge and platforms, including the vegetation along the former rail corridor, will also have been removed, as part of the previous Sydney Metro West planning application, and a new pedestrian access between the James Ruse Drive and Rosehill Gardens racecourse provided around the northern end of the construction site.	Neighbourhood

Representative viewpoints

Representative viewpoints that have been selected to inform the daytime visual impact assessment are shown in Figure 17-12. These viewpoints would be of local sensitivity.

While the impact ratings for all seven viewpoints are provided, the following two have been selected as the most representative viewpoints for this site to be discussed further in this section. This takes into account the degree of sensitivity, and potential operational and construction elements that would be visible:

- **viewpoint 3: view south-east along James Ruse Drive** – presents potential impacts visible from residential areas and hotels to the west of James Ruse Drive, experienced by a large volume of residents and workers
- **viewpoint 6: views from the M4 Western Motorway** – presents views that would be experienced by a large volume of road users on the heavily trafficked M4 Western Motorway.

A detailed assessment of all viewpoints is provided in Technical Paper 6 (Landscape and visual amenity).

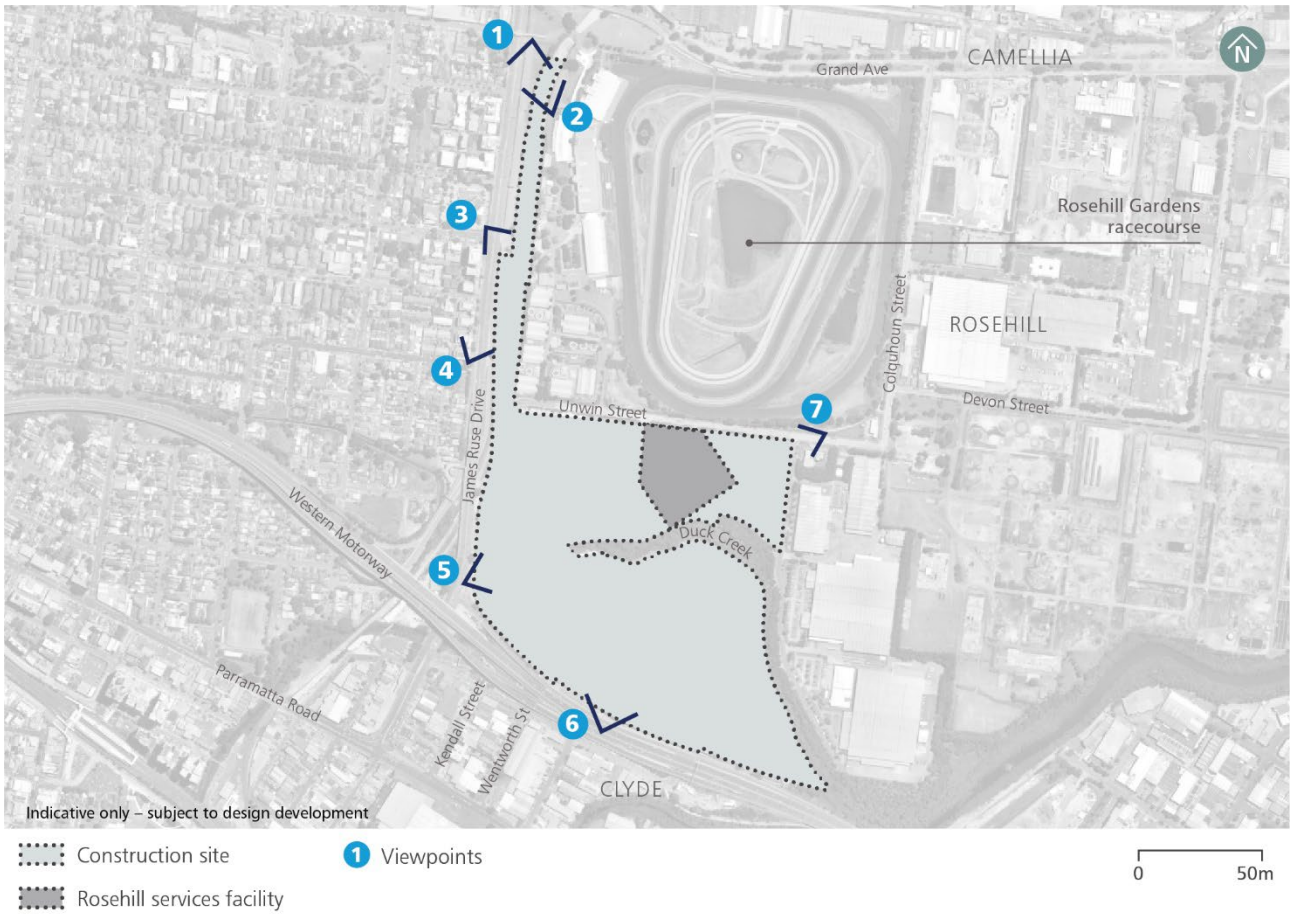

Figure 17-12 Representative viewpoints – Clyde stabling and maintenance facility and Rosehill services facility

Night-time visual sensitivity

The Clyde stabling and maintenance facility construction site is located in an industrial area, which would be moderately lit at night, with lighting associated with the surrounding large-scale industrial and commercial uses. It has a medium district brightness (A3) and low sensitivity.

Parts of the Rosehill Gardens racecourse would be brightly lit during evening track events and functions. The headlights from traffic moving along the M4 Western Motorway and James Ruse Drive would also contribute to the night-time setting. While some of this lighting would be filtered by the existing vegetation within and on the perimeter of the site, there would be a general skyglow above the site and numerous bright sources of light seen in this area. There will also be some remaining security lighting from work under the previous Sydney Metro West planning application.

17.9.2 Operational impact assessment

Operation of this proposal at Clyde stabling and maintenance facility and Rosehill services facility would comprise underground and surface elements. The key elements that would be visible are described in Section 17.2.

Landscape impact

Landscape character impacts anticipated as a result of the operation of this proposal are summarised in Table 17-19. Management of potential impacts is discussed in Section 17.9.4.

During operation, there would generally be negligible landscape impacts associated with Clyde stabling and maintenance facility and Rosehill services facility. Metro trains would operate intermittently on the surface track in the location of the former T6 Carlingford line. These train operations would be similar in character to those previously seen in in this location when the T6 Carlingford Line was operational. The metro dive structure and tunnel portal, where trains enter and exit the mainline tunnels, would be located to the west of the racecourse and largely out of view, as metro trains would descend towards the tunnel entry progressively from the south.

The remaining sections of Duck Creek and A'Becketts Creek that run through or are adjacent to the Sydney Metro site would be rehabilitated and parts of Duck Creek would be renaturalised, improving the condition of these sections of the creeks. There would also be new trees and landscaped areas across the site. This additional vegetation would improve amenity and contribute to the integration of the buildings and infrastructure with the surrounding setting.

There would be a water treatment plant building located adjacent to James Ruse Drive, however Sydney Metro is investigating options for the location of the water treatment plant within the Clyde stabling and maintenance facility and Rosehill services facility site (including locations closer to the Rosehill services facility). This building would rise several storeys above the site and be about 25 metres long, forming a continuous built form and visual barrier in this area. The open-air dive structure leading to tunnel portal would also restrict east-west pedestrian movement in this area.

There would be improvements in local accessibility due to the implementation of a section of the 'Wilderline' (a City of Parramatta Council proposed active transport corridor within the former T6 Carlingford Line) as part of this proposal. This would include improved connectivity to Rosehill Gardens racecourse entry, near Grand Avenue, and improvements to part of the eastern side of James Ruse Drive.

Table 17-19 Landscape character impacts during operation – Clyde stabling and maintenance facility and Rosehill services facility

Location	Landscape sensitivity level	Magnitude of change	Impact rating
Rosehill Gardens racecourse	Regional	No perceived change	Negligible
A'Becketts Creek and Duck Creek	Neighbourhood	Noticeable improvement	Negligible
The site and streetscapes including Unwin, Kay, Wentworth and Shirley Streets	Neighbourhood	Noticeable improvement	Negligible
Former T6 Carlingford Line and Rosehill Station	Local	No perceived change	Negligible

Daytime visual amenity impact

Visual amenity impacts anticipated as a result of the operation of this proposal are summarised in Table 17-20. Management of potential impacts is discussed in Section 17.9.4.

Generally, there would be negligible to minor adverse visual impacts during operation, due to the scale of the surrounding rail and road infrastructure, as well as the general industrial nature of the area.

Table 17-20 Daytime visual impacts during operation – Clyde stabling and maintenance facility and Rosehill services facility

Location	Sensitivity rating	Magnitude of change	Impact rating
Viewpoint 1: view south from the James Ruse Drive footbridge	Local	Noticeable reduction	Minor adverse
Viewpoint 2: view north from the car parking areas of Rosehill Gardens Racecourse	Local	Noticeable reduction	Minor adverse
Viewpoint 3: view south-east along James Ruse Drive	Local	Noticeable reduction	Minor adverse
Viewpoint 4: view north-east from James Ruse Drive	Local	No perceived change	Negligible
Viewpoint 5: view north-east from M4 Western Motorway onramp	Local	Noticeable reduction	Minor adverse
Viewpoint 6: views from the M4 Western Motorway	Local	Noticeable reduction	Minor adverse
Viewpoint 7: view south-west to the corner of Unwin and Shirley Streets	Local	No perceived change	Negligible
Views from Rosehill Gardens racecourse	Local	No perceived change	Negligible
Views to the power supply route	Neighbourhood	No perceived change	Negligible

As noted in Section 17.9.1, the most representative viewpoints have been discussed in detail in this section. Potential impacts from these viewpoints would include the following:

- **viewpoint 3: view south-east along James Ruse Drive** – there would be a minor adverse visual impact to this view during operation. There would be metro trains visible on the surface track, in the middle and background of this view, travelling between the dive structure and the stabling and maintenance facility. The track would pass under the Unwin Street and Kay Street bridge (constructed during work carried out under the previous Sydney Metro West planning application), which would partly screen views to the stabling yard from this location. A section of the 'Wilderline', along the western verge of James Ruse Drive, would be located in the middle ground of this view and would improve the public domain in this area. Overall, much of the metro infrastructure would be located below the level of the road and screened by vegetation on and surrounding the site. The setting also has a precedent of rail and road infrastructure, which this proposal would be compatible with
- **viewpoint 6: views from the M4 Western Motorway** – there would be a minor adverse visual impact to this view during operation. There would be glimpses across the new stabling facility, including large industrial scale buildings and multiple rows of surface track, where trains may be seen moving or stabling in large numbers. There would be new roads, parking areas, site fencing, overhead electrical equipment and lighting across the site. The stabling facility would be surrounded by swathes of vegetation that would establish over time and provide some filtering and softening of these views. This view has a high capacity to absorb the scale of this proposal due to the setting of industrial built form and road infrastructure.

Night-time visual amenity impact

The anticipated night-time visual impacts during operation are summarised in Table 17-21.

Clyde stabling and maintenance facility would operate 24 hours a day, seven days a week. As such, the site would be brightly lit at night-time for staff parking and security. This lighting would be consistent with the surrounding lighting levels of other industrial buildings and would not be likely to alter the prevailing light levels of this area.

There would be metro trains operating on the surface track, accessing and egressing the mainline via the dive structure. These trains would have headlights that would not be directed toward any receptor but would be viewed as they pass and would contribute generally to the light levels in this area of the site. There would be some security lighting at the water treatment plant, which would also be consistent with the lighting in this urban area.

While the level of lighting required to support the stabling and maintenance activities at the services facility and along the dive structure would increase the light levels in the southern areas of the site, the metro train vehicle lights and some other minor building lighting would not. The site would be set within an area that had previously included a range of industrial uses including the Sydney Speedway, which was brightly floodlit at night during events. This lighting would be set back from any residential areas, and this lighting would be largely absorbed into its setting.

Table 17-21 Night-time visual amenity impacts during operation – Clyde stabling and maintenance facility and Rosehill services facility

Location	Sensitivity rating	Magnitude of change	Impact rating
Clyde stabling and maintenance facility and Rosehill services facility	A3: Medium district brightness	No perceived change	Negligible

17.9.3 Construction impact assessment

This proposal would require the continued use of the Clyde stabling and maintenance facility and Rosehill services facility construction sites established under the previous Sydney Metro West planning application. The main elements that would be seen include the proposed works, construction site features, equipment and vehicle access routes described in Chapter 6 (Proposal description – construction) of this Environmental Impact Statement and Section 17.4.

Landscape impact

Landscape impacts anticipated as a result of the construction of this proposal are summarised in Table 17-22. Potential temporary landscape impacts would generally be minor to moderate adverse due to the continued presence of construction activity. Management of potential impacts is discussed in Section 17.9.4.

While there would be no direct landscape impact on Rosehill Gardens racecourse and supporting venue facilities as a part of this proposal, the continued large-scale construction activity within areas adjoining the racecourse would alter the amenity of adjacent areas of the racecourse complex.

No new areas of A'Becketts Creek or Duck Creek would be impacted as part of this proposal. The sections of these creeks that are impacted would remain within the construction site and would be subject to ongoing construction activity during this construction of this proposal.

The realigned section of Unwin Street and Kay Street, as they pass through the construction site, would continue to be used for construction vehicles to access the southern areas of the Clyde stabling and maintenance facility construction site. Vegetation established under the previous Sydney Metro West planning application would progressively mature and assist in the integration of the long embankments associated with the realigned streets. The realigned section of Unwin Street and Kay Street would be open to public use during this time, improving local accessibility and permeability for road users and pedestrians within this area of Clyde.

Table 17-22 Landscape impacts during construction – Clyde stabling and maintenance facility and Rosehill services facility

Location	Landscape sensitivity level	Magnitude of change	Impact rating
Rosehill Gardens racecourse	Regional	Noticeable reduction	Moderate adverse
A'Becketts Creek and Duck Creek	Neighbourhood	Considerable reduction	Minor adverse
The site and streetscapes including Unwin, Kay, Wentworth and Shirley Streets	Neighbourhood	Considerable reduction	Minor adverse
Former T6 Carlingford Line and Rosehill Station	Local	Considerable reduction	Moderate adverse

Daytime visual amenity impact

Visual amenity impacts anticipated as a result of the construction of this proposal are summarised in Table 17-23. Management of potential impacts is discussed in Section 17.9.4.

Table 17-23 Daytime visual impacts during construction – Clyde stabling and maintenance facility and Rosehill services facility

Location	Sensitivity rating	Magnitude of change	Impact rating
Viewpoint 1: view south from the James Ruse Drive footbridge	Local	Noticeable reduction	Minor adverse
Viewpoint 2: view north from the car parking areas of Rosehill Gardens Racecourse	Local	Considerable reduction	Moderate adverse
Viewpoint 3: view south-east along James Ruse Drive	Local	Considerable reduction	Moderate adverse
Viewpoint 4: view north-east from James Ruse Drive	Local	Considerable reduction	Moderate adverse
Viewpoint 5: view north-east from M4 Western Motorway onramp	Local	Considerable reduction	Moderate adverse
Viewpoint 6: views from the M4 Western Motorway	Local	Noticeable reduction	Minor adverse
Viewpoint 7: view south-west to the corner of Unwin and Shirley Streets	Local	No perceived change	Negligible
Views from Rosehill Gardens racecourse	Local	No perceived change	Negligible
Views to the power supply route	Neighbourhood	No perceived change	Negligible

As noted in Section 17.9.1 of this Environment Impact Statement, the most representative viewpoints have been discussed in detail in this section. Potential temporary impacts from these viewpoints for the duration of construction would include the following:

- **viewpoint 3: view south-east along James Ruse Drive** – there would be a moderate adverse temporary visual impact to this view. There would be large-scale construction works seen on the site, however views to the work would be limited by intervening landform and vegetation. Therefore, there would continue to be a considerable reduction in the amenity of this view. Hoarding would be maintained along the site boundary and there would be large construction equipment, partly obstructed by the cutting to the north and site offices, storage, amenities and workshops. Construction vehicles would be seen moving along the rail corridor, and on the realigned Unwin Street and Kay Street bridge elevated and in the background of this view. Track works would be visible occurring within the rail corridor and extending towards the stabling site in the background. Overall, work within the stabling site and Rosehill services facility would be out of view, screened by retained vegetation within Rosehill Gardens racecourse and retained along the creeks within the construction site
- **viewpoint 6: views from the M4 Western Motorway** – there would be a minor adverse temporary visual impact to this view due to the continuation of construction work visible on the site. This works would include construction and fit-out of the stabling yard, including rail entry/exit structures, surface rail track installation, electrical fit-out, signalling and communications work. There would be construction vehicles seen on the realigned Unwin Street and Kay Street, and large construction equipment and activity seen across the site to undertake this work. There would be site offices, amenities, storage and workshops within the site, and works to construct the facility buildings. While the extent and scale of the construction activities would be substantial, the view would be seen at speed for a short duration, and the site would be seen in a sequence of views that includes a wider expanse of industrial scale activities.

To manage these potential impacts, management and mitigation measures are provided in Section 17.9.4 and Chapter 20 (Synthesis) of this Environmental Impact Statement. These sections include measures to locate elements of construction sites to minimise visual impact, where feasible and reasonable.

Night-time visual amenity impact

The anticipated night-time visual impacts as a result of construction of this proposal are summarised in Table 17-24.

Much of the work on the Clyde stabling and maintenance facility and Rosehill services facility construction sites would be carried out during standard work hours. During these times these areas there would be low-level security lighting within the site and at the site offices, workshops and amenities. However, there would be out of hours work required for the Rosehill services facility site, in the northern part of the site. There would also be out of hours materials and equipment delivery, and access for underground and internal construction activities, accessed via the mainline tunnel entry. This work may take place 24 hours per day, seven days per week.

This additional lighting would be seen within an area where there is lighting associated with the existing industrial areas and the street lights and moving headlights on James Ruse Drive and surrounding roads. This work would remain set back from the residential areas of Rosehill by James Ruse Drive. Overall, this additional lighting would be readily absorbed into the existing moderately lit setting.

Table 17-24 Night-time visual amenity impacts during operation – Clyde stabling and maintenance facility and Rosehill services facility

Location	Sensitivity rating	Magnitude of change	Impact rating
Clyde stabling and maintenance facility and Rosehill services facility	A3: Medium district brightness	No perceived change	Negligible

17.9.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, landscape and visual amenity impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes landscape and visual amenity management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

The design of this proposal would also be consistent with the principles and outcomes presented in the Design Guidelines (Appendix E).

Mitigation measures that are specific to the operation and construction of Clyde stabling and maintenance facility and Rosehill services facility to address potential impacts are listed in Table 17-25.

Table 17-25 Landscape and visual amenity mitigation measures – Clyde stabling and maintenance facility and Rosehill services facility

Ref	Impact/issue	Mitigation measure	Timing
Landscape and visual amenity			
EIS-LV7	Visual impacts	Engineered batters and water management measures would be designed to have a natural shape and low profile as far as is reasonable and feasible and would be designed to support vegetation that would allow for their visual integration and screening over time.	Operation
EIS-LV11	Visual impacts	Revegetate the embankments and provide screening vegetation between the proposed surface rail (in the former T6 Carlingford rail corridor) and the Rosehill Gardens racecourse to minimise views where feasible.	Operation
EIS-LV12	Visual impacts	Opportunities to provide further vegetation screening of the stabling and maintenance facility, and realigned Unwin and Kay Street bridge from sensitive receivers, such as the M4 Western Motorway, James Ruse Drive, and residential properties to the west of James Ruse Drive, would be investigated during design development.	Operation

Ref	Impact/issue	Mitigation measure	Timing
EIS-LV13	Visual impacts	Corridor services, including the combined services route, would be designed to reduce visual clutter and minimise visual impact, ensuring these structures have a low profile and do not obstruct views across the corridor.	Operation
EIS-LV14	Visual impacts	The water treatment building would be designed to minimise its mass and scale and have a high-quality architectural form and finish.	Operation

17.10 Soils, contamination and groundwater

Further details on the contamination assessment, including the approach and methodology, are provided in Technical Paper 7 (Contamination). The approach and methodology for the soils and groundwater assessments are provided in Chapter 4 (Methodology) of this Environmental Impact Statement and Appendix D (Detailed assessment methodologies). The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

17.10.1 Baseline environment

The baseline environment as relevant to soils, contamination and groundwater is described in the following sections.

Prior to the commencement of this proposal, the land required for the Clyde stabling and maintenance facility and Rosehill services facility construction sites will be excavated and levelled as a result of activities carried out under the previous Sydney Metro West planning application.

Soils

The existing soils environment is described in detail in Chapter 19 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) and is summarised in the following sections.

The geological units expected to be encountered at Clyde stabling and maintenance facility and Rosehill services facility include fill (0 to 1 metres below ground level), Quaternary deposits (1 to 13 metres below ground level), Ashfield Shale and Mittagong Formation (13 to 28 metres below ground level) and Hawkesbury Sandstone (greater than 28 metres below ground level).

The Soil Landscapes of Sydney 1:100,000 Sheet (Chapman et al., 2009) and Penrith 1:100,000 Sheet (Bannerman et al., 2010) identify Disturbed terrain soil units underneath and in the vicinity of Clyde stabling and maintenance facility and Rosehill services facility. Disturbed terrain often consists of disturbed soils where original soils have been removed or buried. Landfill may include soil, rock, building and waste material with a cap of sandy loam.

Soil salinity

The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) identified there is potential for saline soils to be present at Clyde stabling and maintenance facility and Rosehill services facility.

Acid sulfate soils

Potential acid sulfate soils risk maps obtained from the former Office of Environment and Heritage (now part of NSW Department of Planning and Environment) were reviewed to assess the probability of potential acid sulfate soils being present in proximity to Clyde stabling and maintenance facility and Rosehill services facility.

The Clyde stabling and maintenance and Rosehill services facility construction sites are mapped as Class 4 acid sulfate soils risk, with a high probability of potential acid sulfate soils at depths greater than two metres below ground level. Large areas around Clyde and Rosehill are identified as ‘disturbed terrain’, including areas within an surrounding the construction sites (see Figure 17-14), which are often located on reclaimed land or land subject to dredging or mining, with the potential presence of acid sulfate soils. These areas are associated with fill and/or alluvium that extends from harbour shores up local drainage lines.

Contamination

The work carried out under the previous Sydney Metro West planning application will include the investigation and remediation of soil and/or groundwater contamination where required in accordance with the applicable mitigation measures and conditions of approval.

Areas of environmental interest identified in Chapter 20 of *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* at the Clyde stabling and maintenance facility and Rosehill services facility construction sites are described as follows:

- AEI 12 – Sydney Speedway (within the construction sites) – low risk of residual soil and groundwater contamination from heavy metals and hydrocarbons from historical leaks and spills from vehicle maintenance and use
- AEI 13 – Hazardous building materials (within the construction sites) – low risk of soil contamination from heavy metals, hydrocarbons, pesticides, asbestos or polychlorinated biphenyls (PCB) from on-site buildings, structures and demolition wastes, although surface soils and previously dumped construction waste is expected to be remediated under the previous Sydney Metro West planning application
- AEI 14 – Viva Clyde Terminal Facility (to the east of the construction sites) – low risk of residual groundwater contamination from hydrocarbons, lead, chromium and per- and poly-fluoroalkyl substances (PFAS)
- AEI 15, 16 and 17 – Industrial land uses and historical filling (within and surrounding the construction sites) – moderate risk of residual soil and groundwater contamination from heavy metals, hydrocarbons and asbestos
- AEI 18 – Parramatta heliport (within the construction sites) – low risk of residual soil and groundwater contamination as a result of hydrocarbon, volatile organic compounds and PFAS leaks, and spills from petroleum storage infrastructure, maintenance and refuelling and fire-fighting foam storage
- AEI 19 – Rapid Oil Distributors (within the construction sites) – low risk of residual soil and groundwater contamination as a result of hydrocarbons spills and leaks.

AEIs rated as moderate risk or above following the completion of the work carried out under the previous Sydney Metro West planning application are shown on Figure 17-13.

AEI 10 and 11, which were identified for the previous Sydney Metro West planning application, are not applicable to this proposal as there is no likely contamination pathway from these AEIs to the construction sites (partially due to the separate distance) and are therefore not considered to be a source of contamination for this proposal (refer to Appendix C of Technical Paper 7 (Contamination)).

Overall, the risk of shallow soil contamination is considered to be low for these areas of environmental interest for this proposal, as surface soils and hazardous construction waste will be removed as part of the work carried out under the previous Sydney Metro West planning application.

Ongoing monitoring and management may be required if contaminated material is capped in-situ. Residual groundwater contamination sources may also remain in areas that are not subject to remediation under the previous Sydney Metro West planning application.

The conceptual site model and risk ranking for the areas of environmental interest at Clyde stabling and maintenance facility and Rosehill services facility are detailed in Appendix C of Technical Paper 7 (Contamination).

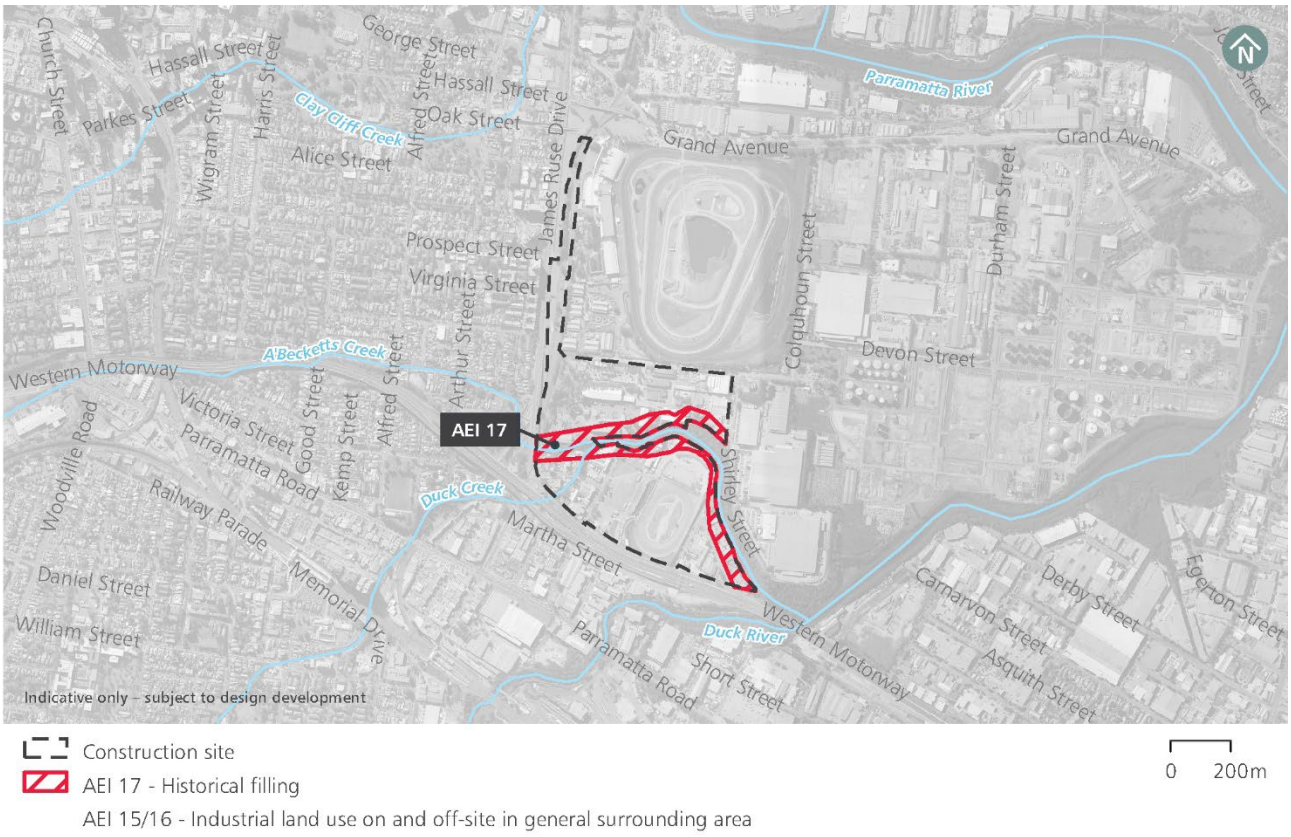

Figure 17-13 Areas of environmental interest (moderate risk or above) – Clyde stabling and maintenance facility and Rosehill services facility

Groundwater

The work carried out under the previous Sydney Metro West planning application will include the excavation of a tunnel portal, dive structure and Rosehill services facility shaft, which will be untanked (excavation that allows groundwater to flow into the structure) where low permeable rock is intercepted, and tanked (excavation/cavern constructed with an impermeable casing/membrane that minimises groundwater inflows to negligible rates) where the more permeable alluvial/fluvial deposits are intercepted.

The baseline groundwater environment for this proposal is described further in Table 17-26, and shown in Figure 17-14.

Table 17-26 Groundwater baseline environment Clyde stabling and maintenance facility and Rosehill services facility

Aspect	Description
Groundwater levels and flow	As a result of the work under the previous Sydney Metro West planning application, the groundwater level within the immediate vicinity of the Clyde stabling and maintenance facility and Rosehill services facility is predicted to reduce to about 25 metres below ground level (Sydney Metro, 2020a) (see Figure 17-14 for groundwater drawdown extent). This groundwater level is expected to remain at the commencement of construction for this proposal. The predicted groundwater inflows to the tunnel portal, dive structure and shaft up to about 0.8 litres per second is expected to continue at the commencement of construction for this proposal. Localised groundwater flow is expected to be towards the tunnel portal, dive structure and shaft.

Aspect	Description
Groundwater quality	The baseline groundwater quality may be impacted by a change in the groundwater flow direction, towards the tunnel portal, dive structure and shaft (which has the potential to induce contaminated groundwater seepage). Potential contaminants of concern include heavy metals, hydrocarbons (including light non-aqueous phase liquid), volatile organic compounds and perfluorooctanesulfonic acid as detailed in Chapter 20 of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a). Groundwater level drawdown in the vicinity of saltwater bodies has the potential to cause saltwater to intrude into fresh groundwater systems. There is potential that the saline waters of Duck Creek could be drawn into the fresh groundwater adjacent to the creek. The potential impacts to sensitive receptors are discussed in Section 5.5.8 of Technical Paper 7 (Hydrogeology) of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a), and form the baseline environment for this proposal.
Groundwater users	Eleven registered bores reported to be used for monitoring purposes are expected to have a reduced groundwater level at the commencement of construction for this proposal (see Figure 17-14). No registered water supply bores were identified within the groundwater drawdown extent predicted for work under the previous Sydney Metro West planning application.
Groundwater dependent ecosystems	Figure 17-14 shows three potential groundwater dependent ecosystems identified to the south and east of the tunnel access shaft along Duck Creek: • Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion • Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion • Saltmarsh in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion). No groundwater dependent ecosystems were identified within the predicted extent of groundwater drawdown for the work carried out under the previous Sydney Metro West planning application.
Surface water and groundwater interaction	The interaction between surface water and groundwater in proximity to Clyde stabling and maintenance facility and Rosehill services facility is considered limited due to the anthropogenic alteration of the area. The primary interactions include: • surface water acting as recharge to underlying groundwater units, where hydraulic gradients and modified environments (e.g. concrete-lined waterways/channels) allow • groundwater discharging to surface water as baseflow, especially in areas of low elevation (where hydraulic gradients and modified environments allow) • induced flow of surface water into groundwater due to the predicted groundwater drawdown resultant from work under the previous Sydney Metro West planning application. The surrounding area is highly urbanised with predominantly impervious surfaces across the catchments prior to the commencement of work for this proposal, which reduces possible surface water infiltration into soils and underlying groundwater. Groundwater drawdown is expected in proximity to Duck Creek and A'Becketts Creek at the commencement of construction for this proposal. Further assessment under the previous Sydney Metro West planning application would confirm if there is an existing groundwater baseflow contribution to A'Becketts Creek and Duck Creek. If there is existing groundwater baseflow contribution to A'Becketts Creek and Duck Creek, then the work carried out under the previous Sydney Metro West planning application has the potential to reduce that baseflow contribution. Where further investigations confirm a substantial reduction in baseflow, measures would be implemented to reduce the potential for baseflow loss.

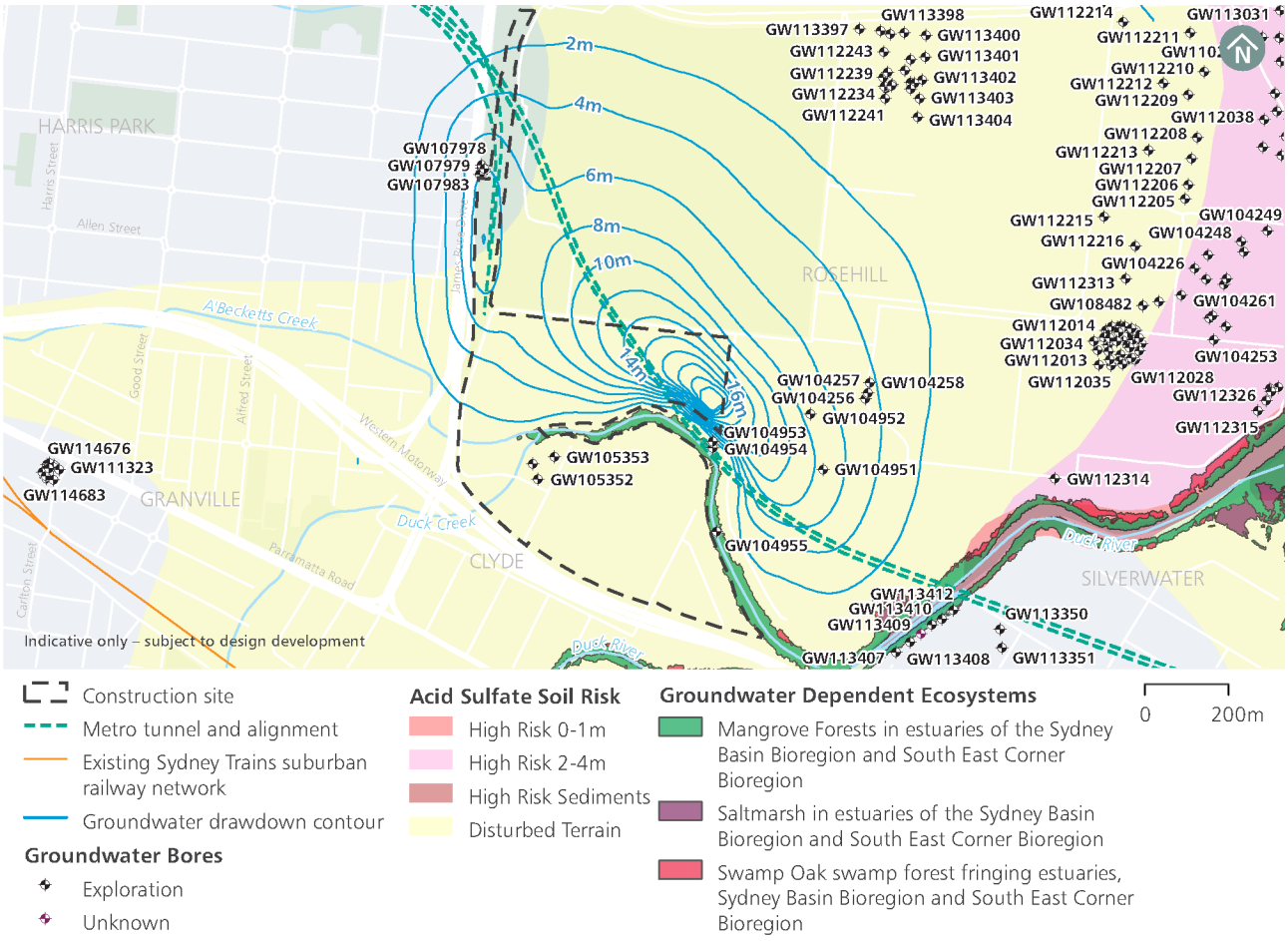

Figure 17-14 Groundwater baseline environment – Clyde stabling and maintenance facility and Rosehill services facility

17.10.2 Operational impact assessment

Soils

The operation of Clyde stabling and maintenance facility and Rosehill services facility is not expected to have any further impact on soils, including from saline soils, as there would be no excavation after completion of construction. Acid sulfate soil investigations would be undertaken under the previous Sydney Metro West planning application to assess potential impacts and decide whether an Acid Sulfate Soils Management Plan is required for operation of this proposal.

Contamination

Soil and/or groundwater contamination where present would be investigated and remediated during work carried out under the previous Sydney Metro West planning application in accordance with the relevant mitigation measures and conditions of approval. There would likely be a requirement for a long-term management of residual soil contamination and to monitor groundwater contamination, particularly if the remediation approach includes capping in-situ for any contamination encountered during work carried out under the previous Sydney Metro West planning application.

Groundwater drawdown containing potentially contaminated groundwater is expected to be minor as the tunnel portal, dive structure and Rosehill services facility shaft would be tanked where the more permeable alluvial/fluvial deposits are intercepted. All groundwater extracted would be captured, pumped to the operational water treatment plant at Clyde stabling and maintenance facility and treated prior to discharge in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality).

Operation of Clyde stabling and maintenance facility and Rosehill services facility would include train mechanical maintenance works, a train wash, water treatment plant and substation. Operation of the facility would require the storage and use of chemicals, oils and fuels, which could result in a spill or leak causing new soil or groundwater contamination. Management measures associated with the use and storage of chemicals during operation would be implemented (refer to Chapter 20 (Synthesis) of this Environmental Impact Statement).

Groundwater

Potential impacts to groundwater during operation at Clyde stabling and maintenance facility and Rosehill services facility are described in Table 17-27.

Table 17-27 Potential impacts to groundwater during operation – Clyde stabling and maintenance facility and Rosehill services facility

Potential impact	Discussion
Groundwater recharge	Groundwater within the Clyde stabling and maintenance facility and Rosehill services facility area is predominantly recharged by rainfall runoff and infiltration through the soil profile. The surface area of impervious surfaces at Clyde stabling and maintenance facility and Rosehill services facility is not expected to substantially increase due to the operational elements for this proposal, as the construction site prior to commencement of work for this proposal would comprise predominately paved (impervious) surfaces.
Groundwater levels, inflows, and flow patterns	During operation of this proposal, the potential impacts of this proposal are expected to be consistent with the baseline groundwater levels, inflows, and flow regime (as described in Table 17-26). Further groundwater modelling to confirm the impacts and flow patterns would be carried out for the work under the previous Sydney Metro West planning application in accordance with condition of approval D122. This groundwater modelling report would be reviewed and updated as required for this proposal.
Groundwater quality	Groundwater quality and the volume of potentially impacted groundwater to be managed during operation of this proposal is expected to remain consistent with the baseline conditions (refer to Table 17-26). Groundwater inflows would be collected, treated at the operational water treatment plant at Clyde stabling and maintenance facility, and discharged in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality).
Groundwater dependent ecosystems	Potential impacts on groundwater baseflow contribution to Duck Creek, if realised, may continue to impact potential groundwater dependent ecosystems that were identified to the south and east of the tunnel shaft along Duck Creek. As per mitigation measure B3 for the previous Sydney Metro West planning application, additional investigations and assessment would be completed to confirm the potential for impacts to groundwater dependent ecosystems due to groundwater drawdown, and to identify any required mitigation through design. This would be reviewed and updated as required for this proposal (refer to mitigation measures in Section 17.10.4).
Surface water – groundwater interaction	The baseline conditions for surface water features in proximity to Clyde stabling and maintenance facility and Rosehill services facility are expected to continue during the operational phase of this proposal and therefore there is potential for groundwater drawdown to impact on recharge to surface water features. Mitigation measures GW2 and GW3 for the previous Sydney Metro West planning application require further investigations during design development to confirm the existing baseflow contribution by groundwater resources to A'Beckett's Creek and Duck Creek, and to confirm the likelihood and significance of potential impacts of predicted groundwater drawdown on baseflow. Where further investigations confirm a substantial reduction in baseflow, measures would be implemented to reduce the potential for baseflow loss. A review of further investigations and potential treatments implemented under the previous Sydney Metro West planning application would be carried out to identify whether further measures may need to be implemented to manage potential impacts on recharge to surface water features as part of this proposal.

Potential impact	Discussion
Policy compliance	The minimal harm criteria in the NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) and Water Sharing Plan rules (NSW Department of Industry, 2011) adopted under the previous Sydney Metro West planning application are expected to be complied with during the operation of this proposal.

17.10.3 Construction impact assessment

Soils

There may be potential temporary minor soil erosion from the exposure of soil to water runoff and wind during minor excavation works required for this proposal. This would be adequately managed with the implementation of standard erosion and sediment controls.

There is the potential to disturb saline soils at the Clyde stabling and maintenance facility and Rosehill services facility construction sites. Any potential salinity impacts would be managed in accordance with *Book 4 Dryland Salinity: Productive Use of Saline Land and Water* (NSW Department of Environment and Climate Change, 2008b).

There is potential for acid sulfate soils within the construction site and predicted groundwater drawdown extent during construction. The exposure of acid sulfate soils during construction could result in the release of acid sulfates, which could pollute downstream watercourses. Further investigation of acid sulfate soils would be undertaken under the previous Sydney Metro West planning application. This would be reviewed for this proposal to identify the potential need for further measures to manage acid sulfate soils, if present.

Contamination

Existing contamination

All areas of environmental interest were ranked as moderate risk for this proposal, except for AEI 12, 13, 14, 18 and 19 which were ranked as a low risk. Soil contamination within parts of the construction site would be excavated and or remediated (if required) under the previous Sydney Metro West planning application in accordance with the applicable mitigation measures.

Residual soil and groundwater contamination could remain and require management in parts of the construction site where minor excavation works are required for this proposal, particularly if the remediation approach includes capping in-situ for any contamination encountered during work carried out under the previous Sydney Metro West planning application.

The operational power supply route from Rosehill services facility to Camellia substation would be constructed by trenching within the road reserve. Excavation work for the power supply route could encounter contamination associated with:

- industrial wastes that may have been used in the construction of roadways. If present, this contamination would be exposed by the work and represents a moderate risk
- historical industrial use in the area. This contamination is unlikely to be exposed by the work and represents a low risk.

New contamination

With the exception of the use and storage of chemicals associated with construction activities (e.g. fuels and oils associated with the operation of plant and equipment), the construction activities associated with this proposal are unlikely to represent a significant source of contamination. Management measures associated with the use and storage of chemicals during construction activities would be implemented (refer to Chapter 20 (Synthesis) of this Environmental Impact Statement.

Groundwater

Potential impacts to groundwater during construction at Clyde stabling and maintenance facility and Rosehill services facility construction site are outlined in Table 17-28.

Table 17-28 Potential impacts to groundwater during construction – Clyde stabling and maintenance facility and Rosehill services facility

Potential impact	Discussion
Groundwater recharge	Groundwater within the construction site and surrounding area is predominantly recharged by rainfall runoff and infiltration through the soil profile. The impervious surface area within the construction site is expected to increase marginally. However, this area is small relative to the overall aquifer, such that the net impact on regional recharge due to construction of this proposal is considered negligible.
Groundwater levels, inflows, and flow patterns	Groundwater inflows to the tunnel portal, dive structure and Rosehill services facility shaft would continue throughout construction of this proposal at roughly the modelled inflow rates identified as part of the baseline environment (refer to Table 17-26). The potential impacts from construction of this proposal are expected to be consistent with the baseline groundwater levels, inflows and groundwater flow regime under the previous Sydney Metro West planning application. Potential groundwater impacts of this proposal would be managed through the implementation of mitigation measures outlined in the CEMF and Chapter 20 (Synthesis) of this Environmental Impact Statement. This would include the development of a Groundwater Construction Monitoring Program that would be consistent with the requirements of condition of approval C17 for the previous Sydney Metro West planning application.
Groundwater quality	Groundwater quality and the volume of potentially impacted groundwater (e.g. saline water intrusion) to be managed during construction of proposal is expected to remain consistent with the baseline conditions. Potentially contaminated groundwater inflows would be collected, at construction water treatment plants, and discharged in accordance with the water quality requirements outlined in Section 18.9 (Hydrology and water quality). Technical Paper 7 (Hydrogeology) of the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a) assessed that saline water intrusion from Duck Creek could occur; however, no likely environmental impacts were identified as groundwater dependent ecosystems in the area are tolerant to saline water and groundwater is not beneficially used in the area.
Groundwater dependent ecosystems	Potential impacts on existing groundwater baseflow contribution to Duck Creek, if realised, may impact potential groundwater dependent ecosystems, which were identified to the immediate south and east of the shaft along Duck Creek. Potential impacts are expected to be consistent with the baseline conditions during construction of this proposal. Additional investigations and assessment completed as part of the previous Sydney Metro West planning application (in accordance with mitigation measure B3 for those works) would be reviewed and updated for this proposal, to confirm the potential for impacts, and to identify any required mitigation through design (refer to mitigation measures in Section 17.10.4).
Surface water – groundwater interaction	The potential for groundwater drawdown to impact on recharge to surface water features would remain consistent with the baseline conditions during construction of this proposal. Further investigations would be undertaken for the work under the previous Sydney Metro West planning application to confirm the existing baseflow contribution by groundwater resources to A'Becketts' Creek and Duck Creek, and to confirm the likelihood and significance of potential impacts of predicted drawdown on baseflow. Where further investigations confirm a substantial reduction in baseflow, measures would be implemented to reduce the potential for baseflow loss. The mitigation measures identified for the previous Sydney Metro West planning application would be maintained during construction of this proposal.
Policy compliance	The minimal harm criteria in the NSW Aquifer Interference Policy (NSW Department of Primary Industries, 2012) and Water Sharing Plan rules (NSW Department of Industry, 2011) adopted for the previous Sydney Metro West planning application are expected to be complied with into construction of this proposal.

Potential impact	Discussion
Ground movement	The potential for ground movement (and therefore potential impacts to buildings and structures) as a result of construction of this proposal is unlikely due to the excavation of the tunnel portal, dive structure and shaft being carried out under the previous Sydney Metro West planning application. As such, the extent of ground movement is considered to be negligible as a result of construction of this proposal.

17.10.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

Soils, contamination and groundwater during construction of this proposal would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes soil, contamination and groundwater management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

Mitigation measures that are specific to the operation and construction of Clyde stabling and maintenance facility and Rosehill services facility to address potential impacts are listed in Table 17-29.

Table 17-29 Soils, contamination and groundwater mitigation measures – Clyde stabling and maintenance facility and Rosehill services facility

Ref	Impact/issue	Mitigation measure	Timing
Soils, contamination and groundwater			
EIS-GW3	Groundwater dependent ecosystems	Additional investigations and assessment completed as part of the previous Sydney Metro West planning application (mitigation measure B3) would be reviewed and updated for this proposal, to confirm the potential for impacts to groundwater dependent ecosystems due to groundwater drawdown, and to identify any required mitigation through design.	Construction

17.11 Flooding

Further details on the flooding assessment, including the approach and methodology, are provided in Technical Paper 8 (Hydrology, flooding and water quality). The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

17.11.1 Baseline environment

Clyde stabling and maintenance facility and Rosehill services facility are both located in close proximity to Duck Creek. The previous Sydney Metro West planning application identified that the construction site is generally three to six metres Australian Height Datum (AHD), with some raised mounds up to 10 metres AHD and other elevations ranging from five to 15 metres AHD.

Under the previous Sydney Metro West planning application, construction activities to raise the Clyde stabling and maintenance facility to above the PMF level, as well as excavation works for the dive portal and Rosehill services facility shaft, will occur prior to this proposal.

The previous Sydney Metro West planning application will also include the installation of waterway structures in both Duck Creek and A'Becketts Creek which would require creek diversion and downstream realignment, trunk drainage and water quality ponds sized for the operation of the Clyde stabling and maintenance facility.

Due to the filling of the site and protection work under the previous Sydney Metro West planning application, the Clyde stabling and maintenance facility site would not be inundated in a PMF event and the Rosehill services facility site would be protected from the PMF event. This is also the case when sea level rise is considered with the PMF event in relation to climate change. The area around the site is largely impacted in the PMF event, with some areas upstream of the site also impacted in one per cent Annual Exceedance Probability (AEP) flood event. Duck Creek, A'Becketts Creek and Duck River in the vicinity of the site are high hazard in both the one per cent AEP and PMF events.

There are no coastal inundation risks relevant to the sites and immediate surrounds.

17.11.2 Impact assessment

The additional works associated with this proposal at Clyde stabling and maintenance facility and Rosehill services facility build on the major earthworks and protection of the sites carried out under the previous Sydney Metro West planning application. Therefore, these works would occur above the PMF level, even when considering sea level rise associated with climate change. As such, the operation of the facilities would also have immunity above the PMF level.

There would be no additional filling of the floodplain around the sites as part of this proposal; therefore, there would be no additional flooding impacts beyond those assessed and approved under the previous Sydney Metro West planning application. Consequently, no additional flooding assessment is necessary for Clyde stabling and maintenance facility and Rosehill services facility.

During construction, potential flood hazard to people and vehicles accessing the construction site would need to be managed as part of construction planning as the area surrounding the construction site is vulnerable to flooding. This would be through the continuation of arrangements in place as part of the previous Sydney Metro West planning application.

17.11.3 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

Potential flooding impacts during construction of this proposal would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes flood management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

17.12 Social impacts

Further details on the social impact assessment, including the approach and methodology, are provided in Technical Paper 9 (Social impacts). A discussion of potential broader proposal-wide and regional social impacts (both benefits and disbenefits) are provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

17.12.1 Baseline environment

The characteristics of the communities within the social locality is described as the social baseline. The social baseline has been analysed by considering the human, social, economic, physical, and natural capital present around Clyde stabling and maintenance facility and Rosehill services facility.

Statistical analysis of the social baseline has been carried out by considering the primary geographical areas of interest as defined by the Australian Bureau of Statistics (ABS). These areas of interest have been termed as:

- **the proximal area:** Statistical Area level 1 (SA1s) have been chosen as the closest approximation of each of the localities along the corridor
- **suburb:** Statistical Area level 2 (SA2s) have been chosen to prepare community profiles for the proposal corridor
- **region:** The Greater Sydney area has been chosen to assist with the assessment of the broader social impacts. It has also been used for comparative purposes.

A summary of the community capitals related to Clyde stabling and maintenance facility and Rosehill services facility is discussed in Table 17-6. This summary considers the proximal area of analysis only. A discussion of potential broader corridor-wide and regional social impacts (both benefits and disbenefits) is provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

Table 17-30 Community capitals summary - Clyde stabling and maintenance facility and Rosehill services facility

Capital	Summary
Human	Almost three quarters of the population within the Clyde locality were between the ages of 20 and 64 (74.1 per cent) and those over the age of 65 making up only 4.8 per cent of the population. A slightly higher share of residents attended educational facilities compared to other localities across the corridor. In 2016, 22.9 per cent of residents were attending educational facilities, most at university or another tertiary institution, or attending infants/primary school, which is only slightly lower than Greater Sydney (25.2 per cent)
Social	A quarter of the households in the Clyde locality were lone person households, which is slightly higher than both the metro corridor and Greater Sydney (23.6 per cent and 21.7 per cent respectively). In the Clyde locality, 30.3 per cent of households spoke English only at home, which was one of the lowest shares compared to other localities, with Arabic, Korean and Mandarin being the next most dominant languages. More than one in five residents are engaged in an educational facility, including preschool, infants/primary and secondary school, university, TAFE or other education facilities. Residents within the Clyde locality have reasonably high levels of stability of residence (lower stability indicates that residents may move around more regularly) compared to other corridor localities and the corridor as a whole. About 69 per cent of residents within the Clyde locality were in the same address as they nominated in the previous census.
Economic	Overall, households in the Clyde locality were the less affluent compared to other localities in the corridor, with the lowest proportion of households earning above $2,500 per week (18.6 per cent). 58.5 per cent of households rented in this locality with 79.9 per cent paying weekly rent in either the medium highest or highest quartile (greater than $340 per week) and there were also higher levels of unemployment (8.5 per cent of the eligible working age population, population compared to 6 per cent in Greater Sydney). Unemployment levels are calculated based on those of eligible age (between the ages of 16 and 65), who are not engaged in secondary education and who are able to work. Taken together these factors suggest that some households in the locality could be susceptible to financial and mortgage stress. While the majority of dwellings were being rented, a relatively high share was owned with a mortgage (39.8 per cent), with 39.1 per cent paying in the medium highest quartile (between $1785 to $2518 per month). The dominant industries of employment for residents in the Clyde locality were retail trade (10.9 per cent), health care and social assistance (10.5 per cent) and construction (10 per cent).
Physical	In the Clyde locality, most dwellings were flats, units or apartments; however, this share was below that of some of the surrounding localities. The average household size of the locality was 2.6, which was slightly higher than the majority of the other localities within the corridor. Residents within the Clyde locality were highly car dependent compared to residents across the entire corridor, with 54.5 per cent of residents reporting travelling to work via car as a driver. Within the predominantly industrial and commercial settings at Clyde stabling and maintenance facility and Rosehill services facility there is limited social infrastructure, which is associated with the lack of residential population.
Natural	Duck Creek is in immediate proximity to Clyde stabling and maintenance facility and Rosehill services facility.

17.12.2 Operational impact assessment

Social impacts would be experienced at different geographies or spatial extents. Most operational impacts at Clyde stabling and maintenance facility and Rosehill services facility would be felt at a regional and a suburb level; however, some would be experienced at a proximal level. This section focuses on the operational impacts at the proximal level, while a region- and suburb-based analysis, including potential beneficial social impacts, is provided in Chapter 18 (Proposal-wide) of this Environmental Impact Statement.

An assessment of the potential social impacts, both positive (benefits) and negative (disbenefits), of the operation of Clyde stabling and maintenance facility and Rosehill services facility are outlined in Table 17-31.

These potential social impacts are unmitigated and would be appropriately managed through the mitigation measures outlined in Section 17.12.4 and through the performance outcomes detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. Sydney Metro would also develop a Community Benefit Plan to guide the development of community benefit initiatives (by Principal Contractors).

A residual impact rating has been assigned to each pre-mitigated impact in Table 17-31 to quantify the impacts after mitigation measures have been applied.

Table 17-31 Summary of operational social impacts – Clyde stabling and maintenance facility and Rosehill services facility

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Social amenity and placemaking benefits, by creating and supporting attractive and active public spaces and transport links that are reflecting the existing or desired future scale and character of local areas.	Surroundings	Positive	Low
Potential decline in social amenity and potential sleep disturbance from operational noise.	Way of life	Negative	Low
Potential decline in community character due to permanent changes to local visual character.	Community	Negative	Low
Potential decline in how people experience their living environments due to light spill, visual amenity and/or extended opening hours of services	Way of life	Negative	Low

Overall, the assessment found that during operation, localised impacts on amenity may be experienced at properties near to Clyde stabling and maintenance facility and Rosehill services facility to the west of James Ruse Drive due to increased noise from the operations of the maintenance facility, primarily due to issues associated with the operation of the trains. In terms of placemaking and visual amenity, the assessment concluded that the facilities would have a negligible impact during operation on the majority of the surrounding landscape and public domain areas, including Rosehill Gardens racecourse and A'Becketts Creek and Duck Creek. There is potential that there would be some slight enhancements to the surroundings for people who access or live in nearby streets.

There would be some residual negative social impacts with respect to noise and visual impact; however, these would be managed to an acceptable level through the mitigation measures identified in Chapter 20 (Synthesis) of this Environmental Impact Statement.

17.12.3 Construction impact assessment

Construction activities would be carried out within the same construction sites required for the work carried out under the previous Sydney Metro West planning application. Anticipated construction impacts are expected to be similar and would be a continuation of those from work carried out under previous Sydney Metro West planning application. During this proposal, local amenity impacts such as noise, vibration, and air quality would reduce compared to the work carried out under the previous Sydney Metro West planning application due to the nature of the construction activities for this proposal.

An assessment of the potential social impacts of constructing this proposal at Clyde stabling and maintenance facility and Rosehill services facility are outlined in Table 17-32.

The potential impacts are unmitigated and would be appropriately managed through the implementation of the OCCS and the mitigation measures outlined in Section 17.12.4, and through the performance outcomes detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. Sydney Metro would also develop a Community Benefit Plan to guide the development of community benefit initiatives (by Principal Contractors).

A residual impact rating has been assigned to each pre-mitigated impact to quantify the impacts after these mitigation measures have been applied.

Table 17-32 Summary of construction social impacts – Clyde stabling and maintenance facility and Rosehill services facility

Pre mitigation impact	Social impact category	Impact type	Residual impact rating
Continued temporary changes to the way of life for people living, working, or accessing services near the construction site, including potential impacts due to continued transport network modifications and continued pedestrian detours to Rosehill Gardens racecourse. Culturally and linguistically diverse households could potentially be disproportionally impacted.	Way of life Livelihoods	Negative	Low
Continued minor changes to community character and sense of place associated with construction activity and how people experience the area, including uncertainty related to the connection of Clyde stabling and maintenance facility and Rosehill services facility with the broader Parramatta community.	Community	Negative	Low
Potential wellbeing impacts associated with ongoing construction activity for those people sensitive to noise and vibration. Culturally and linguistically diverse households could potentially be disproportionally impacted.	Health and wellbeing	Negative	Low
Continued reduction in amenity in local area due to ongoing construction and associated noise, air quality and vibration impacts.	Surroundings Way of life	Negative	Low

The assessment indicates that the social impacts of this proposal would effectively represent a continuation of the impacts from work carried out under the previous Sydney Metro West planning application, though generally at a lower level of intensity and extent. Key negative impacts would be related to community, health and wellbeing, surroundings and way of life, and would be temporary and short term in nature. These impacts would be managed to an acceptable level through proven mitigation measures as identified in Chapter 20 (Synthesis) of this Environmental Impact Statement.

17.12.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, social impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes social impact management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.

The OCCS (Appendix C) also specifies that a Community Communication Strategy would be prepared and implemented during construction which would define the location specific measures to be implemented to minimise impacts on people during construction).

Design refinements that have occurred to avoid or minimise social impacts, and to respond to stakeholder feedback are provided in Technical Paper 9 (Social impacts). Monitoring commitments during the operation and construction of this proposal, including adaptive management measures, are provided in Technical Paper 9 (Social impacts).

17.13 Local business impacts

The approach and methodology for the local business assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

17.13.1 Baseline environment

The Clyde stabling and maintenance facility and Rosehill services facility construction sites will be established under the previous Sydney Metro West planning application. Chapter 16 of The *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD (*Sydney Metro, 2020a) included a description of the existing environment as it relates to this business impact assessment, based on Census 2016 data. As updated census data is not yet available, the broad existing environment described is considered to remain largely relevant to this assessment.

To verify this, a desktop gap analysis was carried out with respect to any new data available and the specific scope of this proposal. The baseline environment is summarised in the sections below and more detail is provided in Chapter 16 of the *Sydney Metro West Environmental Impact Statement - Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a).

Local business profile

The Clyde local business study area is largely consistent with that considered in the *Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* (Sydney Metro, 2020a).

Clyde is an industrial area that straddles the M4 Western Motorway and Parramatta Road and is located adjacent to the Rosehill industrial area.

The northern part of the local business impacts study area includes Rosehill Gardens racecourse, and beyond to the future Camellia town centre, which currently contains a mix of retail outlets, light industries, urban services and warehouses. The future Camellia town centre is about 750 metres north of the construction sites, and currently includes a supermarket, childcare centre, and a café.

The eastern part of the local business impacts study area is dominated by the Viva Clyde and Parramatta Terminal Facilities that store and distribute fuels. North of the Viva site are a number of heavier industries, including building material manufacturing and distribution facilities, and waste management facilities.

The western part of the local business impacts study area is west of James Ruse Drive and includes several hotels and overnight accommodation that are reliant to some degree on Rosehill Gardens racecourse, and the shopping and restaurant district near the Hassall Street intersection which provide conference and event services to a broad customer base.

Businesses within the local business area are primarily destination businesses and while generally not likely to be reliant on passing trade, require access to the road network to access labour markets and customers, and to distribute goods and services.

Table 17-33 Businesses within the Clyde stabling and maintenance facility and Rosehill services facility local business impacts study area

Impact area	Types of businesses	Approximate number of businesses
Within 100 metres of the site	Educational, industrial, arts and recreation, manufacturing, retail, and warehousing	20 to 30
Between 100 and 400 metres of the site	Educational, industrial, cafes, arts and recreation, manufacturing, retail, warehousing, childcare	10 to 20

Employment

At the 2016 census 8,530 people were employed within the destination zones relevant to the Clyde local business study area. ‘Destination zones’ are the spatial unit used to code ‘place of work’ by the Australian Bureau of Statistics. Employment within this study area was made up of goods production, goods distribution, household services (arts and recreation and other services), and recreation – primarily related to Rosehill Gardens racecourse.

Australian Bureau of Statistics 2016 Census data indicates that the Clyde local business impacts study area has a high level of car dependency, with 81 per cent of workers in the area relying on car (as driver) as the method to travel to work. This suggests businesses and workers are dependent on good access to the road network to access labour markets within the region.

17.13.2 Operational impact assessment

A qualitative assessment of the potential indirect operational impacts to local businesses at Clyde stabling and maintenance facility and Rosehill services facility local business study area is provided in Table 17-34. There are no direct impacts anticipated for local businesses during operation. Potential opportunities for local businesses during operation are also provided in Table 17-34.

It is considered highly unlikely that businesses located in the future Camellia town centre area (about 750 metres to the north) and those immediately west of James Ruse Drive would be affected given that they are well separated from Clyde stabling and maintenance facility and Rosehill services facility.

Table 17-34 Local business opportunities and impacts during operation - Clyde stabling and maintenance facility and Rosehill services facility

Potential impact operation	Risk assessment	
	Likelihood	Significance
Potential opportunities		
Improved visual amenity Improved visual amenity would make the area a more attractive place. This could contribute to improved customer experiences for a range of business types (predominantly in the future with the potential for a future Camellia town centre) throughout the area and increased foot traffic for those businesses reliant on passing trade.	Possible	Slight positive
Potential indirect impacts		
Impacts on amenity During operation, very localised impacts on amenity may be experienced at the businesses in close proximity to Clyde stabling and maintenance facility and Rosehill services facility due to increased noise from the operations of the maintenance facility, primarily due to issues associated with the operation of the trains. This notwithstanding, there is not expected to be any exceedance of the applicable noise criteria for nearby businesses, and the majority of businesses that would experience any impacts in this sense do not rely on passing trade or amenity.	Unlikely	Slight negative

17.13.3 Construction impact assessment

A qualitative assessment of potential construction impacts, both the opportunities and the impacts, to local businesses at Clyde is provided in Table 17-35. There are no direct impacts anticipated for local businesses during construction. Potential opportunities for local businesses during construction are also provided in Table 17-35.

It is highly unlikely that businesses located in the future Camellia town centre area and those west of James Ruse Drive would be affected given that they are well separated from the Clyde stabling and maintenance facility and the Rosehill services facility construction site.

Additionally, anticipated construction impacts are expected to be similar and would be a continuation of those experienced during the work carried out under the previous Sydney Metro West planning application. During this proposal, local amenity impacts such as noise, vibration, and air quality would reduce compared to the work carried out under the previous Sydney Metro West planning application due to the nature of this proposal's activities.

Table 17-35 Local business opportunities and impacts during construction – Clyde stabling and maintenance facility and Rosehill services facility

Potential impact construction	Risk assessment	
	Likelihood	Significance
Potential opportunities		
Continuation of increased passing trade from workforce Businesses may experience an increase in business trade and custom from construction workers. Local population servicing businesses such as retail and cafés and restaurants are the most likely to experience an increase in customers as a result of this proposal, in comparison to pre-construction numbers.	Likely	Slight positive
Continuation of redistribution of trade As a result of the work carried out under the previous Sydney Metro West planning application, some local customers could have redistributed their trade towards similar locally serving businesses within other parts of the business study area or the surrounding area which would be positive for those businesses that potentially experience an increase in trade. This redistribution of trade could continue during construction of this proposal.	Possible	Slight positive
Potential indirect impacts		
Continuation of redistribution of trade As a result work carried out under the previous Sydney Metro West planning application, some local customers could have redistributed their trade towards similar locally serving businesses within other parts of the business precinct or the surrounding area which would be negative for those businesses that potentially experience a reduction in trade. This redistribution of trade could continue during construction of this proposal.	Possible	Slight negative
Continuation of temporary traffic congestion and increased travel times Some businesses surrounding the construction site may have experienced impacts associated with traffic congestion and increased travel times during the work carried out under the previous Sydney Metro West planning application. These impacts may continue during construction of this proposal. Modelled intersection performance with construction traffic indicates that the Parramatta Road and Wentworth Street intersection would still operate with spare capacity during both peak hours. Workers within the precinct are highly car dependent and a continuation in traffic congestion and travel times around the local business area could potentially continue to affect journey to work time. It is also expected that a high proportion of customers would access businesses within the area by car, meaning that this could also continue to impact business accessibility in a minor way. This notwithstanding, impacts would be unlikely for the majority of businesses around the site, primarily because workers and businesses in this area already experience a congested road network during some periods of the day, and this proposal is not altering the existing conditions to a significant extent.	Unlikely	Slight negative
Temporary loss of power and utilities Unplanned power and utility interruptions could result in business impacts during interruptions. Given the physical separation between the construction site and the businesses within the study area, and that most utility works would be completed under the previous Sydney Metro West planning application, any substantial impact from unplanned power and utility interruptions is very unlikely.	Almost unprecedented	Slight negative

Potential impact construction	Risk assessment	
	Likelihood	Significance
Continuation of temporarily reduced local amenity Some businesses surrounding the construction site may have experienced impacts associated with reduced local amenity during the major civil construction work, although these are anticipated to be minor. These impacts may continue during construction of this proposal however are considered unlikely to result in lower customer experience for surrounding businesses. Surrounding businesses are primarily industrial and entertainment based (i.e. Rosehill Gardens racecourse). They would generally already experience comparatively lower amenity from surrounding industrial premises, existing infrastructure and proximity to arterial roads such as James Ruse Drive and the M4 Western Motorway.	Unlikely	Slight negative
Continuation of safety and security impacts The industrial parts of the area surrounding the construction site already have relatively low levels of street activity and surveillance. Elsewhere, reduced business activity around the construction site is unlikely to result in any reduction in customer safety and security.	Rare	Slight negative

17.13.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, local business impacts would be managed in accordance with Sydney Metro's CEMF (Appendix F).

The OCCS (Appendix C) also specifies that a Community Communication Strategy and includes requirements related to small business owner engagement. The Community Communication Strategy would define the location specific measures to be implemented to minimise impacts on individual businesses during construction, taking into account the commercial character of the locality, its general trading profile (daily and annually), and information gained from the business profiling.

17.14 Biodiversity

The approach and methodology for the biodiversity assessment are provided in Chapter 4 (Methodology) of this Environmental Impact Statement. The legislative context for the assessment is provided in Appendix B (Legislative and policy context).

17.14.1 Baseline environment

Site context

The area immediately surrounding the proposed location of Clyde stabling and maintenance facility and Rosehill services facility is highly urbanised, with a history of clearing and development over the past 200 years. This includes the earlier use of the area for agriculture, with subsequent redevelopment for industrial and commercial land uses. The area is relatively flat, with a landform generally draining south towards A'Becketts Creek and Duck Creek, both of which flow into Duck River and the Parramatta River.

Vegetation characteristics

Vegetation in this area is limited to regenerated native species, opportunistic weeds and street trees. Two creeks, being A'Becketts Creek and Duck Creek, pass through the Clyde stabling and maintenance facility and Rosehill services facility construction sites. All vegetation occurring within the Clyde stabling and maintenance facility and Rosehill services facility construction sites will be removed as part of the work carried out under the previous Sydney Metro West planning application.

Riparian vegetation, including native vegetation, is present adjacent to the Clyde stabling and maintenance facility and Rosehill services facility construction sites along A'Becketts Creek and Duck Creek, to the point where it joins Duck River immediately east of the construction sites.

Native vegetation

Vegetation present within the riparian areas of A'Becketts Creek and Duck Creek contains a mix of native and exotic species. These areas are highly disturbed and heavily dominated by weeds. Native vegetation persists in places throughout the area, particularly within the brackish and tidal parts of the waterways. The vegetation consists mainly of *Avicennia marina* (Grey mangrove) and is consistent with plant community type 920 – The Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion. This plant community type is considered to be protected marine vegetation under the *Fisheries Management Act 1994*.

Other native species present within the broader riparian area include Swamp oak (*Casuarina glauca*), Willow bottlebrush (*Callistemon salignus*), Floating primrose-willow (*Ludwigia peploides*), Fishbone fern (*Nephrolepis cordifolia*) and Scurvy weed (*Commelina cyanea*). The riparian zones of these waterways are in a poor condition due to extensive invasion by weeds.

Two areas of PCT 920 will be removed under the previous Sydney Metro West planning application to facilitate construction of bridges, culverts and the realigned Kay Street and Unwin Street across the eastern side of the Clyde stabling and maintenance facility and Rosehill services facility construction sites. Other native vegetation is present in the form of planted street trees, including *Eucalyptus saligna* and *Eucalyptus robusta*, which would also be removed.

Threatened flora species

There are no threatened flora species present at the Clyde stabling and maintenance facility and Rosehill services facility construction sites. Downy wattle (*Acacia pubescens*) within the construction sites would be removed as part of work under the previous Sydney Metro West planning application.

Threatened fauna species

The Clyde stabling and maintenance facility and Rosehill services facility construction sites would be cleared (including demolition of existing buildings and structures) under the previous Sydney Metro West planning application. As such, at the commencement of work associated with this proposal no roosting habitat would be present for microbats. No potential impacts to microbats are therefore anticipated and impacts have not been assessed further.

It is recognised that riparian vegetation along the waterways, outside of the construction site established under the previous Sydney Metro West planning application, may provide foraging habitat for some urban-adapted threatened species. One threatened species, *Pteropus poliocephalus* (Grey-headed flying-fox), would be expected to utilise these areas adjacent to the Clyde stabling and maintenance facility and Rosehill services facility construction sites.

Groundwater dependent ecosystems

As identified in Section 17.10, three potential groundwater dependent ecosystems were identified to the south and east of the tunnel access shaft along Duck Creek:

- Mangrove Forests in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion
- Swamp Oak swamp forest fringing estuaries, Sydney Basin Bioregion and South East Corner Bioregion
- Saltmarsh in estuaries of the Sydney Basin Bioregion and South East Corner Bioregion).

Migratory species

There is no habitat associated with migratory species present within the Clyde stabling and maintenance facility and Rosehill services facility construction sites.

Aquatic ecology

A'Becketts Creek and Duck Creek are adjacent to this proposal at the Clyde stabling and maintenance facility and Rosehill services facility construction sites. A'Becketts Creek is a first order watercourse that receives flows from the urbanised catchments of Merrylands, Harris Park, Holroyd and Clyde. These waterways flow into Duck Creek. A'Becketts Creek is estuarine and is mapped as coastal wetland as defined by the State Environmental Planning Policy (Coastal Management) 2018.

Duck Creek is a second order watercourse that receives flows from the urbanised catchments of Guildford, Granville and Clyde, and flows into Duck River adjacent to this proposal. Duck Creek is estuarine and is mapped as coastal wetland adjacent to this proposal and at the confluence of Duck Creek and A'Becketts Creek.

Both of these aquatic habitats are highly disturbed with extensive exotic weed invasion. These waterways have a long history of receiving stormwater runoff from the surrounding industrial and commercial areas, and urban areas further upstream (which encompass the majority of the catchment). Neither of the creeks are mapped as Key Fish Habitat.

Several sensitive receivers are located downstream from Duck Creek along Duck River, including two TECs, Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions and Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner Bioregions. An area of saltmarsh habitat is located on the Duck River approximately 1.2 kilometres downstream from Clyde stabling and maintenance facility. Within this area a small sub-population of *Wilsonia backhousei* is located.

17.14.2 Operational impact assessment

Direct impacts

Direct impacts related to the operation of Clyde stabling and maintenance facility and Rosehill services facility would include the disruption of fauna due to noise, light and human activity, as well as the potential for vehicle strike (both road vehicles and trains).

Noise generated from activities within Clyde stabling and maintenance facility and Rosehill services facility would consist of fleet maintenance activities, train stabling activities, and the movement of road vehicles 24 hours a day. Maintenance activities would be carried out within the enclosed maintenance facility and would not be expected to contribute any substantial disruption to the activities of diurnal or nocturnal fauna. The movement of trains and road vehicles would occur within the context of an area already subject to significant historical and ongoing disturbance associated with the existing nearby major road and rail network, as well as the extensive presence and operation of industrial development. As such, any native fauna present within or near this area is likely to be highly habituated to light, noise and human presence.

The proposed lighting of Clyde stabling and maintenance facility would be designed to illuminate the entirety of the facility 24 hours a day for safety and security reasons. This lighting has the potential to directly deter the movement of native fauna within the area, as well as in adjacent land where ‘light spill’ occurs. This includes the riparian areas of Duck Creek and A’Becketts Creek, which are immediately adjacent to Clyde stabling and maintenance facility and Rosehill services facility. To minimise these impacts, lighting would be designed and implemented to be highly directional through the use of appropriate luminaires and shielding were necessary.

Clyde stabling and maintenance facility and Rosehill services facility would operate 24 hours a day, seven days a week; however this is not anticipated to result in any substantial changes to noise, light and direct disturbance to native fauna movements, given the existing disturbance associated with the existing nearby major road and rail network, as well as the operation of industrial development. The site would also be fenced which would help prevent entry of ground-based fauna. Therefore, direct impacts associated with the operation of these facilities is not anticipated to be significant.

Indirect impacts

Indirect impacts associated with the operation of Clyde stabling and maintenance facility and Rosehill services facility would be limited to the management of stormwater runoff and its impacts to local waterways. This may include changes in the quantity and quality of stormwater runoff leaving the site, resulting in subsequent impacts to nearby aquatic systems such as Duck Creek, A’Becketts Creek and Duck River. Biodiversity impacts associated with such changes include temporary or permanent inundation of wetland habitat, changes in water chemistry affecting sensitive breeding habitat (e.g. pH changes affecting amphibian breeding and foraging habitat), and changes in turbidity affecting the overall health and productivity of aquatic plants and animals, such as mangroves.

Potential impacts to groundwater dependent ecosystems are discussed in Section 17.10.2.

This proposal is located within an area that is already highly urbanised and the existing stormwater systems are likely to already be contributing to the impacts described above. This proposal would seek to manage all operational stormwater effectively and manage the quantity and quality of all water leaving the Clyde stabling and maintenance facility and Rosehill services facility sites. Potential water quality impacts are assessed in Section 18.9 (Hydrology and water quality) of this Environmental Impact Statement).

17.14.3 Construction impact assessment

Direct impacts

As discussed in Section 17.4, construction activities associated with Clyde stabling and maintenance facility and Rosehill services facility would take place entirely within the construction site established under the previous Sydney Metro West planning application.

It is recognised that riparian vegetation along the waterways may provide foraging habitat for some urban-adapted threatened species. Based on the assessment undertaken for the previous Sydney Metro West planning application, only one threatened species, *Pteropus poliocephalus* (Grey-headed flying-fox), would be expected to utilise this location.

On the basis that this proposal would not require any additional removal of vegetation there would be no additional impact to the foraging habitat of threatened species.

The presence of construction activity, including vehicles, machinery, workers and lighting, may result in some disturbance to threatened species in this location, though this is likely to be limited to Grey-headed flying-fox only. Noting the highly urban-adapted nature of this species, and the presence of a camp around 900 metres upstream on Duck River, adjacent to the existing Main Western railway line and the Sydney Trains Auburn Maintenance Centre, this proposal is unlikely to result in a significant impact to the species.

Non-threatened fauna would also be subject to direct disturbance due to the presence of noise, light and human activity. In the context of the locality within the surrounding industrial and commercial development, these impacts are anticipated to be minimal.

There is some potential for fauna to traverse the construction site to access surrounding creeks and vegetation and potentially be struck by construction vehicles. However, these vegetated areas would be excluded from the construction area by way of security fencing and speed limits on site would be heavily limited, substantially reducing the potential for vehicle strike.

Indirect impacts

Potential impacts on water quality and aquatic habitat within the two watercourses adjacent to this proposal could arise from stormwater runoff, and accidental leaks and spills of contaminants associated with construction activities. The mobilisation of sediment and contaminants from the construction site during construction would be managed through the implementation of mitigation measures outlined in the CEMF (Appendix F) . Given the implementation of these measures, the existing runoff from the surrounding industrial development and highly disturbed nature of the watercourses, these impacts are anticipated to be minor.

Potential impacts to groundwater dependent ecosystems are discussed in Section 17.10.

17.14.4 Management and mitigation measures

Environmental management for this proposal would be undertaken through the environmental management approach as detailed in Chapter 20 (Synthesis) of this Environmental Impact Statement. This includes operational mitigation measures (where relevant) and performance outcomes for the operation and construction of this proposal.

During construction of this proposal, biodiversity would be managed in accordance with Sydney Metro's CEMF (Appendix F). The CEMF includes biodiversity management objectives and mitigation measures to minimise impacts as relevant to this proposal as a whole.