Sydney Metro West – Concept and Stage 1

State Significant Infrastructure Assessment SSI 10038

March 2021

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Title: Sydney Metro West – Concept and Stage 1

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Cover image: Sydney Metro West: Parramatta Metro Station Artist Impression (Sydney Metro)

Glossary

Abbreviation	Definition
Amendment Report	*Sydney Metro West Westmead to The Bays and Sydney CBD Amendment Report Concept and Stage 1* prepared by the Proponent and dated 20 November 2020
BC Act	*Biodiversity Conservation Act 2016*
BDAR	Biodiversity Development Assessment Report
Concept	The Sydney Metro West project at a concept level
Council	Cumberland City, City of Parramatta, City of Canada Bay, Burwood, Strathfield, Inner West or City of Sydney
CSSI	Critical State Significant Infrastructure
Department	Department of Planning, Industry and Environment
DPIE BCD	Biodiversity and Conservation Division, DPIE
DPIE Water	Water Group, DPIE
EIS	*Sydney Metro West Environmental Impact Statement – Westmead to The Bays and Sydney CBD* prepared by the Proponent and dated 15 April 2020
EPA	Environment Protection Authority
EP&A Act	*Environmental Planning and Assessment Act 1979*
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EPL	Environment Protection Licence
Heritage NSW	Heritage NSW, Department of Premier and Cabinet
Heritage Council	Heritage Council of NSW
Minister	Minister for Planning and Public Spaces
REF	Review of Environmental Factors
Planning Secretary	Secretary of the Department of Planning, Industry and Environment
Submissions Report	*Sydney Metro West Westmead to The Bays Submissions Report Concept and Stage 1* prepared by the Proponent and dated 20 November 2020
TfNSW	Transport for NSW

Executive Summary

Sydney Metro (the Proponent) is seeking approval for the concept and Stage 1 construction of the Sydney Metro West project (the project). The project comprises an underground metro rail line with eight new metro stations between Westmead and the Sydney CBD. Key components include a turn-up-and-go metro service using approximately 24 kilometres of twin tunnels between Westmead and Sydney CBD; new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and the Sydney CBD.

The project would provide a direct, fast, reliable and frequent rail connection between Parramatta, Sydney's Central River City, and Sydney's Eastern Harbour City, and have capacity to run a metro train every two minutes in each direction. The project would relieve congestion on Sydney Train's T1 Western Line, T9 Northern Line, and T2 Inner West and Leppington Line, and double existing rail capacity between Parramatta and Sydney CBD.

The Proponent has staged applications for the construction and operation of the project as identification of the Sydney CBD metro station location and tunnel alignment through the Sydney CBD require further work. The State significant infrastructure (SSI) application, which this assessment report relates to, concerns the project at a concept level (no construction or operation) and Stage 1 (involving civil construction between Westmead and The Bays including station excavation and tunnelling). Applications for other construction and operation of the project are expected to be lodged by the Proponent in the future.

The project complies with the objects of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is consistent with the NSW Government's key priorities and transport planning framework. The project is critical State significant infrastructure under section 5.13 of the EP&A Act. The Minister for Planning and Public Spaces is the approval authority for the subject application.

The potential environmental impacts of construction and operation are considered acceptable, subject to implementation of appropriate mitigation and management measures, and the enforcement of the Department's conditions of approval.

Community engagement

The EIS was exhibited from 30 April 2020 until 26 June 2020 (a total of 58 days) and received 188 submissions from 179 individual submitters (not including late submissions provided to the Proponent for consideration following the conclusion of the exhibition period). Of the submitters, 119 were community members, 13 were NSW Government agencies, seven were councils, 39 were interest groups and organisations, and one was from a member of Parliament.

The key issues raised by the community include project design; construction traffic, parking and access impacts; property damage during construction; impacts to local businesses; construction noise and vibration impacts; design around the future metro stations; heritage impacts during construction; engagement and consultation; and cumulative impacts of the project with other infrastructure projects.

Key assessment issues

Traffic and transport

The operation of the project would provide local and regional transport benefits by providing an additional public transport option, alleviating demand on Sydney Train's T1 Western Line and encouraging public transport use in areas currently serviced primarily by buses. Notwithstanding the operational benefits, traffic would increase temporarily during construction and have localised impacts around construction sites.

Heavy vehicle movements, including spoil haulage trucks, are proposed during excavation at all sites, and would be particularly noticeable at Westmead and The Bays where tunnel spoil haulage is expected. Despite increased congestion as a result of construction, the implementation of the Proponent's mitigation measures, including scheduling construction traffic movements outside of peak hours, and preparation of construction traffic management plans, would help manage construction traffic impacts to acceptable levels. Further, spoil haulage by barging is encouraged.

On and off-street parking in the vicinity of construction sites would be removed at The Bays, Westmead, Parramatta, Clyde and Five Dock due to construction. Although parking on the street by the project workforce would be discouraged and the Proponent is committed to maintaining access to infrastructure and properties, including off-street car parking, the Department has recommended a construction parking and access strategy to identify project workforce parking options, which may include installing off-street car park facilities and providing park-and-ride shuttle bus services to construction sites for the workforce.

The impacts of Stage 1 construction would have a negligible impact to the cumulative traffic impacts from other major infrastructure projects in the Rozelle area. This is due to the scheduling of movements outside peak periods and the small number of construction vehicle movements compared to other approved projects. To minimise construction traffic impacts to the residents of the Balmain peninsular, a condition is recommended to limit the project use of Robert Street, Rozelle to emergencies and the construction of the power supply line only.

Noise and vibration

Construction would occur across the proposed alignment simultaneously. Site establishment would be the first activity where surface sites are prepared to enable TBM launch sites and station box excavation to commence. Once these sites are established and tunnelling or excavation begins, noise and vibration impacts would occur around these ancillary sites and where tunnelling is within 20 metres (in depth) of a receiver. Station box excavations would be limited to standard construction hours to give respite to adjoining residents. A range of mitigation and management measures would be employed, including the use of acoustic sheds at most surface sites.

Traffic noise impacts would result from local road detours at Westmead during Stage 1 construction. Eligible residents on affected streets in Westmead would be offered mitigation options to manage increased traffic noise.

Rozelle power supply work would be undertaken early to provided power to operate the TBM and other tunnelling equipment at The Bays. Work to enable future augmentation of the power supply by other projects would be undertaken at the same time so that this does not need to be done again in the future and embedding construction fatigue. The work undertaken as part of the project would

allow those future projects (Western Harbour Tunnel, The Bays precinct development) to draw cabling through without the need for trenching and roadwork.

Noise generated by major civil work (tunnelling and excavation) between The Bays and Sydney CBD, and station precinct development and operation would be assessed as part of future staged applications.

The Department acknowledges that complex infrastructure projects in urban environments would result in noise impacts and that these impacts must be minimised as far as practicable and proactively managed. It is considered that the Proponent has identified a range of measures that would assist in mitigating these impacts and, combined with the recommended conditions, the Department considers that noise impacts would be appropriately managed.

Flooding and hydrology

The project has sought to alleviate flooding impacts to most areas and no significant flooding impacts are predicted to surrounding properties. Cumulative and concept plan estimated impacts would continue to be reviewed during project development and detailed design.

Changes to flow paths and landforms at the Clyde Stabling and Maintenance Facility construction site have the potential to change flood characteristics both on and off site. The Bays metro station construction site is subject to overland flows and coastal inundation. In both circumstances the impacts are considered minor.

The Department recognises that the concept proposal has been designed to minimise impacts on existing flood behaviours during construction and operation. Flood impacts from the result of Stage 1 construction are minor and temporary, with further flood modelling to be undertaken at later stages of the project as the design is refined.

Climate change has been considered and accommodated in the project's design and would be further reviewed during the development and assessment of future stages.

Aboriginal and non-Aboriginal heritage

The study area includes a number of registered Aboriginal heritage sites, with the majority located in the Parramatta CBD. Potential for archaeological finds are primarily related to the Parramatta Sand Body and other undisturbed land. Satisfactory mitigation measures have been proposed and reinforced through recommended conditions to protect and / or interpret Aboriginal heritage sites and archaeology.

The study area includes a number of heritage items; however, the project has avoided direct and significant impacts to the majority of listed items. Notwithstanding, Stage 1 excavation has the potential to cause ground movement resulting in minor (cosmetic) impacts to structures and excavations have the potential to impact archaeological remains at Parramatta and at The Bays. Heritage interpretation has been considered at a concept level and would be refined during future stages. Structural damage to heritage items is unlikely and conservative vibration damage screening levels have been adopted to minimise cosmetic damage. Potential archaeology at metro station sites would be managed through a comprehensive design and excavation methodology.

The Department has considered the relatively minor heritage impacts in the context of the benefits from the construction of this project overall. The Proponent's commitments for managing and reducing

heritage impacts, in association with the Department's recommended conditions, would ensure that heritage impacts are appropriately managed and minimised to the greatest extent practicable.

Property, land use, social and economic considerations

The concept proposal would be a transformative project which enhances transport connections between communities and precincts once operational. The resulting public transport network expansion and enhanced reliability across the rail network would provide significant benefits to local and regional communities. It would support the continued growth and development of the Greater Sydney Region.

Stage 1 would have social and economic impacts that cannot be entirely mitigated, and property acquisitions would be required. However, acquisition of property has been minimised by locating the majority of the project underground; and acquisition would be undertaken in accordance with relevant land acquisition policy and with support services for affected parties.

The proposed Community Benefits Plan(s), Small Business Owners Engagement Plan(s) and environmental management measures would effectively mitigate amenity and accessibility impacts to businesses and the community while ensuring access to public transport is maintained or improved through a variety of transport solutions.

Notwithstanding, the Department recognises that there would be cumulative impacts associated with concurrent or consecutive construction, especially around Westmead, Parramatta, Sydney Olympic Park and The Bays, which have the potential to exacerbate social and economic impacts. The recommended conditions of approval, in conjunction with the environmental mitigation measures and commitments would manage the levels of residual impact to acceptable levels.

Groundwater and settlement

Groundwater across the construction corridor is generally shallow, between one and five metres below ground level. Tunnels would be between 20 and 50 metres below ground level and sealed to prevent groundwater inflow. The depth to tunnel, intervening (low permeability) geology and tunnel lining would minimise the likelihood of groundwater inflow to the tunnel and ground movement.

Ground movement is expected to be minimal as the majority of project elements are designed as tanked structures reducing groundwater drawdown and subsequent ground movement. The proposal must meet established ground movement criteria and would be subject to independent property review. Groundwater would be treated before reuse or discharge.

Overall ground movement and settlement impacts are expected to be minimal due to the construction methodology and type, however a well developed process to identify changes caused by the project would be implemented, including property impact assessment and rectification.

Contents

1 Introduction

1.1 Sydney Metro program

Sydney Metro is a new stand-alone metro railway system and Australia's biggest public transport program. Sydney Metro's program of work is shown in Figure 1 and includes:

- Sydney Metro North West, between Tallawong and Chatswood, which commenced services in May 2019
- Sydney Metro City & Southwest, between Chatswood and Bankstown via the Sydney CBD, which is under construction and is due to commence services in 2024
- Sydney Metro West (this project)
- Sydney Metro Western Sydney Airport, a new metro line between St Marys and the new Western Sydney Aerotropolis connecting the city's greater west with Western Sydney International (Nancy-Bird Walton) Airport. This line is currently under assessment.

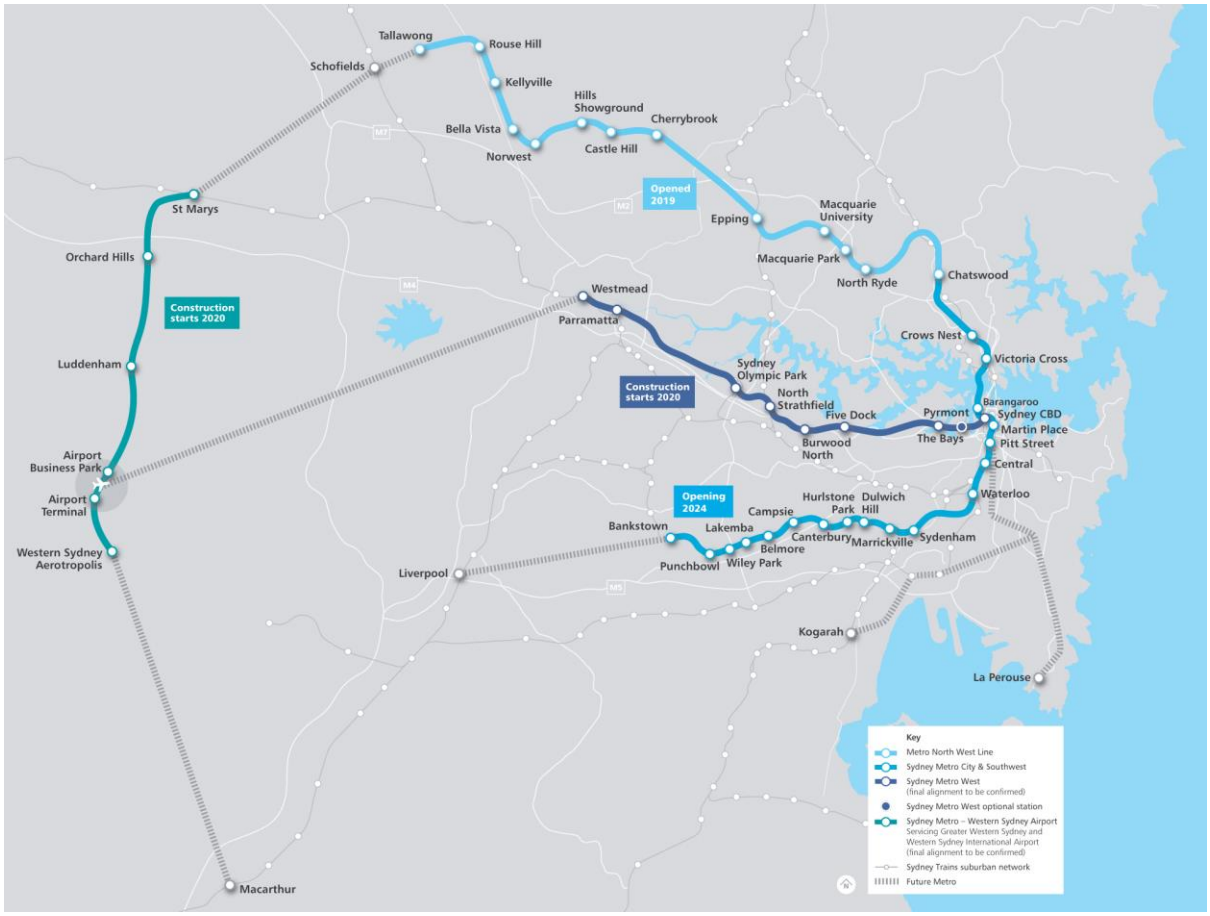

Figure 1 | Sydney Metro program of work (Source: Amendment Report)

1.2 Sydney Metro West project

The Sydney Metro West project (Metro West, the project) is a committed initiative identified in the *Greater Sydney Region Plan: A Metropolis of Three Cities* (Greater Sydney Commission, 2018) and *Future Transport 2056* (TfNSW, 2018).

Metro West would provide a direct, fast, reliable and frequent connection between Parramatta and Sydney CBD, and have capacity to run a metro train every two minutes in each direction. It would relieve congestion on Sydney Train's T1 Western Line, T9 Northern Line, and T2 Inner West and Leppington Line, and double the existing rail capacity between Parramatta and the Sydney CBD.

The project involves the construction and operation of an underground metro rail line with eight new metro stations between Westmead and Sydney CBD. The key components include:

- approximately 24 kilometres of twin tunnels between Westmead and Sydney CBD
- new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD
- a turn-up-and-go metro service operating early morning to late at night, seven days a week
- pedestrian links and connections to other modes of transport (including existing Sydney Trains suburban rail network and other parts of the metro network) and surrounding land uses
- modifications to existing Sydney Trains suburban stations and associated rail infrastructure (such as overhead wiring, signalling, access tracks/paths and rail corridor fencing) at Westmead and North Strathfield
- services within each metro station, including mechanical and fresh air ventilation equipment and electrical power substations to supply power for operation
- a stabling and maintenance facility at Clyde, including associated aboveground and belowground tracks to connect to the mainline tunnels and other operational ancillary infrastructure
- services facilities at Rosehill (within the Clyde stabling and maintenance facility construction site), Silverwater and between Five Dock and The Bays for fresh air ventilation and emergency evacuation
- alterations to pedestrian and traffic arrangements, cycling and public transport infrastructure around metro stations
- subdivision of metro station sites to support integrated station and precinct development and ancillary facilities.

The NSW Government announced in December 2020 that a metro station would be constructed at Pyrmont. The metro station location is under investigation and is subject to a separate assessment and approval.

1.3 Staged applications

The Proponent has sought to stage applications for the construction and operation of Sydney Metro West as identification of the Sydney CBD metro station location and tunnel alignment through the Sydney CBD require further work.

The proposed stages are:

- Concept – Sydney Metro West project at a concept level. No construction or operation (this report)
- Stage 1 – major civil construction between Westmead and The Bays including station excavation and tunnelling (this report)
- Stage 2 – major civil construction between The Bays and the Sydney CBD including station excavation and tunnelling (future application)
- Stage 3 – tunnel fitout, metro station building and operation of the entire line between Westmead and Sydney CBD (future application).

2 The Project

2.1 Project description

Metro West involves the construction and operation of a new underground metro rail line, approximately 24 kilometres long, between Westmead and the Sydney CBD. New metro stations would be built at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and the Sydney CBD. The proposed alignment, metro stations and operational ancillary facilities at Silverwater and Clyde are shown in Figure 2.

A potential metro station at Pyrmont is currently under investigation and is not part of the project.

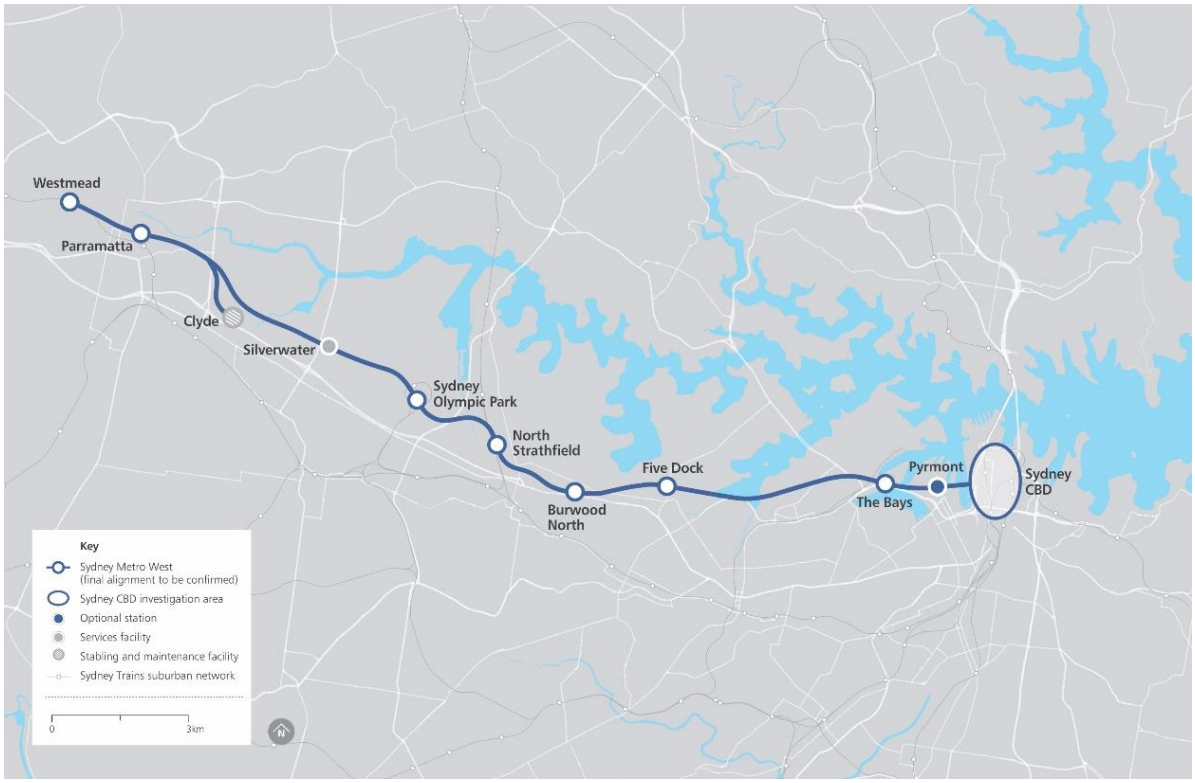

Figure 2 | Sydney Metro West alignment (Source: Amendment Report)

Project – construction

Key elements of constructing the project are described in **Table 1**.

Table 1 | Project construction activities

Construction activity	Overview of activity
Enabling work	• demolition • utility supply, adjustments and protection • transport network modifications • heritage investigations, salvage and clearance, protection and archival recordings

Construction activity	Overview of activity
	• additional geotechnical and contamination investigations and remediation
Tunnel excavation and associated tunnelling support activities	• mainline tunnel excavation from Westmead and The Bays with tunnel boring machines retrieved at Sydney Olympic Park • caverns, stub tunnels and connection tunnels by roadheaders • concrete segment facility, including storage, at Clyde • movement of excavated spoil from Westmead and The Bays
Station excavation and construction	• station excavation and fitout • movement of excavated spoil • station precinct work
Rail interchange support work at Westmead and North Strathfield	• new aerial concourse with lifts and stairs at Westmead to existing Sydney Trains platforms • adjustments to existing station entry points, platforms and associated infrastructure at Westmead • new aerial concourse and other interchange support work at North Strathfield
Operational ancillary infrastructure construction	• shaft excavation, lining and reinforcement of shaft • movement of excavated spoil • construction site facilities • installation of electrical equipment
Stabling and maintenance facility construction	• import and placement of fill material • structural work for crossings of A'Becketts and Duck Creeks • site drainage • track and rail systems fitout • building construction including operations control centre
Dive structure (connecting the stabling and maintenance facility to the mainline tunnels) and tunnel portal construction	• cast in-situ concrete piles along edge of dive structure • dive structure excavation connecting • placement of precast and cast in-situ concrete for tunnel portal
Tunnel rail systems fitout	• fresh air tunnel ventilation installation • track slab and rail fastening • electrical cable and equipment installation • overhead power supply installation

Project – operation

The project would be located underground in twin tunnels. It would be a fully automated network, high-demand turn-up-and-go service with driverless single deck trains with capacity to run a metro train every two minutes in each direction. Interchange with Sydney Trains would be possible at Westmead and North Strathfield metro stations.

Trains and metro stations would be fully accessible, and metro stations would have lifts and access to provide direct access from station openings to platforms. Automated station platform screen doors along the platforms would open with train doors, increasing passenger access / egress and safety.

Metro trains would have wheelchair spaces, dedicated priority seating for those less mobile and multi-purpose areas for prams, luggage and bicycles.

Operation is expected to commence in 2030.

2.2 Project staging

In accordance with section 5.20 EP&A Act, the Proponent has sought approval for the project in stages. The current application relates to the Concept and Stage 1 as follows:

- the Concept includes the concept of a new underground metro rail line, approximately 24 kilometres long, between Westmead and the Sydney CBD. No construction or operation
- Stage 1 comprises major civil construction between Westmead and The Bays for station excavation and tunnelling.

This application does not include tunnel fitout or metro station building between Westmead and The Bays, construction between The Bays and Sydney CBD, or the operation of the line.

SSI approval for Stages 2 and 3 described in section 1.3 would be sought separately.

2.3 The Concept

Main components of the Concept for which approval is sought are described in **Table 2**.

Table 2 | Main components of the Concept

Aspect	Description
Tunnels	• twin underground rail tunnels 24 kilometres long from Westmead to the Sydney CBD
Metro stations	• new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock, The Bays and Sydney CBD • pedestrian links and connections to other modes of transport (existing Sydney Trains suburban rail network and other parts of the Sydney Metro network) and surrounding land uses • services within each metro station, including mechanical and fresh air ventilation equipment and electrical power substations to power operation
Ancillary infrastructure	• stabling and maintenance facility at Rosehill / Clyde, and associated above- and belowground tracks to connect to mainline tunnels and other operational ancillary infrastructure • services facilities at Rosehill (within the stabling and maintenance facility), Silverwater and between Five Dock and The Bays for fresh air ventilation and emergency evacuation, the location under investigation and subject to a future assessment and approval process • modification to Westmead and North Strathfield suburban stations and associated overhead wiring, signalling, access tracks and corridor fencing • traction power supply through dedicated traction substations
Station sites	• alterations to pedestrian and traffic arrangements, cycling and public transport infrastructure around the metro stations • subdivision of station sites to support integrated station and precinct development and ancillary facilities

2.4 Stage 1 construction

Stage 1 would involve civil construction between Westmead and The Bays including:

- enabling work
- excavation of two mainline tunnels (each around 24 kilometres in length) using tunnel boring machines launched from Westmead and The Bays, excavation of cross passages (between the two mainline tunnels) and stub tunnels near Westmead, and tunnel lining
- support service facilities at Westmead and The Bays construction sites for the tunnel boring machines including power supply, work trains, grout batching plant, storage space, water supply and water treatment
- station box excavation for new metro stations at Westmead, Parramatta, Sydney Olympic Park, North Strathfield, Burwood North, Five Dock and The Bays
- shaft excavation for services facilities at Rosehill / Clyde and Silverwater
- civil work for the stabling and maintenance facility at Clyde including earthwork
- road underpass and box culverts to A'Becketts Creek and Duck Creek at Clyde construction site
- high voltage power supply routes through Westmead, Parramatta, Clyde and Rozelle
- a concrete segment casting facility at Clyde construction site
- excavation of a tunnel dive structure and associated tunnels at Rosehill to support a connection between the Clyde stabling and maintenance facility and the mainline metro tunnels.

The tunnel route and construction sites for the metro stations and services facilities, are shown on Figure 3. If approved, Stage 1 construction is scheduled to start at the end of 2021 and continue for approximately five years. An indicative construction program (including construction sites and timing) is shown in Figure 4.

2.5 Amendment to the project

The Concept and Stage 1 have been revised since the EIS was publicly exhibited. These changes are described in an Amendment Report as:

- Clyde stabling and maintenance facility construction site – Kay Street and Unwin Street route realignment amended from a road bridge over Duck Creek and A'Becketts Creek to a road underpass with box culverts to Duck Creek and A'Becketts Creek
- Sydney Olympic Park metro station construction site – Northern pedestrian entry amended from cut-and-cover construction method to a mined construction method

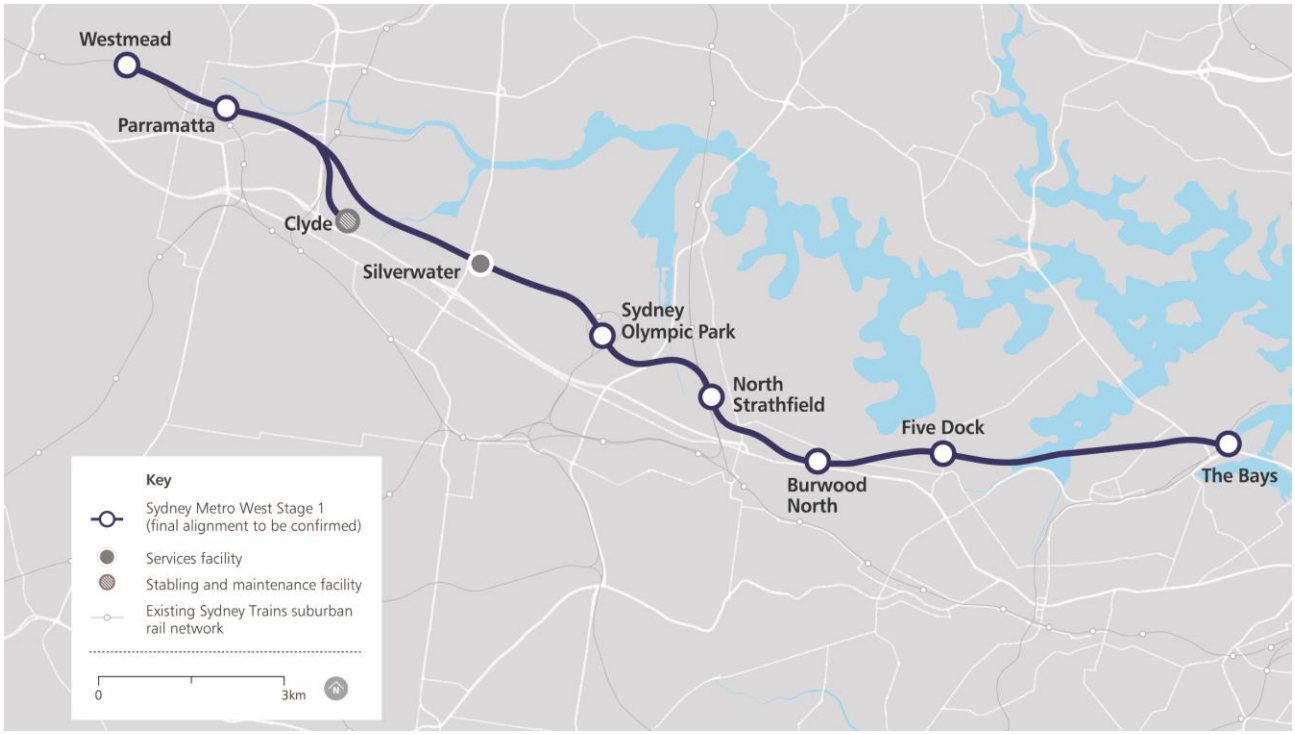

Figure 3 | Stage 1 route and construction sites (Source: Submissions Report)

- Five Dock metro station construction site – Waterview Street to be converted to one-way general traffic flow between First and Second Avenues for the duration of construction
- The Bays metro station construction site – a longer station box to support future eastern tunnelling and tunnel fitout construction and revised construction site layout to accommodate the Port Access Road on its current alignment
- The Bays metro station construction site and Rozelle power supply work – consolidation of power supply work for the project and other future major projects.

2.6 Application(s) for latter stages / related projects

The application under assessment in this report relates to the Concept and Stage 1. The Proponent plans to lodge further application(s) for later stages of the project before completion of Stage 1 construction.

The following related developments are not part of the project:

- integrated station and precinct developments
- a metro station at Pyrmont
- realignment of Port Access Road, Sommerville Road and Solomons Way at The Bays Precinct
- Sydney Metro West precast facilities at Eastern Creek
- construction of new speedway facilities at Eastern Creek Motor Sports Precinct in the Western Sydney Parklands.

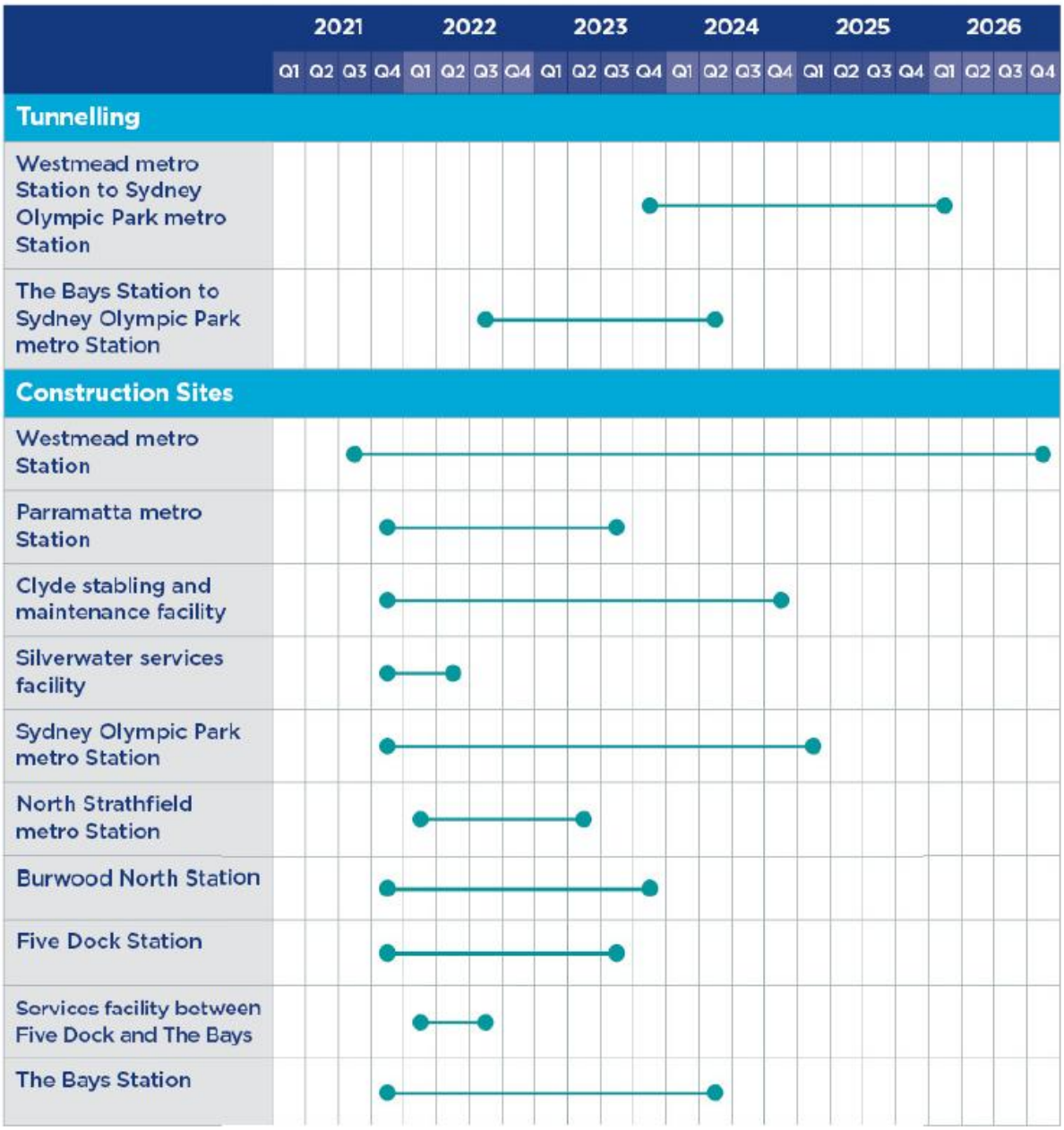

Figure 4 | Indicative construction program for Stage 1 (Source: EIS)

Any decision(s) to proceed with the developments outlined in the paragraph above would be subject to the relevant assessment pathway before commencing.

The road realignment at The Bays was assessed under the Review of Environmental Factors (REF) process by the Proponent and was determined on 18 August 2020.

A REF for the Eastern Creek precast facilities has been prepared by the Proponent and was open for public comment until 4 December 2020.

The Sydney International Speedway project (SSI 10048) was approved by the Minister for Planning and Public Spaces on 23 December 2020.

Further consideration of the REFs and assessment of the Sydney International Speedway project are provided in **Section 4.7**.

3 Strategic context

3.1 Strategic justification

The project would respond to existing and emerging constraints on the existing Sydney Trains rail network and Sydney's current and forecast population and economic growth. It would improve capacity, reliability and efficiency of the existing transport system by relieving pressure on the rail and road networks and meet growing demand for public transport services.

The Sydney Metro network has been influenced and informed by several strategic plans and NSW Government policies. An important aspect of *Future Transport* (TfNSW, 2018), a plan to create and maintain a world class, safe, efficient and reliable transport system, is the transition to a three-tier transport system which includes Sydney Metro rail.

Greater Sydney Region Plan: A Metropolis of Three Cities (Greater Sydney Commission (GSC), 2018) establishes a strategic vision that by 2056, Sydney will transform into a metropolis of three cities where people live within 30 minutes of their jobs, education, health facilities and services. As part of the Sydney Metro program of work, the project would support the delivery of the '30-minute city' and provide a mass transit link to connect the Central River City (Greater Parramatta) and the Eastern Harbour City (Sydney CBD).

The project is also consistent with other Australian and NSW Government strategic planning policies and frameworks, including:

- 2020 Infrastructure Priority List (Infrastructure Australia, 2020)
- NSW State Infrastructure Strategy 2018-2038: Building the Momentum (Infrastructure NSW, 2018)
- Eastern City District Plan (GSC, 2018)
- Central City District Plan (GSC, 2018)
- Sydney City Centre Access 2018 (TfNSW, 2018).

3.2 Project justification

Key project benefits are detailed in **Table 3**.

Table 3 | Key project benefits

Benefits	Description
Transport benefits	• increase rail network capacity on the western corridor between Westmead and the Sydney CBD by double • alleviate constraints and reducing train and station crowding on the T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line • increased accessibility to key employment and housing growth centres including Westmead, Parramatta, Sydney Olympic Park and The Bays

Benefits	Description
	• increase public transport network reach and use, linking precincts not serviced by passenger rail • meet forecast demand for passenger rail transport.
Customer benefits	• provide direct, fast and reliable connections to key precincts • provide efficient transfers with the T1 Western Line at Westmead, T9 Northern Line at North Strathfield in the suburban rail network and Sydney Metro City & Southwest in the Sydney CBD. • allow for transfers with the future Parramatta Light Rail (Stage 1) at Westmead and Parramatta • improved travel times, particularly between Greater Parramatta and the Sydney CBD • enhancing customer safety, comfort and accessibility experience.
Operational benefits	• increase operational reliability, resilience, efficiency and flexibility in the rail network • opportunity to optimise the bus network and improve road network traffic conditions for road users • improved travel times.
Modal shift benefits	• increase in public transport market share • reduce reliance on private vehicles, traffic congestion and pollution.
Other benefits	• foster job growth and productivity benefits associated with improved public transportation • support planned growth and facilitate city-shaping and urban renewal by connecting employment with housing • enhance social equity with improved access to jobs and housing • expanding the '30-minute cities'.

During construction across all stages, the project is estimated to create around 10,000 direct and 70,000 indirect jobs.

3.3 Project development and alternatives

The merits of the project were considered in the context of a number of alternative options, including:

- do nothing
- improvements that can be achieved through implementing regulatory, governance and better-use reforms
- improvements to other parts of the transport network, including road, bus, light rail and ferry
- improvements to parts of the Sydney Train network.

These are summarised in

Table 4.

Table 4 | Alternatives considered

Alternative	Evaluation

Do nothing	• Demand on Sydney's rail network is nearing capacity during peak periods. If nothing is done, the T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line would continue to operate at or near capacity at peak times, with limited capacity for new growth in the corridor.
	• Road networks in the corridor would continue to operate at capacity in peak times, creating congested roads and increased travel times for buses and private vehicles.
	• A lack of public transport connectivity at key precincts such as Sydney Olympic Park and The Bays would not be addressed.
	• Long term public transport capacity requirements for projected population and employment growth between Parramatta and Sydney CBD are not met.
	• The Department is satisfied that this option is not preferred as:
	  ○ the existing rail network would not support growing transport demand and meet Sydney's growing population needs;
	  ○ it would not support strategic growth; and
	  ○ it would not meet the objectives of *Future Transport 2056*.

Regulatory, governance and better-use reforms	• Continued implementation of rail network improvements such as automated signalling and increased frequency of Sydney Trains rail services as part of the *More Trains, More Services* program. • More efficient use of roads, more frequent bus and ferry services and bus priority initiatives. • Transport access program to improve accessibility to existing Sydney Trains railway stations and ferry wharves. • The Department recognises that these reforms in isolation are immediate to medium term measures that would enhance efficiency of the existing network but would not be enough to address forecast demand growth. Additional investment in public transport infrastructure is required.
Alternative transport modes	• NSW Government is investigating alternative transport infrastructure including new motorways, suburban rail connections, bus rapid transit services and increased ferry services. • Construction and operation of the project does not preclude development and implementation of alternative transport solutions. • The Department supports a multi-option approach to addressing Sydney's transport requirements including the project.
Rail network alternatives	• Improvements to the Sydney Trains suburban network, through the *More Train, More Services* program which includes additional rail services, new trains and upgraded rail infrastructure. • The Department recognises that the enhancement of the Sydney Trains network provides an important solution in meeting increasing service demand but does not meet demand in the long term and or support opportunities related to housing growth and the development of new areas. • Improvements on the existing network would not provide services to new rail catchments and key precincts not currently serviced by rail, such as Five Dock and The Bays.

An objective of the project is to offer a faster trip from Parramatta to the Sydney CBD (and vice versa) than is possible on the existing Sydney Train's T1 Western Line, which takes approximately 31 to 33 minutes. An optimum travel time of around 20 minutes was identified by the Proponent. This travel time provides the greatest balance of benefits for customers travelling for a range of reasons, including business and leisure trips, with other benefits such as expanding the 30-minute catchment for key precincts and offering greater economic benefit through a balance of fast travel times, new metro stations within the corridor to new catchments and improved connectivity. Accordingly, the number of metro stations along the alignment has been limited to 10.

Four strategic corridor alignment and service alternatives were assessed, and different metro station location options within the project. Metro stations considered and shortlisted but ultimately removed from further consideration included Rydalmere, Camelia, Rosehill and Silverwater. Further, the Proponent considered tunnel configuration alternatives including single-tube and twin-tube configurations. Alternate locations for the stabling and maintenance facility and services facilities were also considered.

Different construction options were investigated for:

- tunnel construction, such as tunnel boring machine launch and retrieval sites
- location of concrete segment facility
- transport of spoil from excavation, comprising road transport, rail transport, and barging and shipping transport.

4 Statutory Context

4.1 State significant infrastructure

The project was declared critical State significant infrastructure (CSSI) by the Minister under section 5.13 *Environmental Planning and Assessment Act 1979* (EP&A Act) on 23 September 2020. The Minister is the approval authority.

4.2 Permissibility

The project is for the purpose of a rail infrastructure facility and is characterised as development permitted without consent, in accordance with clause 79 *State Environmental Planning Policy (Infrastructure) 2007* (the Infrastructure SEPP).

4.3 Other approvals

In accordance with section 5.22(2) EP&A Act, the only environmental planning instruments that apply are the Infrastructure SEPP (as it relates to the declaration of development that does not require consent) and *State Environmental Planning Policy (State and Regional Development) 2011* (as it pertains to the declaration of infrastructure as State significant infrastructure (SSI)). No other environmental planning instruments substantially govern the carrying out of the project.

Construction of the project would likely be subject to an environment protection licence issued under the *Protection of the Environment Operations Act 1997*.

Other legislation that applies includes *Land Acquisition (Just Terms Compensation) Act 1991* and the *Contaminated Land Management Act 1997*.

4.4 Staging

The assessment and approval process for a SSI project is established under Part 5, Division 5.2 EP&A Act. Staged infrastructure applications can be made under section 5.20 EP&A Act. The staged infrastructure application currently under assessment relates to the Concept and Stage 1 construction for the proposed infrastructure. Further application(s) would be lodged in respect of later stages of the proposed infrastructure including operation.

4.5 Mandatory matters for consideration

Objects of *Environmental Planning and Assessment Act 1979*

The determination must have regard to the objects of the EP&A Act, and the Department has considered the objects of the EP&A Act including:

- ecologically sustainable development (see **Section 4.5.1** and **6**)
- social and economic welfare (see **Section 6**)

- protection of the environment, including in relation to biodiversity, traffic, noise and vibration, air quality, surface and groundwater hydrology, urban design, amenity and socioeconomic issues (see **Section 6**)
- sustainable management of built and cultural heritage, including Aboriginal cultural heritage (see **Section 6**)
- good design and amenity of the built environment (see **Section 6**)
- promote the sharing of the responsibility for environmental planning and assessment between the different levels of government (see **Section 5**)
- community participation in the assessment of the project (see **Section 5**).

Ecologically Sustainable Development (ESD)

The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991*. Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental consideration in decision-making process and that ESD be achieved through the implementation of:

- the precautionary principle
- inter-generational equity
- conservation of biological diversity and ecological integrity
- improved valuation, pricing and incentive mechanisms.

Project objectives which guide the delivery and operation of the project would contribute to the sustainability of the project and meeting ESD principles. In addition to the objectives, the Proponent has addressed the above principles directly in the EIS and identified a range of initiatives and targets as part of its environmental and sustainability policy to manage impacts associated with these issues such as sustainable procurement practices; minimising water use during construction and considering opportunities for water reuse; and using endemic species in landscaping and prioritising use of Aboriginal knowledge (six seasons) in asset management.

The Department has recommended conditions of approval requiring:

- the project achieve a minimum Infrastructure Sustainability Council of Australia (ISCA) Infrastructure Sustainability rating of 75 (Version 1.2) (or equivalent) or a 5-Stage Green Star rating
- a water reuse strategy be prepared and implemented that is based on best practice.

The precautionary principle is applied throughout the EIS and the Department considers the assessment and the range of mitigation measures adequately adopt the principle. The Department is also satisfied that the valuation and pricing of the environmental resources associated with the Concept and Stage 1 of the project have been adequately considered and internalised through the project design and the mitigation measures.

In conclusion, the Department considers that the Concept and Stage 1 of the project are consistent with the principles of ESD.

4.6 Biodiversity Development Assessment Report

Section 7.9(2) of the *Biodiversity Conservation Act 2016* (BC Act) requires all applications for SSI to be accompanied by a Biodiversity Development Assessment Report (BDAR) unless the Planning Agency Head and the Environment Agency Head determine that the proposed development is not likely to have any significant impact on biodiversity values. A BDAR was submitted by the Proponent.

The Department's assessment of biodiversity is provided in **Section 6.7**.

4.7 Consideration of related development

Sydney Metro West Eastern Creek Precast Facilities

The Sydney Metro West Eastern Creek Precast Facilities project is a proposed concrete segment manufacturing facility at Lenore Drive, Eastern Creek. It would be used to produce concrete segments to line the twin tunnels for Metro West. The environmental impacts of the facility were assessed in a REF (Sydney Metro, 2020) (Sydney Metro West Precast Facilities REF) which was exhibited until 4 December 2020. Key impacts are summarised as:

- a minor noise impact on a small number of residential receivers for a short period of time during earthwork
- a partial to total removal of low significance Aboriginal sites
- cumulative traffic, noise and biodiversity impacts between the project and road upgrades occurring in the area, including the Archbold Road upgrade and Western Access Road construction
- clearing of up to above 1.92 hectares of native vegetation (including EPBC-listed of Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest).

To the extent they are impacts associated with the project, on the basis of the risks and management / mitigation measures assessed in the Sydney Metro West Precast Facilities REF, the impacts are considered acceptable.

The Bays Road Relocation Work

The Bays Road relocation work is a proposed reconfiguration of Port Access Road, Sommerville Road and Solomons Way at The Bays Precinct. These works would improve road reliability of the network and access to the White Bay Cruise Terminal and other port related businesses during Metro West construction. Environmental impacts were considered in a REF (Sydney Metro, 2020). The REF was exhibited from 30 April to 29 May 2020. In summary, the following impacts were identified:

- construction noise impacts with 'moderate' and 'high' impacts for a short duration during site clearing during standard construction hours

- exceedances of the cosmetic damage screening criteria at some buildings at the White Bay Power Station and Cement Australia site
- minor visual and vibration impacts at the White Bay Power Station where work occurs within the SHR listed curtilage
- cumulative construction traffic impacts associated with other Transport for NSW projects, including the M4-M5 Link (Rozelle Interchange) and Western Harbour Tunnel.

To the extent they are impacts associated with the project, on the basis of the risks and proposed mitigation measures assessed, the Department is satisfied that they are acceptable (as managed by the mitigation measures). The Department understands that site preparation work has begun.

Sydney International Speedway

The Sydney International Speedway project (the Speedway), a speedway car and motorcycle racing track in the Eastern Creek Motor Sports Precinct in the Western Sydney Parklands, was approved on 23 December 2020. It would replace the speedway at Clyde which is situated on land to be acquired for the Metro West stabling and maintenance facility. Environmental impacts of the Speedway were assessed in an EIS exhibited from 19 August 2020 to 16 September 2020. The EIS, Assessment Report, Instrument of Approval and Notice of Decision can be reviewed here. Key impacts are summarised as:

- minor increases in air pollutants during construction, and dust on the adjoining dragway may impact its safe operation
- 0.3 hectares of threatened ecological communities would be cleared
- temporary impacts on the surrounding road network during construction and traffic delays following concurrent events with 500 to 1500 spectators each at the speedway and dragway
- noise impacts at residences and sensitive receivers during events requiring treatment.

To the extent they are impacts associated with the project, on the basis of the risks and mitigation measures assessed, the Department is satisfied that they are acceptable.

5 Engagement

5.1 Department's engagement

Under section 5.28(1)(c) EP&A Act, the Planning Secretary must make the EIS publicly available. The Department placed the EIS and accompanying documents on exhibition from 30 April 2020 to 26 June 2020 (a total of 58 days) on the Department's Major Projects website.

Notification of the public exhibition was advertised in The Daily Telegraph, Sydney Morning Herald, and The Weekly Times to inform the public of the exhibition details and how to comment on the project. The Department notified relevant State and local government authorities of the exhibition.

Due to the timing of the exhibition period and assessment during the COVID-19 pandemic, standard exhibition procedures such as displaying physical copies of the EIS for public inspection at local libraries and council offices, and community information sessions, were unable to proceed in a COVID-safe manner to comply with NSW Government Public Health Orders.

The Department undertook a site visit on 15 July 2020 of the proposed alignment to obtain a comprehensive understanding of the surrounding environment, its sensitivities and issues raised in submissions.

Relevant State regulatory agencies and councils were invited to a planning focus meeting in March 2020 where presentations were held on the project and an opportunity to ask questions was provided to inform development of Secretary's Environmental Assessment Requirements.

5.2 Summary of submissions

188 submissions were received from 179 submitters during exhibition of the EIS. 127 submissions were from 119 community members, 13 were from NSW Government agencies, seven from local Councils, 40 submissions were from 39 special interest groups and organisations and one was from a member of Parliament. Community submissions were received from individuals and strata body/owners' corporations of residential developments. A summary of submissions is provided in **Table 5** to **Table 9**. A link to the full copy of the submissions is provided in **Appendix C**.

Table 5 | Summary of Government agency submissions

Submitter	Number	Position
Government agencies		
1. Ausgrid	1	Comment
2. Crown Lands	1	Comment
3. Department of Primary Industries – Agriculture	1	Comment
4. Department of Primary Industries – Fisheries	1	Comment

Submitter	Number	Position
5. DPIE Biodiversity and Conservation Division	1	Comment
6. DPIE Water Group and the Natural Resources Access Regulator (NRAR)	1	Comment
7. EPA	1	Comment
8. Heritage Council of NSW	1	Comment
9. Heritage NSW (Aboriginal Cultural Heritage Regulation Branch)	1	Comment
10. Infrastructure NSW	1	Comment
11. NSW Health	1	Comment
12. Sydney Olympic Park Authority	1	Support
13. Sydney Water	1	Comment
TOTAL	**13**	**12 Comment, 1 Support**

Table 6 | Summary of local Council submissions

Submitter	Number	Position
Local councils		
1. Burwood	1	Support
2. City of Canada Bay	1	Comment
3. Cumberland City	1	Support
4. Inner West	1	Comment
5. City of Parramatta	1	Comment
6. Strathfield	1	Comment
7. City of Sydney	1	Support
TOTAL	**7**	**4 Comment, 3 Support**

Table 7 | Summary of special interest group submissions

Submitter	Number	Position
Special interest groups and organisations		
1. BW Fabrication	1	Support
2. Royal Agricultural Society of NSW	1	Support
3. Property Council of Australia (NSW), UDIA NSW, Urban Taskforce & Western Sydney Business Chamber	1	Comment
4. North Strathfield Community Group	1	Support
5. Fitzpatrick Investments Pty Limited	1	Comment
6. Save North Strathfield Residents Action Group	1	Object
7. Eagle Partners	1	Support
8. DP 270206 Kings Bay Estate	2	Comment x 2
9. The McDonald College	1	Comment
10. Callan Street Rozelle Residents	1	Object
11. WalkSydney	1	Comment
12. St Alban's Anglican Church Five Dock	1	Comment
13. National Trust of Australia (NSW)	1	Comment
14. Knight Frank Town Planning on behalf of Harvey Norman	1	Comment
15. Tanert Pty Ltd	1	Comment
16. Five Dock Chamber of Commerce	1	Comment
17. Parramatta Chamber of Commerce	1	Comment
18. Parramatta River Catchment Group	1	Comment
19. The Owners Corporation SP72939 – Pendium Apartments	1	Comment
20. University of Sydney	1	Comment
21. Stay Upright Pty Ltd	1	Comment
22. Urban Taskforce Australia	1	Comment
23. The GPT Group	1	Support
24. Five Dock Square BMC DP 1062325	1	Comment
25. Sydney Business Chamber	1	Support

Submitter	Number	Position
26. Lendlease Building	1	Support
27. Five Dock Public School P & C Out of School Hours (OOSH)	1	Support
28. UDIA NSW	1	Comment
29. Western Sydney Business Chamber	1	Support
30. Action for Public Transport (NSW) Inc	1	Support
31. St Luke's Anglican Church, Concord – Burwood	1	Support
32. Five Dock Public School Parents & Citizens Association	1	Comment
33. Urbis on behalf of Australian Turf Club	1	Comment
34. WestProtects	1	Object
35. Sydney Olympic Park Business Associate Incorporated	1	Support
36. Friends of Callan Park	1	Comment
37. Ecove Group	1	Support
38. Business NSW	1	Comment
39. Mayrin Group	1	Comment
TOTAL	**40**	**24 Comment, 13 Support, 3 Object**

Note: 39 special interest groups made 40 submissions.

Table 8 | Summary of community submissions

Submitter	Support	Object	Comment
Community submissions by local government area			
1. Bayside			1
2. Blacktown City			1
3. Burwood			1
4. City of Canada Bay	11	4	17
5. City of Canterbury-Bankstown	1		1

Submitter	Support	Object	Comment
6. Cumberland City			5
7. Georges River			1
8. The Hills Shire		1	2
9. Inner West	4	12	5
10. Lane Cove		1	1
11. City of Liverpool	1		
12. Northern Beaches	1		
13. City of Parramatta	4	6	23
14. City of Penrith			1
15. City of Ryde		1	
16. Strathfield			2
17. City of Sydney	2		1
18. City of Willoughby		2	1
19. Outside of greater metropolitan Sydney	4		1
Subtotal	**28 Support**	**27 Object**	**64 Comment**
TOTAL		**119**	

Table 9 | Summary of Member of Parliament submissions

Submitter	Number	Position
Julia Finn MP	1	Object

5.3 Key issues raised in submissions – Government agencies

Sydney Water recommended consultation throughout detailed design and construction and that further consideration be given to water service infrastructure demand requirements in the project corridor. Concern was raised regarding increases in demand for flood mitigation services on Sydney Water if there was extensive filling of the floodplain, particularly in Clyde. Construction should not impact the heritage-listed Beattie Street stormwater channel at The Bays. Recommend conditions for the monitoring of groundwater and surface water quality during construction.

Infrastructure NSW is concerned with potential structural impacts to the heritage-listed White Bay Power Station, particularly due to vibration exceedances during construction.

Environment Protection Authority (EPA) raised concerns relating to management of noise, vibration and water quality impacts during construction. EPA provided detailed advice and recommendations regarding noise and vibration, water quality, hydrogeology, contamination and waste.

Crown Lands acknowledged that Crown Land at Clyde would be compulsorily acquired in accordance with NSW legislation for the project.

Sydney Olympic Park Authority (SOPA) gave strong support for the project, and recommended conditions to mitigate potential construction impacts relating to groundwater, traffic, pedestrian access, soil and surface water, dilapidation reports, and occupation and repair of public domain.

Ausgrid confirmed its commitment to maintaining a close working relationship with the Proponent and provided a single point of contact to facilitate all project related work.

Heritage Council of NSW (Heritage Council) raised concern regarding potential impacts to heritage items when the location of the future Sydney CBD metro station is not known. The Heritage Council also raised concerns regarding potential impacts to the White Bay Power Station, Rozelle, and the Roxy Theatre, Parramatta, both of which are State heritage listed.

NSW Health commented on noise, air and cumulative impacts as they relate to health.

Heritage NSW (Aboriginal Cultural Heritage Regulation Branch) identified risks and limitations of the Aboriginal cultural heritage assessment, and recommended measures such as test excavations and undertaking Aboriginal heritage assessment for the full extent of the concept.

DPIE Biodiversity and Conservation Division (DPIE BCD) sought to have the biodiversity mitigation and management measures identified generally in the BDAR to be more specifically detailed during the assessment phase instead of in the post-approval phase. DPIE BCD advised on perceived gaps in the Proponent's flooding and hydrology assessment for the project corridor and recommended further investigation and flood modelling be undertaken to understand impacts relating to construction and operational phases of the project. Concern was raised that there was not enough existing quantitative flooding information to support the qualitative conclusions made by the Proponent.

Finally, DPIE Biodiversity Conservation Division advised that additional flood modelling for the proposed metro station at The Bays was required as this future metro station would be situated in the lower portion of the White Bay catchment and would be impacted by overland and coastal sources. DPIE BCD recommended that drainage of flood water at The Bays required further understanding.

DPIE Water Group and Natural Resources Access Regulator (DPIE Water) stated that further detail of work at Duck Creek and A'Becketts Creek in Clyde should be provided which demonstrates adherence to appropriate NRAR guidelines. DPIE Water provided recommendations for conditions to be satisfied post approval, to minimise potential impacts on the groundwater system.

Department of Primary Industries – Agriculture and **Department of Primary Industries – Fisheries** had no comments.

5.4 Key issues raised in submissions – Local Council

Burwood Council supports the project and the connectivity and place-making opportunities that the future Burwood North metro station presents but emphasised the importance of adequate precinct planning and station integration. Council raised concern with construction impacts to businesses and the community, particularly traffic and transport impacts, including the lack of construction off-street workforce carparking.

City of Canada Bay Council acknowledges the benefits to metropolitan connectivity that the project would bring to its local government area. Issues raised by Council include:

- traffic and transport – construction traffic impacts around all three metro stations in the local government area (LGA), loss of street parking, project workforce parking impacts, traffic congestion, impacts to bus reliability, and impacts to pedestrian access and active transport
- noise and vibration construction impacts on residents and businesses, mitigation measures, construction monitoring, property damage, and building pre- and post-condition surveys
- heritage impacts – impacts to heritage buildings from vibration, mitigation measures, and the need for building condition survey reports to all potentially affected heritage items
- general concerns – regarding urban design, precinct planning, engagement, operation of local businesses during construction, social impacts, groundwater, ground settlement, spoil removal, hydrology, flooding, biodiversity and sustainability.

Cumberland City Council supports the project and the additional placemaking that would occur along the metro corridor, commenting on the benefits the project would bring to its LGA.

Council raised concerns generally about traffic and transport, and noise and vibration and specifically about the impacts around Hawkesbury Road, Westmead Public School, emergency vehicle routes, and intersection performance. Recommendations included that sleep disturbance assessment be completed and alternative accommodation being a respite option for consideration.

Inner West Council generally supports the project but expressed concerns with staging the application. Council stated that full consideration of impacts was not possible and that the project needed to be viewed in its entirety. Council provided comment on potential additional metro station locations and alternative route alignments; commented on ongoing consultation; and raised concerns about placemaking and station integration of The Bays.

Construction traffic, construction workforce parking, noise and vibration, out of hours work, heritage, contamination, vegetation removal, cumulative impacts and air quality were also raised. Council stated that more extensive letter-drops and an extension of the consultation period should have been considered during the COVID-19 pandemic.

City of Parramatta Council expressed its support for the project but noted that many of the impacts, particularly in Parramatta CBD and Westmead would only be apparent during later stages of the project, which have yet to be exhibited. Issues raised by Council include:

- project design – addition of, or provision for, an additional metro station at Camelia, an alternate location for the Clyde maintenance facility, and integration with other infrastructure projects such as Parramatta Light Rail and future rail lines

- engagement – Council requests ongoing consultation on later stages of the project, particularly in relation to local connectivity between the future metro stations and surrounds, spoil haulage routes, and further information on the role and responsibilities of the Sydney Metro Place Managers responsible for the management of relationships with local stakeholders
- placemaking – the indicative precinct plans require further development. Station integration with their surrounds, interchange with other transport modes, urban design, public art, wayfinding, consideration of Parramatta CBD's future Civic Link, interface with heritage buildings and heritage interpretation were raised for further consideration. Design and integration of the Clyde maintenance and services facilities with the surrounding environment requires further assessment
- construction traffic and transport – provision for active transport during construction; pedestrian, cyclist and motorist safety, construction site access, construction traffic and related congestion
- construction noise and vibration impacts on sensitive receivers
- heritage – impacts to listed items within the Parramatta metro station construction site
- socio-economic, property and land use – consideration of social impacts, offsetting loss of recreation space in Clyde, property acquisition and business impacts.

Council raised general concerns regarding groundwater drawdown, contamination, hydrology, flooding, vegetation removal, utilities, cumulative impacts, spoil and waste management and sustainability.

Strathfield Council noted no metro station is proposed for its LGA, thus limiting the benefits the project may bring the community of its LGA. Council raised concerns regarding public transport access and travel times, street parking, cumulative traffic impacts and road network performance, and integration of the project with the Sydney Trains network, specifically the future operational performance of Strathfield Station, a major rail network and bus network interchange, not located along the metro corridor.

City of Sydney Council gave its support for the concept. Council stressed the importance of a metro station at Pyrmont and concern at its exclusion from the project, commenting on the expected population and jobs growth that it would bring.

5.5 Key issues raised in submissions – Community and special interest groups / organisations / Member of Parliament

The Department received 127 submissions from 119 individual community members, one from a member of Parliament and 40 submissions from 39 special interest groups and organisations, including local schools, companies and business associations, parents and citizens associations, residential action and community groups, chambers of commerce, owners' corporations and social interest groups. The submissions raised a range of issues, with many commenting on multiple issues.

The frequency that key issues were raised by the community and special interest groups is shown in **Figure 5** and summarised below. Further details on the issues raised in submissions are provided in **Section 6**.

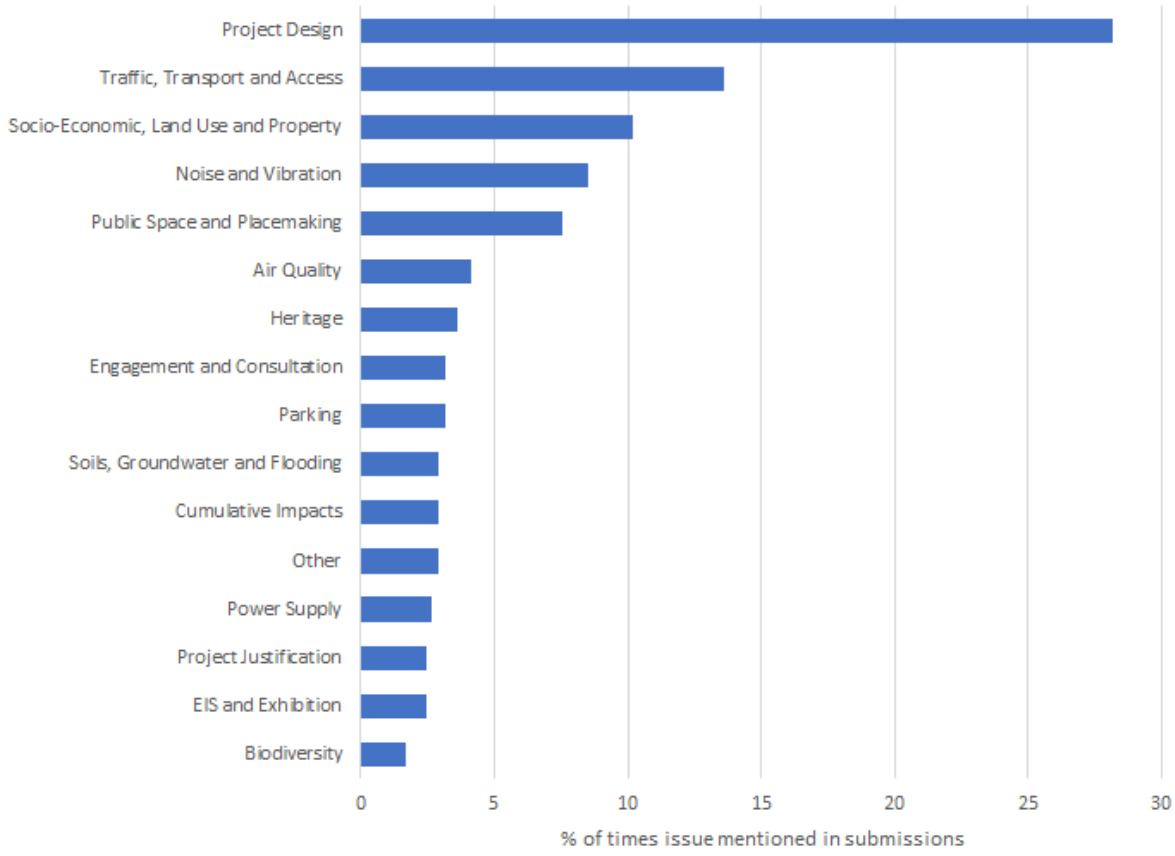

Figure 5 | Summary of issues raised by community and special interest groups

Project design

- the location of additional metro stations and connections, particularly around Rydalmere, Camellia, Pyrmont, Wentworth Point, Rosehill, Leichhardt, Silverwater and Sydney CBD
- the proposed metro route duplicates the western line and has metro stations in suburbs already serviced by Sydney Trains stations
- provisions be made to allow for future connections / extensions to University of Sydney, Western Sydney Airport and the Eastern Suburbs
- concern with the tunnel interface with other tunnels such as WestConnex
- comments on station access, integration and configuration including provision for cross platform interchanges with Sydney Trains and other Sydney Metro services
- integration with Inner West Light Rail
- comments on the *Future Transport 2056*.

Traffic, access and parking

- pedestrian access and vehicles interaction during construction at Five Dock, particularly on Great North Road
- need for appropriate wayfinding, safe access and disability access around proposed metro station precincts during construction and operation
- impacts on cycleways around Westmead and Clyde
- additional traffic, particularly heavy vehicles, causing traffic congestion and delays
- safety issues with high numbers of heavy vehicles around schools during construction
- access to residential and commercial properties during construction
- importance of appropriate active and public transport connections to future metro stations, including feeder buses and bike
- more entrances to metro stations required
- most construction sites would not have enough on-site car parking for the construction workforce resulting in parking on local streets
- consideration of workforce parking provisions at and around construction sites, including on-site parking and provision of shuttle bus services.

Socio-economic, land use and property

- up zoning and redevelopment requested around metro stations, particularly Westmead and North Strathfield
- concern with up zoning and redevelopment around metro stations, particularly Burwood North
- concerns regarding property damage, compensation or rectification of damage
- loss of land value with sub-stratum land acquisition for tunnelling and reduced rental property income during construction
- further assessment of impacts to local businesses during construction
- closure of Sydney Speedway; recreational land earmarked for acquisition should be offset
- construction impacts on the community mentally, physically and financially.

Noise and vibration

- construction impacts to sensitive land uses, such as schools and places of worship
- impacts to amenity and wellbeing of households during tunnelling and excavation
- concern with operational train noise
- construction vibration impacts on residential accommodation, shops and heritage buildings, including structural damage

- concern with lack of mitigation measures in the EIS
- impacts to wellbeing of horses at Rosehill Racecourse during construction.

Public spaces and placemaking

- seek high quality placemaking and urban design around future metro stations
- loss of green space and gardens in North Strathfield
- implement temporary placemaking measures during construction
- concern with how placemaking would be addressed in Stage 1.

Air quality

- construction dust and odour impacts
- dust build up on properties neighbouring construction sites.

Heritage

- rectification of property damage to heritage items
- vibration impacts to heritage items during construction, particularly the Roxy Theatre and White Bay Power Station
- comprehensiveness of Aboriginal cultural heritage assessment and cumulative impacts to Aboriginal cultural sites.

Engagement and consultation

- further consultation and workshops, including future metro stations
- comprehensiveness of engagement during the COVID-19 pandemic
- ongoing consultation and direct engagement through construction, with a single point of contact.

Soil, groundwater and flooding

- water table drawdown
- impacts to waterways from run-off and discharges
- disturbance of contaminated soils.

Cumulative impacts

- construction fatigue arising from the project (and the installation of the high voltage cables through Rozelle particularly along Callan Street in particular) and other infrastructure projects, such as WestConnex and Western Harbour Tunnel

- cumulative noise, vibration, traffic and air pollution impacts to residences near construction sites
- construction of over station development not adequately considered.

Project justification

- increased working from home would render the project not needed, as demand for service / patronage on the future metro line would not be there due to the COVID-19 pandemic
- planning and cost benefit analysis does not justify the project.

Biodiversity and tree management

- loss of trees - goal should be more aspirational than “no net loss”
- native vegetation should be planted across the project corridor.

Other comments

- construction timeframe is too long
- general waste and sustainability concerns regarding construction of project.

5.6 Response to submissions and amendment report

The Department provided the Proponent with the above submissions following the public exhibition of the EIS and requested the Proponent prepare a response to those submissions.

The Proponent refined the project refinements and prepared an amendment report (see **Appendix E**) which included the changes set out in **Table 10** below:

Table 10 | Changes in the Amendment Report

Change	Proponent’s Justification
Clyde stabling and maintenance facility construction site: Kay Street and Unwin Street route realignment amended from a road bridge over Duck Creek and A’Becketts Creek to a road underpass with boxed culverts to Duck Creek and A’Becketts Creek	• Address concerns regarding increase flood levels in and adjacent to Duck Creek and Duck River • Additional design investigations have been undertaken. The road underpass and box culverts would improve the way future metro rail tracks cross the site.
Sydney Olympic Park metro station construction site: Northern pedestrian entry amended from cut-and-cover construction method to a mined construction method	• Minimise impacts to State heritage listed Abattoir Heritage Precinct gardens.
Five Dock metro station construction site:	• Address concerns that heavy vehicles movements to the eastern construction site at

Change	Proponent's Justification
Waterview Street to be converted to one-way general traffic flow between First and Second Avenues for the duration of construction	Five Dock would result in safety and amenity issues.
The Bays metro station construction site: A longer station box to support future eastern tunnelling and tunnel fitout construction and revised construction site layout to accommodate the Port Access Road on its current alignment	• Provide dedicated access points for future tunnel fitout work (at the western end) and the future eastern tunnelling work (at the eastern end) to be separated from station work • Would reduce the overall duration of construction for future stages, which would reduce environmental impacts.
The Bays metro station construction site and Rozelle power supply work Consolidation of power supply work for the project and other future major projects	• Minimise cumulative and future construction impacts on residents.

The Department considered the proposed changes raised and concluded that the amendment report did not require public exhibition. The submissions report (**Appendix D**) and amendment report (**Appendix E**) were made publicly available on the Department's Major Projects website on 20 November 2020.

The submissions report and amendment report were forwarded to government agencies and councils for feedback. Government agencies and councils raised concerns with the amended design and assessment in the amendment report. Following the publication of the submissions report and amendment report, the Department received feedback from government agencies and councils on the amended project. Issues raised included:

- site specific details on the management of archaeological excavation in Parramatta should be provided during the assessment phase of the application
- investigations into the heritage significance of structures that are proposed to be demolished within the curtilage of the White Bay Power Station should be undertaken during the assessment phase of the application
- construction vibration impacts on heritage items
- general flooding risk along the project corridor
- flooding impacts on the future The Bays metro station
- potential flooding impacts because of construction at the Clyde construction site
- specific flora and fauna management and mitigation measures should be detailed in the BDAR as well as the Flora and Fauna CEMP Sub-plan
- conversion of the open creeks at Clyde to box culverts would result in flooding and biodiversity impacts. Box culverts would potentially cause blocking
- loss of private recreation space in Camellia
- placemaking opportunities for the Camellia construction site.

The Department considered the relevant issues raised in submissions received from exhibition of the EIS and feedback on the amended project in its assessment as detailed in **Section 6**.

Many issues raised in submissions related to future stages of the project, including placemaking, detailed station design and access; and future transport connections. These matters were not considered further as part of this assessment but would be considered in future stages. Matters associated with future development and zoning changes are subject to their relevant planning and assessment processes. Matters related to the provision of additional stations and extensions are also outside the scope of the Concept application and are not considered further in this assessment.

6 Assessment

The Department has identified the key issues as traffic and transport, noise and vibration, flooding, hydrology, Aboriginal and non-Aboriginal heritage, and property, land use, social and economic considerations (**Sections 6.1** to **6.5** respectively). Other issues considered are discussed in **Section 6.6**.

6.1 Traffic and transport

The operation of the project would provide local and regional transport benefits by providing an additional public transport option, alleviating demand on Sydney Train's T1 Western Line and encouraging public transport use in areas currently serviced primarily by buses. Notwithstanding the operational benefits, traffic would increase temporarily during construction and have localised impacts around construction sites. Operational traffic and transport around station sites would be assessed as part of a future staged application.

Heavy vehicle movements including spoil haulage are proposed during excavation at all sites and would be particularly noticeable at Westmead and The Bays where tunnel spoil haulage is expected. Despite increased congestion due to construction, the implementation of the Proponent's mitigation measures, including scheduling construction traffic movements outside peak hours, and preparation of construction traffic management plans, would help manage construction traffic impacts to acceptable levels. Further, the Department has recommended the Proponent explore opportunities for spoil haulage by barging to reduce construction traffic on the road network.

On and off-street parking near construction sites would be removed at The Bays, Westmead, Parramatta, Clyde and Five Dock due to construction. Although parking on the street by the project workforce would be discouraged, and the Proponent is committed to maintaining access to infrastructure and properties including off-street car parking, the Department has recommended a construction parking and access strategy to identify project workforce parking options, which may include installing off-street car park facilities and providing park-and-ride shuttle bus services to construction sites for the workforce.

The cumulative traffic impacts of Stage 1 construction with other major infrastructure projects in the Rozelle area have been considered and are considered manageable. To ensure construction traffic on Robert Street, Rozelle is limited, a condition is recommended to limit its project use to emergencies and the construction of the power supply line only.

Issue

A metro line between Westmead and the CBD would have significant regional and local benefits

The Concept would assist in alleviating demand on the existing T1 Western Line by providing an additional public transport option and encouraging public transport use in areas currently serviced primarily by buses.

Impacts to local road networks and on-street parking are expected as the introduction of new metro stations and altered access arrangements are introduced. However, it is expected that access and travel time benefits to the regional road network and local access for cyclists and pedestrians would be improved with emphasis on improved active transport in place-making around station precincts.

The impacts identified as part of the Concept are manageable and would be subject to detailed consideration in the assessment of future stages.

Construction traffic would have local, but manageable, impacts around construction sites

Stage 1 construction would increase construction traffic around metro station sites. Light and heavy vehicles would support the establishment and excavation of the metro station sites and spoil haulage from tunnel construction at The Bays and Westmead. Haulage routes were selected to reduce impacts on local roads by selecting the quickest and most direct access to arterial roads. Across the alignment, local roads around metro station and facility sites would experience more construction traffic. These impacts would be more pronounced in locations that are densely developed and already experience congestion.

Construction of all stages is expected to occur between 2021 and 2026. The length of impact at each site would vary depending on local constraints. Spoil generated by the Tunnel Boring Machines (TBMs) would be removed at Westmead and The Bays, generating the most construction traffic. The Clyde stabling yard and maintenance facility would also generate a higher number of heavy vehicles during fill importation.

The performance of most intersections around the construction sites during Stage 1 is not expected to be significantly impacted. Some intersections would experience reduced delays due to the introduction of signals and local network changes. Intersections that would experience increased delays are identified in **Table 11**.

Table 11 | Intersection delays that would increase by 30 seconds or greater with Stage 1 (Source: EIS)

Construction Site	Intersection	Expected increase in delay during construction (seconds per vehicle)
Westmead	Hawkesbury Road / Priddle Street	42
	Hawkesbury Road / Amos Street	81
	Bailey Street / Hassall Street	33
Silverwater	Silverwater Road / Derby Street	43
Five Dock	Great North Road / Garfield Street	57
	Great North Road / Second Avenue	81

Heavy vehicle movements are proposed 24 hours a day, seven days a week during excavation at all sites (excluding Silverwater and North Strathfield) and during tunnel spoil removal at Westmead and The Bays. While delays are expected at intersections, the implementation of the Proponent's mitigation measures, including 24 hour a day, seven days a week spoil haulage at some construction sites (excluding Westmead, Five Dock, and Burwood North where vehicles do not enter / exit the site on Parramatta Road), scheduling construction traffic movements outside of peak hours, and the implementation of construction traffic management plans would manage the impacts of construction traffic to acceptable levels. The proposed construction vehicle routes at the Burwood North construction sites is shown in **Figure 6**.

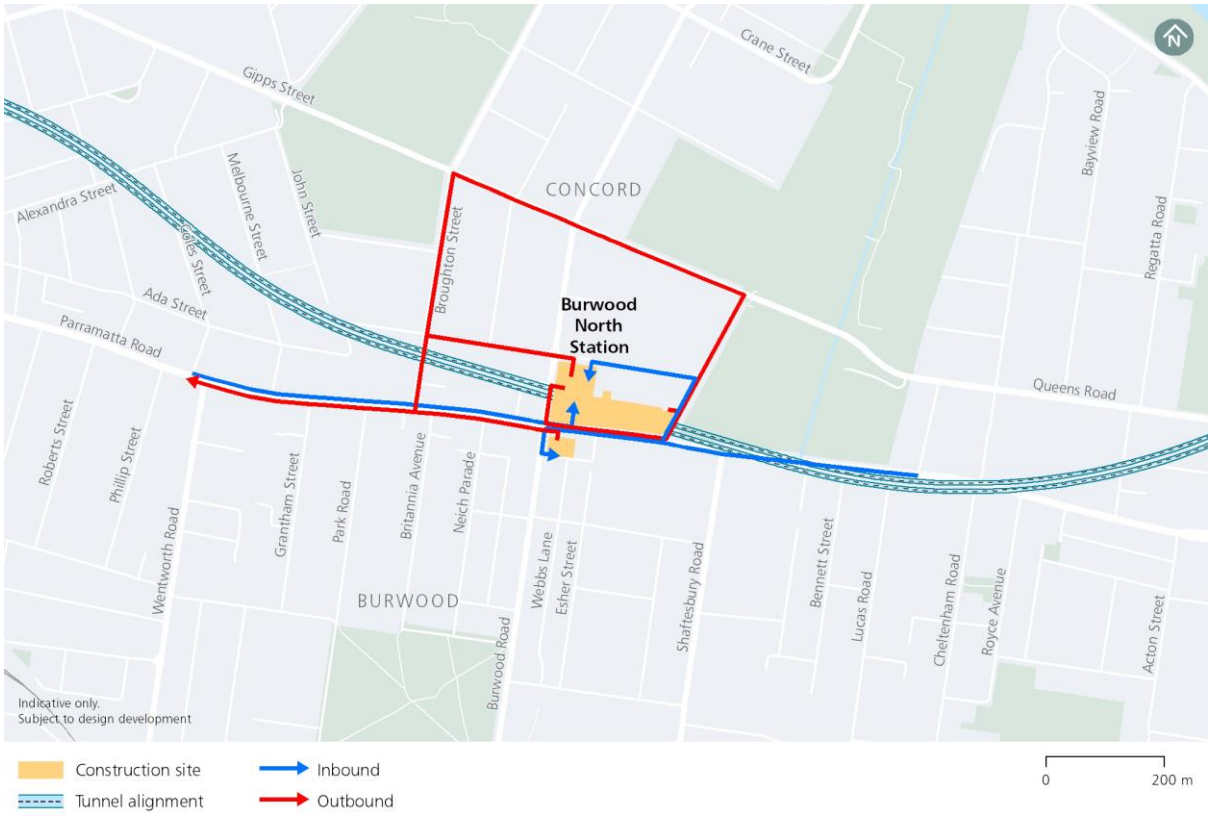

Figure 6 | Indicative haulage routes from Burwood North construction sites (Source: EIS)

Parking impacts around sites as a result of the removal of spaces, construction parking and access changes, would need to be managed during construction

On and off-street parking in the vicinity of the metro station sites and ancillary facilities would be temporarily removed. This would have the greatest impact in developed areas around construction sites and the proposed power supply to The Bays from Rozelle substation. Permanent loss of on-street parking is expected at Westmead, Parramatta, Clyde and Five Dock due to permanent road realignments and the removal of multi-level car parks and off-street parking behind businesses.

Clyde and The Bays are the only construction sites that would include dedicated car parking for construction workers. A small number of spaces can only be accommodated at remaining sites for trade and other light vehicles that travel between sites. These sites are generally located near public transport; construction worker parking on local streets would be discouraged and measures to encourage travel by public transport and ride-sharing, providing alternative parking locations and shuttle bus transfers reviewed and implemented.

There may be areas where access to properties is impacted, particularly as part of high voltage utilities work through Rozelle and Balmain. The Proponent has committed to maintaining access to residential properties, including off-street car parking, at all times. Consultation with property owners would be ongoing throughout construction.

There would be temporary and permanent impacts to bus routes and stops at Westmead

To provide a seamless interchange between the metro and existing heavy rail services at Westmead, the metro station would be built to the south of the existing Sydney Trains station. This would require permanent closure of Alexandra Avenue, east of Hawkesbury Road, and the realignment of

Alexandra Avenue would be considered in a future application. Bus infrastructure would be temporarily relocated up to 200 metres from its current location, and the location of temporary and permanent bus stops would be determined in consultation with TfNSW, City of Parramatta Council and bus operators.

Submissions

Community and special interest groups

Traffic and transport issues raised in public submissions included:

- 24 hours a day, seven days a week spoil haulage impacts, including parking and idling on local roads, and identification of alternative haulage routes
- access to private property during construction and conflicts between residents accessing properties and heavy vehicles leaving the site
- loss of parking due to construction worker parking and alternative modes of access to sites for workers
- objection to more vehicles using Grand Avenue at Westmead and possible impacts to pedestrians and residents
- concern for the safety of pedestrians and cyclists near construction support sites, particularly heavy vehicle movement around schools and emergency vehicle routes
- provision of temporary active transport links during construction and opportunities for new active transport links following the completion of construction
- relocation of public transport infrastructure and alternative routing of services
- traffic signal phasing to accommodate additional traffic in the network
- traffic management measures
- operational parking for commuters using the Metro.

Councils and government agencies

Inner West Council made a submission that addressed both Concept and Stage 1 of the proposal. Regarding the Concept, Council raised:

- the need for a precinct-wide assessment of cumulative construction traffic in the Rozelle area
- driver training and heavy vehicle identification (including GPS tracking)
- kerbside parking studies and a Green Travel Plan to reduce construction worker parking on local roads
- concerns with alternative haulage routes identified for The Bays site
- a traffic review of how opening of WestConnex M4-M5 Link would impact the construction traffic and haulage routes for The Bays metro construction site (with a focus on the impacts on active and public transport, and activity generated by the Rozelle Railyards Linear Park).

Cumberland City Council raised concerns regarding the traffic impacts to Westmead Public School; increases in traffic along Hawkesbury Avenue; and the intersection of Alexandra Avenue / Bridge Road. Further consultation on management of intersection impacts was requested. Active transport and public transport mitigation and management measures were considered suitable.

City of Canada Bay Council raised concerns with:

- construction worker car parking at Five Dock and Burwood stating that the proposed mitigation measures have not been effective on other major infrastructure projects in the area
- congestion and traffic noise impacts on residents and education providers
- private property access
- the need for post-construction restoration of any damage to road or footpath surface
- the need for pedestrian crossings and traffic signals at intersections at North Strathfield and Burwood North
- impacts on active transport.

Burwood Council identified concerns with construction worker car parking and suggested shuttle buses; bus stop relocation; and pedestrian access points to the metro station south of Parramatta Road be provided during operation.

Strathfield Council noted the limited impact the proposal would have on the local road network but raised concerns about construction worker parking around North Strathfield; delays to bus routes; that cumulative traffic impacts at Sydney Olympic Park and North Strathfield were not fully addressed and requested ongoing consultation.

City of Parramatta Council recommended the following be considered:

- replacement of bus priority infrastructure
- traffic signals at the intersection of George Street/Horwood Place
- north-south access for cyclists through Parramatta site (or alternative to be provided)
- maintaining property access
- maintaining a connection between Unwin Street and Parramatta Road at Clyde at all times
- reducing heavy vehicle movements in line with school zones and peak hours
- consultation with Council on construction traffic movements during major special events.

EPA noted that 24 hours a day, seven days a week excavation is proposed and that excavation would cause traffic noise impacts with specific reference to The Bays site and the cumulative impacts of the project across the corridor. It was also noted that the Metro City and Southwest project did not require 24 hours a day, seven days a week spoil haulage.

SOPA recommended that a Traffic and Pedestrian Management Plan be prepared.

Consideration

Construction traffic impacts at The Bays would have a minor cumulative traffic impact

Inner West Council raised concerns that the work at The Bays would exacerbate the cumulative traffic impacts around Rozelle from the construction of the M4-M5 Link and Western Harbour Tunnel, particularly around the City West Link, The Crescent and James Craig Road, as seen in **Figure 7**. The Proponent identified that the work at The Bays would have minor impact to the cumulative road network in peak hours. A comparison of peak hour construction vehicle movements by Sydney Metro and those approved for the M4-M5 Link and Western Harbour Tunnel is provided in Table 12.

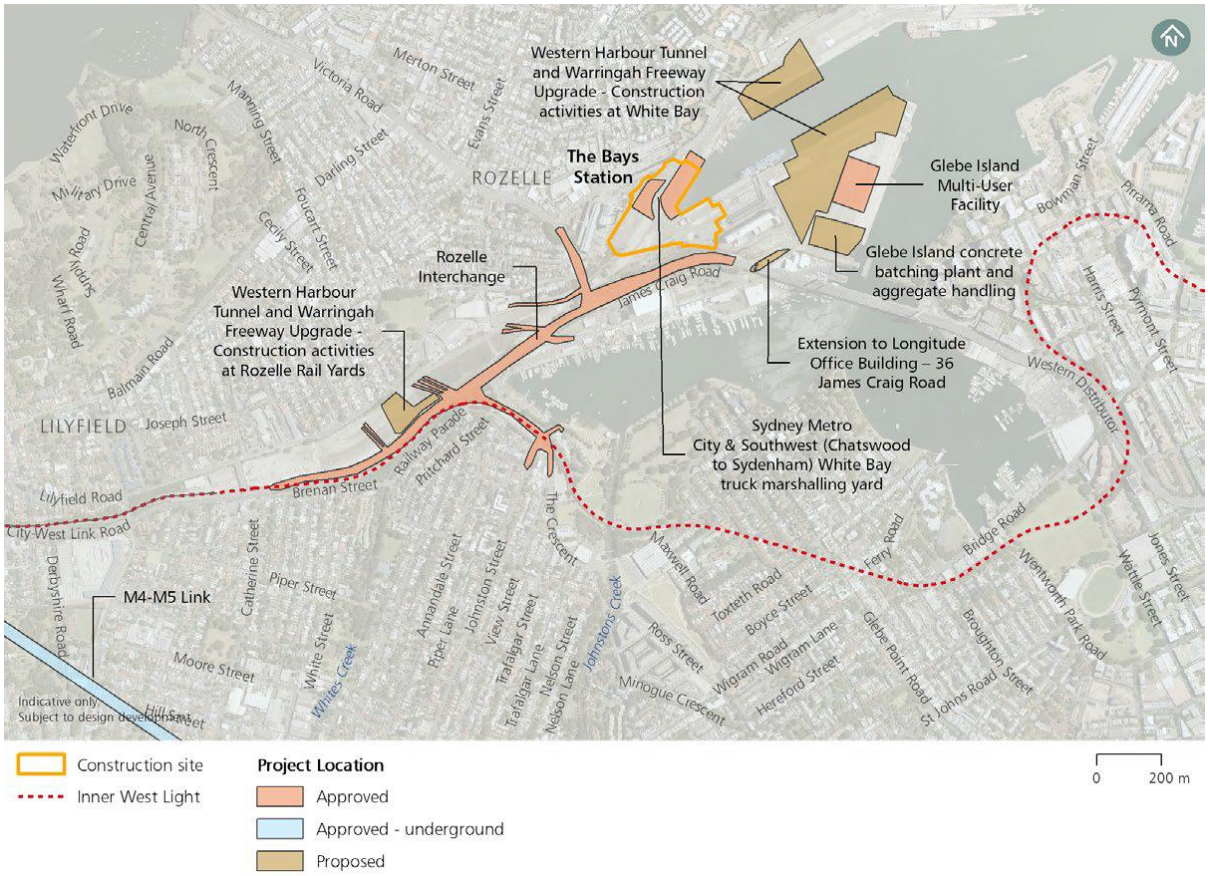

Figure 7 | Projects near The Bays metro station construction site (Source: EIS)

Table 12 | Cumulative traffic impacts at Rozelle (Source: EIS)

Project	Construction Site	AM Peak Light vehicle movements	AM Peak Heavy vehicle movements	PM Peak Light vehicle movements	PM Peak Heavy vehicle movements
Sydney Metro West Stage 1	The Bays metro station	2	8	60	8
WestConnex M4-M5 Link	Rozelle civil and tunnel site	100	46	350	46
	Iron Cove Link civil site	15	4	140	4

Project	Construction Site	AM Peak Light vehicle movements	AM Peak Heavy vehicle movements	PM Peak Light vehicle movements	PM Peak Heavy vehicle movements
Western Harbour Tunnel	Rozelle Rail Yards	45	14	30	14
	Victoria Road	41	37	71	37
	White Bay	40	63	140	63

Spoil haulage from The Bays site would occur 24 hours a day, seven days a week, with most vehicle movement occurring at night when the impact to the network would be the lowest. The Proponent has committed to coordinating traffic management arrangements between major construction projects around The Bays with TfNSW, including Customer Journey Planning (formerly Sydney Coordination Office).

The Department is satisfied that the traffic impacts at Rozelle from work at the The Bays would have a negligible impact on the cumulative construction traffic movements in the Rozelle area. Through the implementation of the mitigation measures, including consultation with Customer Journey Planning, and limiting the use of Robert Street for emergencies and the Rozelle power supply work, the Department is satisfied that The Bays site would be a minor addition to the predicted overall cumulative traffic impact.

Construction Parking and Access Strategy is recommended to address parking losses and identify construction worker parking options

Several community and local council submissions identified concerns with construction workers parking in local streets and in ticketed parking garages. This concern is shared by the Department, particularly given on-street parking by construction worker has been identified as a key issue during the construction of other State significant infrastructure projects within metropolitan Sydney, such as sections of WestConnex. It is acknowledged that tools transport and storage is a key reason given for workers to drive. Most construction sites are close to public transport so a strategy to assist with tools storage could make this a more attractive option. The Proponent has committed to encouraging public transport use and ride-sharing, as limited parking would be provided at construction sites.

However, given the lack of a firm commitment to alternative transport or the ability to enforce its use, the Department has recommended that a Construction Parking and Access Strategy be prepared, for the Secretary's approval, which considers a suite of options to reduce parking impacts in local centres and residential streets. These could include identification of park and ride shuttle bus services to transport construction workers from off-street car parking facilities remote from construction sites, or public transport hubs, leasing of commercial spaces and ongoing monitoring of impacts on local streets.

Spoil haulage by barge is encouraged as a way of reducing spoil truck movements at The Bays

Opportunities to barge spoil along the Parramatta River to reduce road traffic impacts was raised in submissions. A preliminary assessment of barging from The Bays found that barging could supplement road haulage, and between three to eight barge movements per 24 hours could occur at peak spoil production. The Proponent identified an average barge capacity would be able to replace

approximately 80 trucks carrying spoil. The barging of spoil would alleviate the number of truck movements at The Bays, but it would not totally remove the need for the trucking of spoil.

The Department supports this approach and has recommended a condition requiring further investigation of spoil removal by non-road methods to reduce construction road traffic. Where barging from The Bays is considered to be reasonable and practicable, the Proponent has commited to preparing a Maritime Traffic Management Plan to manage the movement of barges through Sydney Harbour and on Parramatta River.

The closure of Alexandra Avenue would require a detour around the construction site which would increase traffic volumes on the surrounding streets, and would be managed through road safety measures to reduce conflicts with general traffic and pedestrians

The Westmead metro station construction site includes land up to the heavy rail boundary and the section of Alexandra Avenue between Hawkesbury Road and Hassall Street. This would require a traffic detour via Hassall Street, Bailey Street and Hawkesbury Road as shown in **Figure 8**. The intersection of Bailey Street and Hawkesbury Road would be signalised to allow safe movements for vehicles from Bailey Street onto Hawkesbury Road and for pedestrians crossing the road.

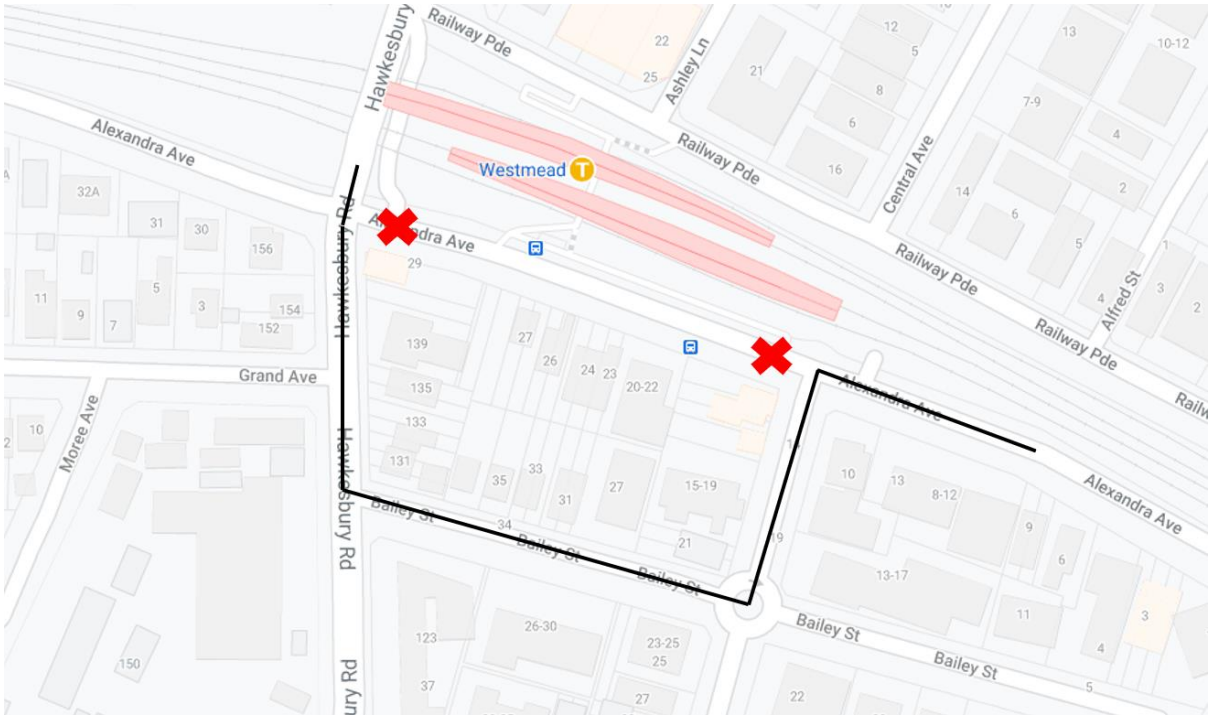

Figure 8 | Proposed location of Alexandra Avenue closure and detour around the Westmead metro station construction site (Source: Google Maps)

The intersection of Bailey Street and Hassall Street would have an increased delay of 33 seconds and would operate near capacity. Westbound traffic using the detour may use Grand Avenue rather than progressing to Alexandra Avenue (west of Hawkesbury Road) which would result in increased traffic numbers on Grand Avenue. Some submissions raised concern with the increased traffic along Grand Avenue, particularly noting the possibility for conflicts between school children and general traffic during school zone hours.

The Proponent has identifed three road safety mitigation measures, which include management of road user and pedestrian safety as construction vehicles access the site (for example through the use

of temporary traffic signals, traffic controllers, physical barriers, and modification to signals), enhancements to the road corridor including speed awareness signs, and the requirement that all heavy vehciles would enter and exit the site in a forward direction where praticable. The impacts of additional users using the detour would be reduced through these measures.

The Department is satisfied that the impacts can be managed through the implementation of a site-specific traffic management plan and the proposed road safety mitigation measures. The noise impacts associated with the traffic increase along Grand Avenue are assessed in **Section 6.2**.

A redesign, realignment and operation of Alexandra Avenue around the Westmead metro site cannot be constructed until later stages of the project. The assessment of the end state design would be addressed in a future application.

To minimise impacts to the residents of the Balmain peninsular, construction vehicles can only use Robert Street for the Rozelle power supply work and during emergencies

Inner West Council does not support the use of Robert Street as an alternative construction route to access The Bays construction site due to:

- the limited queueing capacity within the existing network
- expected traffic generated by approved developments in the area, including a new Bunnings Warehouse on Parsons Street
- the use of Robert Street as the main access route to the White Bay Cruise Terminal for events.

Robert Street is a key access routes to Balmain, Birchgrove and Balmain East, providing a direct connection from the Anzac Bridge and City West Link. Additional construction traffic could exacerbate congestion and travel times in the area.

The Department has not permitted the use of Robert Street as a route for either light or heavy construction vehicles on other State significant infrastructure projects in the Rozelle area (WestConnex M4-M5 Link and the Western Harbour Tunnel), in response to community and Council opposition. In this instance, power supply work to support the tunnel boring machine would occur on Mullens Street and use of Robert Street for materials access is unavoidable. Robert Street also provides the only access to an existing parking lot adjacent to the White Bay Power Station which Sydney Metro intends to make available to construction workers on the power supply route to minimise on-street parking impacts. Access to the parking lot on Robert Street from Victoria Road would use alternative route 2 shown in **Figure 9**.

The Department supports the use of Robert Street while this work occurs, due to the unavoidable nature of construction in this location and to minimise the impacts to residential parking in an area where off-street parking is limited. Other construction worker parking would be provided within the port land when excavation and tunnel boring commence at The Bays metro station construction site. Once this parking is available for use, and the Rozelle power supply work are completed, the Department recommends prohibiting the use of Robert Street by construction vehicles.

Figure 9 | Proposed haulage routes to The Bays metro station construction site (Source: EIS)

To ensure that the Rozelle power supply work can be completed while ensuring consistency with other infrastructure projects in the Rozelle area, the Department has recommended a condition which prohibits the use of Robert Street by construction vehicles unless in the event of an emergency or in association with the Rozelle power supply work.

Regional power supply trenching for multiple projects is to be undertaken to avoid ongoing impacts to Rozelle residents

Power supply augmentation is required in the Rozelle / Balmain area to support a range of State significant infrastructure projects and the proposed future development of The Bays precinct. While power supply work is required for Metro West (construction and operation), an opportunity to reduce cumulative impacts and construction fatigue to residents near the Rozelle sub-transmission station has been identified.

Trenching would be sufficiently sized to allow for cabling required in the future by Western Harbour Tunnel project, Ausgrid and the Port Authority without the need for future disruptive work (as seen in **Figure 10**). Cables could be pulled through when required. This would result in a longer construction period of temporary partial and full road closures and impacts to individual residences than for work for Metro West alone, but would negate the need for disruptive trenching in the future. The Department supports this collaborative approach which minimises the expenditure of resources as well as impacts to residents in highly constrained streets.

Figure 10 | Proposed power supply work for The Bays metro station construction site (Source: Amendment Report)

Moderate traffic impacts are expected due to road closures, temporary access restrictions and temporary loss of on-street parking along Manning, Callan and McCleer Streets. Pedestrian and emergency access would be retained. The Proponent has stated that during work in Manning, Callan and McCleer Streets, offstreet car parking would be provided in the Ausgrid sub-transmission station, with assistance provided to residents to carry shopping, luggage and other heavy or large goods from the Ausgrid station to their residence. A mitigation measure has been provided to this effect.

Other impacts include:

- temporary removal of on-street parking on Moodie, Waterloo and Darling (southern side) streets
- bus stop relocation along Darling Street between Waterloo Street and Hancock Lane.

The proposed benefits of combining the work for several providers is recognised and supported, despite short term impacts.

Road realignment within the Clyde stabling and maintenance facility would have minimal traffic impact

The realignment of Kay and Unwin Streets at Clyde and culvert installation was redesigned with an at-grade road with a small section of road underpass (**Figure 11**) in response to submissions from Parramatta City Council and Sydney Water as a result of flooding concerns. As the revised road is wholly within the construction footprint and no changes to heavy vehicle routes or numbers would be generated, the Department is satisfied that the standard mitigation measures are suitable for any impacts during construction. A condition has also been recommended to address the design, construction and operation of the permanent road realignment at Clyde and to ensure impacts are minimised.

Temporary conversion of Waterview Street, Five Dock to one-way would have minor impacts

Conversion of Waterview Street between First and Second Avenues from a two-way street to one-way is proposed during the construction of Stage 1 with parking retained on both sides of the street in response to community concern of the impacts of heavy vehicles using local roads in Five Dock. This design would limit conflicts between northbound heavy vehicles and southbound residential vehicles, improve safety and reduce the loss of on-street parking along Waterview Street to accommodate two-way traffic.

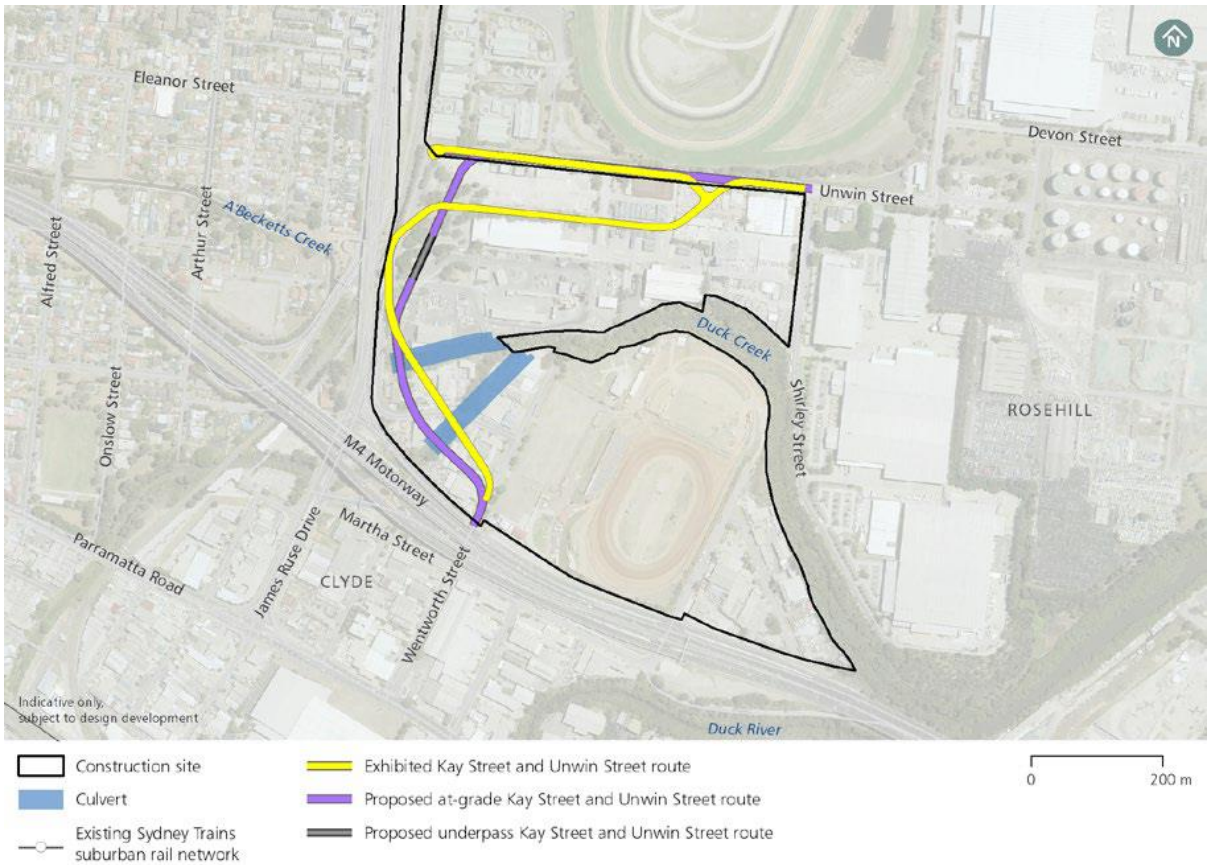

Figure 11 | Proposed permanent road changes at Clyde stabling and maintenance facility construction site and Camellia (Source: Amendment Report)

Southbound traffic would be redistributed from Waterview Street to the surrounding streets. Waterview Street residents may incur slightly longer travel time to access their properties, however this is expected to be negligible. Retention of on-street parking through the one-way conversion of Waterview Street is supported, and provides a safer environment for pedestrians and road users.

Construction would be reduced during special events near construction sites

There may be minor impacts to transport and access to and from the Parramatta CBD, Rosehill Racecourse and Sydney Olympic Park during construction. The following measures are proposed during special events:

- minimising construction, and if necessary, ceasing construction activities
- maintaining access to all areas within the event precinct
- ensuring hoarding and site fencing is established for pedestrian movements adjacent to the construction site
- scheduling deliveries outside of event periods.

Event specific traffic measures would be developed in consultation with TfNSW and event organisers. By consulting with the event operators and reducing construction where required, the impacts and possible safety risks to event attendees would be reduced. Access to the event precinct would be maintained and construction reduced or ceased during the event.

The re-design of the Sydney Olympic Park site (as described in the Amendment Report) would remove the need for closure of Herb Elliot Avenue. The redesign would reduce impacts on local road users and access to special events. This response to concerns raised by the community and the reduction of impacts to traffic around the Sydney Olympic Park site is supported.

Commuter parking is not proposed in the Concept proposal

A submission requested further detail be provided of proposed parking for users of the Metro (commuters). The Concept proposal does not include provision for new commuter parking. The location and design of the proposed stations and interchanges would encourage the use of active and public transport to support the modal access hierarchy, as seen in **Figure 12**, used to locate and design proposed stations.

The Department supports the Proponent's use of the modal access hierachy in the development of the Concept design. Assessment of the operational parking demand would be undertaken in future applications.

Figure 12 | Sydney Metro West modal access hierachy (Source: EIS)

6.2 Noise and vibration

Construction would occur across the proposed alignment simultaneously. Site establishment would be the first activity where surface sites are prepared, to enable TBM launch sites and station box excavation to commence. Once these sites are established and tunnelling or excavation begins, noise and vibration impacts would occur around these ancillary sites. Due to the noise impacts and potential sleep disturbance to surrounding receivers, the Department recommends limiting station box excavations to standard construction hours, except where low impact activity criteria can be met. A range of mitigation and management measures would be employed, including the use of acoustic sheds at most surface sites.

Traffic noise impacts would result from local road detours at Westmead during Stage 1 construction. Eligible residents on affected streets in Westmead would be offered mitigation options, which could include acoustic screening, and temporary or permanent at property treatment, to manage increased traffic noise.

Rozelle power supply work would be undertaken early in the program to provide power to operate the TBM and other tunnelling equipment at The Bays. Work to enable future augmentation of the power supply by other projects would be undertaken at the same time, so that this does not need to be done again in the future and further embed construction fatigue. The work undertaken as part of the project would allow those future projects (Western Harbour Tunnel, The Bays precinct development) to draw cabling through without the need for trenching and roadwork.

Noise generated by major civil work (tunnelling and excavation) between The Bays and Sydney CBD, and station precinct development and operation would be assessed as part of future staged applications.

The Department acknowledges that complex infrastructure projects in urban environments result in noise impacts, and that these impacts must be minimised as far as practicable and be proactively managed. The Proponent has identified a range of measures that would assist in mitigating these

impacts, and combined with the recommended conditions, the Department considers that noise impacts would be appropriately managed.

Issue

Construction hours include activities within standard daytime hours, work outside standards hours and 24 hours a day, seven days a week tunnelling

Proposed construction hours for construction activities are shown in **Table 13**. These are generally consistent with those applied to other infrastructure projects such as the City and Southwest - Chatswood to Sydenham metro project.

The predominant land uses in noise affected areas are:

- Westmead, North Strathfield, Burwood North and Five Dock metro station sites – low density residential
- Parramatta metro station site – within the Parramatta CBD and surrounded by commercial premises
- Sydney Olympic Park metro station site – commercial, tourist, educational and high-rise residential uses
- North Strathfield metro station site – low density residential with a local business district, school, childcare adjoining the existing Sydney Trains T9 railway line
- The Bays metro station site – port land to the east of the former White Bay Power Station and north of Anzac Bridge
- Clyde stabling and maintenance facility site – land between the decommissioned Carlingford train line (Parramatta Light Rail Stage 1) and James Ruse Drive, to the west is residential, to the north of the M4 Motorway and to the south of Rosehill Gardens racecourse.

Table 13 | Proponent proposed construction hours (Source: EIS)

Construction hours	Activities
Above ground activities	
24 hours a day, seven days a week / outside standard construction hours	long term activities to support tunnelling • TBM launch, support and extraction • mucking out and spoil handling • concrete batching plant and segment production facility • construction traffic for material supply to and spoil removal from tunnelling and underground excavation • station box excavation within an acoustic shed short term duration work • Westmead intersection modifications (short term work) • utility work (short term work)
7.00 am to 6.00 pm Monday to Friday	• enabling work • piling • surface construction

Construction hours	Activities
8.00 am to 1.00 pm Saturdays No work on Sundays and public holidays	• Clyde civil and earthwork • initial excavation • station box and ancillary sites excavation at sites that have no acoustic sheds (being Parramatta, Silverwater and North Strathfield)
Underground construction activities	
24 hours a day, seven days a week / outside standard construction hours	• tunnelling work • underground excavation at metro station and ancillary sites (except for Parramatta, Silverwater and North Strathfield which would be subject to standard construction hours as these locations would not have acoustic sheds) • underground excavation at the Clyde stabling and maintenance facility construction site • rock breaking (in the tunnel and cross passages between 10.00pm and 7.00am)
7.00 am to 6.00 pm Monday to Friday 8.00 am to 1.00 pm Saturdays No work on Sundays and public holidays	• controlled blasting
Other construction activities	
Work carried out when required up to 24 hours a day, seven days a week	• work determined to comply with the relevant noise management level at the nearest sensitive receiver • work required to be carried out during rail possessions • delivery of materials outside approved hours as required by the NSW Police or other authorities for safety reasons • emergency situations where it is required to avoid the loss of lives and property and/or to prevent environmental harm • situations where agreement is reached with affected receivers.

The Proponent has proposed tunnelling and station box excavation activities at sites with acoustic sheds to occur 24 hours a day, seven days a week. Typically, acoustic sheds over the key construction zone (in this instance, the metro station shaft) allow construction while providing shielding from noise impacts. Acoustic sheds would be erected at Westmead, Clyde, Sydney Olympic Park, Burwood North, Five Dock and The Bays. The sheds are designed to cover all excavation and spoil handling activities except at The Bays, where spoil handling would occur outside the acoustic shed. Acoustic sheds would not be used at Parramatta, North Strathfield or Silverwater as construction would occur during standard construction hours at these locations.

The concrete batching plant at the Clyde stabling and maintenance facility would operate continuously to produce precast concrete segments used to line the rail tunnels. A continuous supply of segments is required during tunnelling.

Potential for vibration is greatest at the surface and would diminish as excavation gets deeper

Exceedances of the cosmetic damage vibration screening criterion are predicted at approximately 31 buildings in Parramatta, Clyde, Silverwater, Burwood North, Five Dock and The Bays. These include commercial buildings, heritage items, racecourse facilities and a church. The human comfort vibration criterion would also be exceeded at the nearest receivers (approximately 72 buildings) in all areas, meaning occupants of affected buildings may notice vibration at times when certain equipment is in use. Three businesses were identified as exceeding the sensitive equipment screening criterion at Parramatta and Burwood.

These predictions represent a worst-case scenario when vibration intensive work is at the closest point to the affected buildings. As construction progresses to depth, impacts should diminish.

Ground-borne (regenerated) noise is expected from tunnel boring machines at shallow depths

Ground-borne noise impacts during tunnelling depend on the depth of the tunnel. The tunnels are generally 20 to 50 metres deep across the alignment. The shallowest parts are near North Strathfield and Sydney Olympic Park metro stations, which are around 10 to 20 metres below the surface. TBMs progress at a rate of between 20 to 50 metres per day. This means the worst-case ground-borne noise impacts from tunnelling at a receiver would be apparent for a few days as the TBM passes beneath.

Worst-case ground-borne noise impacts from tunnelling during the daytime are expected to comply with noise management levels (NMLs) or result in 'minor' exceedances. Twelve receivers in North Strathfield on Queen Street may experience moderate impacts where the tunnels are closest to the surface.

At night, worst-case impacts are more widespread where ground borne noise exceeds lower background ambient noise levels. In this case, ground borne noise could exceed the NMLs by 20 dB or more at North Strathfield and by 11 – 20 dB for some receivers at Westmead, Parramatta, Clyde, North Strathfield, and Five Dock near metro station sites where the tunnel depth is shallowest.

Heavy vehicle movements would exceed construction traffic noise and sleep disturbance criteria

Increases in road traffic noise (i.e. greater than 2 dB above the existing noise level) are anticipated on some low traffic roads (**Table 14**) around construction sites due to heavy vehicle movements. In some cases, spoil haulage would exceed the night time sleep disturbance criteria.

Table 14 | Construction traffic noise impacts – daytime (Source: EIS)

Location	Roads predicted to have a greater than 2.0 dB increase in noise
Westmead	Hawkesbury Road to the south of the construction site and Bailey Street
	Hassall Street, Bailey Street to the south east and Grand Avenue to the west of the construction site
Parramatta	George Street to the west of the construction site
Clyde	Wentworth Street to the south of the construction site
Silverwater	Derby Street to the north-east of the construction site

Location	Roads predicted to have a greater than 2.0 dB increase in noise
Sydney Olympic Park	No predicted exceedance in criteria
North Strathfield	Queen Street and Wellbank Street, which are both east of the construction site
Burwood	Loftus Street to the east of the construction site
	Burton Street to the east of the construction site
Five Dock	Second Avenue to the east of the construction site
	Waterview Street to the east of the construction site
The Bays	James Craig Road, Port Access Road, Sommerville Road and Solomons Way, generally to the south of the construction site

The local road network around Westmead metro station box would be reconfigured resulting in an increased road traffic noise

As discussed in **Section 6.1**, the local road network at the Westmead site would divert traffic from Alexandra Avenue through Hassall Street, Bailey Street and Grand Avenue (all local roads with low volumes of traffic). Heavy vehicles would also access the Westmead site from Bailey Street. This detour and access is expected to cause a noticeable increase in road traffic noise, exacerbated by the slight gradients along Hassall Street and Bailey Street which may increase engine and breaking noise. This detour would be in place until a new permanent alternative is delivered. This alternative is under investigation and would be assessed as part of a future application(s) and precinct planning process.

Submissions

Community and special interest groups

The following comments were raised:

Concept

- operational noise and vibration impacts
- use resilient track to mitigate operational ground borne noise impacts
- horses stabled at Rosehill Racecourse may experience ground borne vibration impacts

Stage 1

- limit night time work to 11.00pm
- property damage and exceedance in human comfort levels from vibration
- construction traffic impacts on residents, adjoining businesses, education institutions, Rosehill Gardens racecourse (impacts on horses), childcare centre, church services, gatherings and events

- construction respite and a 24 hours a day, seven days a week hotline phone number must be provided
- relocation of residents impacted by construction noise should be considered
- real-time and publicly available continuous noise monitoring should be undertaken
- the assessment does not consider impacts to horses which are more sensitive to noise than humans
- dilapidation surveys must be prepared for all structures potentially impacted by vibration.

Councils and government agencies

City of Parramatta Council considers the Roxy Theatre must not be constrained (by noise or vibration) for future use as a theatre. Noise and vibration assessment should consider actual and planned sensitive receivers along the Metro corridor within the construction time frame.

Burwood Council is concerned about the proposed 24 hours a day, seven days a week work schedule and the impacts experienced by residents during WestConnex construction, particularly noise and amenity impacts (construction fatigue). It recommended more community consultation be undertaken to ensure that the community is aware of project activities.

City of Canada Bay Council is concerned about the 24 hours a day, seven days a week work schedule and requests further ongoing community consultation to determine work programs and mitigation / management measures. Council also raised heavy vehicle movements associated with night time spoil haulage that would affect residents' sleep. A number of recommendations were made including:

- dilapidation surveys of all structures
- ongoing community consultation and a 24 hours a day, seven days a week community hotline to be established
- provision of respite, particularly from night time construction
- Council and community involvement in developing the noise and vibration monitoring program
- future application(s) must consider operational noise attenuation.

Inner West Council notes that some activities would be 24 hours a day, seven days a week such as tunnelling, spoil management / removal, material supply and utility management work. Council is concerned about the cumulative construction noise and vibrations impacts to adjoining residents at White Bay and potential vibration impacts to structures around White Bay Power Station. Awareness about the prolonged nature of residents working from home during the COVID-19 pandemic was raised. Council recommended:

- proactive engagement with the community and Council regarding work scheduling and upcoming night time activities
- consideration of alternative (quieter) equipment, construction methods and acoustic buffers to reduce noise
- real time noise and vibration monitoring including adaptive management

- precondition dilapidation surveys of all structures
- involvement where controlled blasting is proposed at The Bays.

EPA noted that there is no detail of mitigation and management measures to be applied where noise management levels are exceeded. Other matters raised included:

- sleep disturbance assessment was undertaken against superseded guidelines and the new guidelines should be used
- some out-of-hours work would be regulated through an Environment Protection Licence
- cumulative impacts with other projects must be managed to minimise impacts to residents
- benefits of controlled blasting were acknowledged, but the need to actively manage was highlighted
- 24 hours a day, seven days a week tunnelling 'ancillary' activities are not supported without a process to determine if these ancillary work are essential and necessary to support tunnelling.

The EPA emphasised the importance of keeping the community informed about construction as the project progresses and seeking the community's preference on mitigation options, including work scheduling, and respite.

Heritage Council raised concerns that heritage items near White Bay and Parramatta would experience vibration impacts. The 2.5mm peak particle velocity screening criterion should be applied when monitoring vibration impacts.

Infrastructure NSW requested that the 2.5mm/s screening criterion is applied to heritage structures at White Bay. Mitigation measures identified are considered acceptable.

NSW Health noted that some sensitive receivers would experience construction noise impacts. It is considered appropriate that mitigation and management measures are developed in consultation with the impacted community.

Sydney Water advised that vibration monitoring must be undertaken to ensure the local heritage listed Beattie Street Stormwater Channel is not adversely affected.

Consideration

Future stages of the project would be assessed against relevant noise and vibration guidelines, and noise and vibration levels would be managed and mitigated with consideration of the relevant criteria

Certain elements and features of the project would be subject to separate application(s) and assessment. The Proponent intends to design the remaining components of the project to meet relevant operational noise and vibration guidelines including:

- *Rail Infrastructure Noise Guideline* in relation to potential airborne noise, ground-borne noise and vibration impacts
- *Assessing vibration: a technical guideline* (Department of Environment and Conservation, 2006) in relation to potential human comfort vibration impacts to vibration impacts to sensitive equipment

- *Noise Policy for Industry* (EPA, 2017) in relation to potential noise from fixed facilities such as metro station and services facilities.

As part of future applications, the following matters also need to be considered:

- where there is the potential for ground-borne noise and vibration impacts from operational rail lines in tunnels, the use of resilient track forms would be considered
- noise and vibration impacts of any permanent changes to the local road network
- the need for appropriate noise attenuation measures at metro stations and services facilities, such as equipment selection, positioning of plant and ventilation discharges, in-duct attenuators, and acoustic enclosures.

Based on the performance and the assessment of other metro projects on the Sydney Metro network, it is considered that operational impacts can be either designed out (use of resilient track, location of plant and equipment) or mitigated (at-property treatments to address road traffic noise), however all these matters would form part of the subsequent future stages and assessment process.

Standard construction hours have been adjusted to provide flexibility to work scheduling and a reduction in overall construction timeframe

Standard Saturday construction hours, as defined in the *Interim Construction Noise Guideline* (DECC, 2009) (ICNG), are 8.00 am to 1.00 pm. However, given the favourable past performance of the Proponent on other State significant infrastructure projects and the benefits of a more flexible construction hours arrangement, the Department considers that activities on a Saturday should be able to continue to 6.00 pm and has recommended this. The extension of Saturday hours provides greater flexibility to schedule a full day of work on Saturdays, may reduce the need for out-of-hour requests and may ultimately reduce the period of construction.

On balance, the Department considers that construction on Saturday afternoons is acceptable under the circumstances and is reflective of changing community behaviours and because night time activities associated with spoil haulage, deliveries and metro station box excavations would be restricted at Westmead, Burwood North and Five Dock. Further discussion about these restrictions are detailed below.

The Proponent is required to manage noise impacts on the local community and sensitive receivers as part of day to day construction. In relation to this, the Department has recommended noise-generating work near schools, child care centres and hospitals that results in noise levels above NMLs not be timetabled within sensitive periods (such as exam periods), unless other reasonable arrangements with affected institutions are made at no cost to the affected institution.

Rozelle power supply work would be delivered early to ensure power is provided to construction sites at The Bays to accommodate multiple projects thereby reducing cumulative impacts to adjoining residents

Since the development of the EIS, further discussions have occurred between Sydney Metro, Transport for NSW (for the Western Harbour Tunnel project, subject to separate planning approval), Ausgrid and Port Authority of NSW to consider their future power needs from the Rozelle sub-transmission substation. The power supply route is shown in **Figure 10**.

As there would be multiple projects operating at The Bays area, including future development, the Proponent intends to undertake all work and add extra conduits to accommodate all development occurring at The Bays, which would:

- reduce the need for additional trenching activities in the future
- reduce the overall future impacts on the surrounding community
- ensure that this project does not remove the ability to provide for power supply for the other future projects.

This approach is supported. If these utility activities were undertaken separately, it would result in trenching occurring through local streets multiple times over many years with the associated cumulative impacts to the local community such as traffic and noise impacts.

To ensure the utility upgrades can be delivered efficiently, a number of conditions would apply to address noise impacts, including:

- use of alternative construction methods
- use of portable noise barriers around particularly noisy equipment such as concrete saws
- work during standard construction hours, unless permitted through an Environment Protection Licence (EPL) or out-of-hours work protocol
- community consultation and identification of appropriate respite periods
- engagement of a Utility Coordination Manager
- community complaints management system to be created before any construction activities occurring, including a 24-hour hotline number.

Metro station box excavations is limited to standard construction hours unless low impact criteria can be met

Metro station box excavations at locations with acoustic sheds are proposed 24 hours a day, seven days a week. This approach is appropriate in areas dominated by commercial or industrial uses. However, residents around metro station locations at Westmead, Burwood North and Five Dock would experience significant noise impacts from metro station box excavations. Residents at Burwood North and Westmead, spoil haulage for station box excavation would take approximately 18 months to two years. Five Dock would be subject to approximately six months for cut and cover shaft excavation and another 18 months for mined station cavern excavation.

Table 15 illustrates the number of sensitive receivers who would experience noise exceeding sleep disturbance criteria across a range of activities associated with metro station box excavation. The EPA, various councils and community members have indicated strong concern with the proposal to work 24 hours a day, seven days a week. The Department agrees with these concerns and does not support metro station box excavation, cut and cover excavation and surface works occurring during the night time period should there be exceedance of noise levels.

Table 15 | Overview of NML exceedances during the night time period – all receiver types (Source: EIS)

Site	Scenario	Activity	Night time NML exceedance			Sleep disturbance exceedance		
			1-10 dB	11-20 dB	20+ dB	1-10 dB	11-20 dB	20+ dB
Westmead	Excavation with shed	Mucking out	12	1	-	38	10	2
		Through rock using rock breaker (doors closed)	22	3	-	38	10	2
		Through rock using rock breaker (doors open)	63	16	1	39	10	2
	TBM launch and support	TBM support and spoil removal	14	2	-	38	10	2
Burwood	Excavation with shed	Mucking out (doors closed)	-	-	-	-	-	-
		Through rock using rock breaker (doors closed)	15	1	-	1	-	-
		Through rock using rock breaker (doors open)	145	20	5	27	5	-
	Mined cavern with shed	Mining with support (doors closed)	**2**	**-**	**-**	**1**	**-**	**-**
		Mining with support (doors open)	**22**	**5**	**-**	**5**	**-**	**-**
Five Dock	Excavation with sheds	Mucking out (doors closed)	**13**	**-**	**-**	**61**	**20**	**4**
		Through rock using rock breaker (doors closed)	**122**	**16**	**-**	**61**	**20**	**4**
		Through rock using rock breaker (doors open)	**375**	**88**	**17**	**108**	**22**	**6**
	Mined cavern with shed	Spoil removal (doors closed)	**9**	**-**	**-**	**61**	**20**	**4**
		Mining with support (doors closed)	**62**	**5**	**-**	**61**	**20**	**4**
		Mining with support (doors open)	**164**	**28**	**4**	**61**	**20**	**5**

Notwithstanding the Department's proposed night time restrictions, excavation may occur outside of recommended hours, subject to meeting noise levels that would not exceed night time or sleep disturbance criteria (*i.e.* deemed to meet low impact criteria). The low impact noise criteria are based on acceptable noise limits identified in the ICNG. The Proponent has demonstrated on other projects that it can meet these low impact criteria and subsequently continue construction with limited community impact.

Spoil haulage and heavy vehicle movements would be restricted to ensure night time respite for residents is provided

The Proponent has requested spoil haulage and deliveries occur 24 hours a day, seven days a week to support tunnelling activities at most metro station sites. Due to the potential night time noise impacts associated with these activities in residential areas, the Department considers these should be limited. However, to ensure that the construction sites can operate efficiently, spoil haulage and deliveries from Westmead, Five Dock and Burwood would be permitted until 10.00pm, but not permitted between the hours of 10.00 pm and 7.00 am, unless strict noise criteria are met. This would ensure that excess spoil can be moved off site and not delay the overall construction program, while larger equipment or material can still be delivered when traffic levels are much lower. These restricted hours and/or strict noise criteria would aid in maintaining night time amenity for residents.

No specific restrictions have been placed on the North Strathfield or Parramatta site because the Proponent intends to undertake construction activities at these locations during daytime hours and not within an acoustic shed. For activities to occur outside the standard construction hours, the low impact criteria must be met.

Although Westmead construction site would operate 24 hours a day, seven days a week to support tunnel boring, spoil would need to be stored on site overnight and deliveries occur before 10.00 pm. unless low impact noise criteria can be achieved between 10.00 pm and 7.00 am.

Construction vibration can be appropriately managed

Construction vibration can affect human comfort. It can also cause concern about potential physical or cosmetic damage to buildings, and in some cases the structural integrity of adjacent buildings. Human comfort criteria are generally the more stringent. Where these are met, the likelihood of cosmetic or more serious structural damage is low.

For structures where the cosmetic damage vibration screening criterion is likely to be exceeded, further review (pre- and post- construction dilapidation surveys) and attended vibration monitoring is proposed during the construction period. Vibration policy guidance does not require the provision of more stringent vibration criteria to a heritage building (whether it is a listed building or simply old), unless there is concern for its structural integrity. This approach is consistent other major linear infrastructure projects including the Sydney Metro City and Southwest.

Some businesses or equipment may be more sensitive to vibration. Three businesses were identified with sensitive equipment at Parramatta and Burwood. The Department has recommended that construction causing vibration near facilities with special equipment that is sensitive to noise and vibration consider timetabling of work or choice of construction methods as may be appropriate, in consultation with those facilities.

While the Department considers the Proponent has identified appropriate safeguards to manage vibration impacts, including undertaking activities to comply with applicable construction vibration criteria, these can be strengthened through the recommended condition requirements:

- preparation of a land use survey before work, to identify additional uses that are sensitive to construction vibration
- pre- and post- construction dilapidation surveys of buildings likely of being at risk of damage before commencement of any work, including rectification of damage caused by the construction of the project
- establishment of an Independent Property Impact Assessment Panel for the resolution of property damage disputes
- measures and procedures to minimise construction vibration impacts including alternative construction methods and equipment
- strict vibration limits to structurally unsound heritage items
- real time vibration monitoring and adaptive management measures to ensure limits are not exceeded.

Blasting was considered as a possible alternative to rock breaking and ripping for metro station excavation. Any proposal to blast would be subject to stringent processes and limits, including community engagement, time limits, trial blasting, and must be carried out to meet relevant criteria to minimise unacceptable noise and vibration impacts to the community. This work is also subject to an EPL.

The Department acknowledges a similar blasting process was proposed and limits applied for excavation required at Victoria Cross on the City and Southwest - Chatswood to Sydenham project. However, blasting on this project did not proceed as the Proponent could not meet the strict limits, despite community support for further trial blasting. Should blasting be considered for this project it would need to be implemented subject to meeting the strict limits and community agreement.

Residents along Grand Avenue, Hassall Street and Bailey Street in Westmead would receive at-property treatment to manage increased traffic noise

As discussed in **Section 6.1**, the local road network would be modified to accommodate a new metro station box at Westmead. The modified network would divert traffic from Alexandra Avenue through Hassall Street, Bailey Street and Grand Avenue, resulting in an increase in traffic volumes on these local roads.

Residents may experience a noticeable increase in road traffic noise of more than 2 dB(A). Under the *Road Noise Policy* (DECCW 2011) (RNP), an increase of more than 2 dB(A) in road traffic noise triggers the need for noise mitigation. To ensure appropriate noise mitigation is provided to properties that would exceed traffic noise criteria under the RNP, a condition is recommended that requires a comprehensive process be undertaken to determine the mitigation measures to be offered. The process would include:

- traffic noise measurements of base case and altered traffic network (detour route)
- developing property specific noise mitigation measures based on the measured exceedances

- providing at-property treatment options to the landowners for agreement before installation.

In relation to the end state road network, this would be subject to a future application and assessment as the Proponent is currently reviewing potential options. As part of this assessment, the Proponent would have to undertake an assessment against the RNP and determine if additional mitigation is required or whether additional receivers would trigger mitigation requirements under the RNP.

6.3 Flooding and hydrology

The project has sought to minimise flooding impacts to most areas and no significant flooding impacts are predicted to surrounding properties. Cumulative and concept plan estimated impacts would continue to be reviewed during project development and detailed design.

Changes to flow paths and landforms at the Clyde stabling and maintenance facility construction site have the potential to change flood characteristics both on and off site. The Bays metro station construction site is subject to overland flows and coastal inundation. In both circumstances the impacts are considered minor.

Climate change has been considered and accommodated in the project design and would be further reviewed during the development and assessment of future stages.

Issue

Changes to flow paths and landforms at the Clyde stabling and maintenance facility construction site have the potential to change flood characteristics both on and off site

The Clyde stabling maintenance facility is located within the A'Becketts Creek floodplain. The site has been highly modified, including filling, and is surrounded by industrial land uses.

The site and surrounding areas are subject to existing flooding. The proposal has the potential to alter the flooding and drainage characteristics of the area during Stage 1 construction through the alteration of flow paths within A'Becketts Creek, raising surface levels and reducing flood storage. The proposed design includes two nine metre box culverts in A'Becketts Creek and flood mitigation to manage flows. The potential for blockages within waterways during construction would be managed by a Soil and Water Management Plan which includes measures to monitor and clear debris.

The Bays metro station construction site is subject to overland flows and costal inundation

The Bays construction site is situated on low lying former docklands with a typical elevation of three to four metres Australian Height Datum (AHD). The site is adjacent to the former White Bay Power Station, situated on low-lying land and is recognised as an overland flow ponding area for a 60 hectare sub-catchment, extending north-west into Rozelle. Therefore, parts of the site are expected to be subject to major overland flows. The low-lying area drains out via trunk drainage and overland via Robert Street to White Bay.

The site is also affected by coastal inundation in low lying portions of the construction site during the 1 per cent Annual Exceedance Probability (AEP).

Submissions

Community and special interest groups

Two community submissions raised flood impacts associated with the proposal. One submitter expressed concern regarding the flood protection of the tunnel between Clyde and Sydney Olympic Park. The second submission queried the difference in flooding conditions between Camellia and Barangaroo.

Councils and government agencies

DPIE Biodiversity Conservation Department requested further flood information, particularly for the detailed design of all proposed stations, demonstrating how stations and tunnel portals would be located outside any potential flood impacts. Further information sought included:

- additional flood modelling to ascertain impacts to Silverwater, Sydney Olympic Park and Five Dock;
- resolving a discrepancy between the EIS and Parramatta Council's modelling and flood data;
- an investigation to ensure the entry to and exit from The Bays metro station protects commuters and physical infrastructure; and
- further information on existing drainage particularly to The Bays metro station.

City of Parramatta Council requested further investigation into the impacts of flooding from work proposed at the Clyde Stabling and Maintenance Facility construction site on upstream and downstream flooding. Council also raised concern that proposed box culverts along A'Becketts Creek would become blocked and further increase flooding and requested that no fill be placed along A'Becketts Creek to avoid flood impacts to properties outside of the construction footprint.

Sydney Water did not support the proposed fill within the Clyde Stabling and Maintenance Facility construction site as it would increase flooding at adjoining properties. Engagement between the Proponent and Sydney Water was requested during early design development to address local flood storage loss, potential cumulative impacts and consideration related to the proposed filling within the floodplain.

City of Canada Bay Council commented on potential increases in overland flow at North Strathfield, Burwood North and Five Dock metro stations, which should be addressed to ensure that the proposal does not lead to increased flooding.

Consideration

Cumulative and concept plan impacts would continue to be reviewed during project development and detailed design

Changes in flood behaviour would likely occur due to proposed future development including the revitalisation of The Bays Precinct and Camellia Town Centre. A cumulative flood study incorporating these precincts is beyond the scope of this proposal as limited information is publicly available. The Proponent has committed to including relevant data from regional studies or nearby development as part of additional hydrological and hydraulics modelling undertaken during detailed design. The

Department considers this approach appropriate in considering the cumulative effects of future staged applications as further information becomes available.

The proposal has been designed to minimise impacts on existing flood behaviours during construction and operation. Flood impacts from the result of Stage 1 are minor, with further flood modelling to be undertaken at later stages of the project

The Department is satisfied that the minor flood impacts resulting from Stage 1 are temporary as they are predominantly construction impacts. The Proponent has primarily sited metro stations on ridgetops outside of flood zones, ensuring that minimal flood impacts would occur within the site area or to surrounding properties.

The Department notes that design refinement would be undertaken during subsequent applications to ensure the design and location of metro stations are outside of flood inundation areas. However, these applications would include permanent infrastructure which have the potential to increase flood afflux. Further flood modelling would be required to ensure that the proposal does not worsen impacts. The Department believes that additional flood modelling which would be undertaken for subsequent stages would address DPIE BCD concerns on station design, ensuring future design would address flood impacts. Further flood behaviour reviews would also consider improvements to permanent drainage infrastructure particularly surrounding The Bays metro station, which would aid in reducing overland flow and ponding of water.

During construction, the Proponent has committed to ensuring flood impacts are within the limits considered acceptable for other similar State significant infrastructure (SSI) projects, which is a 50 mm increase in a 1 per cent AEP. The *NSW Floodplain Development Manual* classifies this increase as a low impact hazard. The Department is satisfied with this commitment as these levels are consistent with flood objectives set for other SSI projects.

Clyde stabling and maintenance facility Stage 1 flood impacts are minor and are expected to be reduced through detailed construction planning

Flood modelling indicates there are changes to inundation duration and flood depth within the site during a 1 per cent AEP and PMF event. The Proponent has committed to flood proofing excavations at risk of flooding, including raised entries into shafts and pumping out water from dive structures. The Department is satisfied that the Proponent's commitments would result in minimal impact from flooding across the site during construction.

The proposal is not expected to result in additional flood impact to buildings outside of the existing flooding footprint in areas beyond the proposal's operational boundary during a 1 per cent AEP flood event. The proposal would result in a minor increase in flood levels from 10 mm to 20 mm at industrial and commercial properties in Auburn adjacent to Duck River in a 5 per cent AEP flood event, however with no increase of flood water predicted above existing floor levels.

The Department understands the Proponent's modelling predicts five additional buildings beyond the project site area would be impacted during the PMF event. Floor level survey would be completed during the design process to confirm the predicted impacts to the five properties. Minimal increases of 30 mm in flood levels are predicted along Duck River. There would be minor, localised increases in flow volumes and rates along minor drainage lines which could potentially impact surrounding land uses, however the Proponent's modelling predicts no impacts resulting in water above freeboard levels.

Additionally, the Proponent has committed to further design refinement as part of the Stage 1 work at the Clyde stabling and maintenance facility site during detailed design to mitigate impacts from increases in levels of up to 30 mm and from impacts relating to fill. The Department supports the Proponent's commitment to further detailed design to ensure minimal rise in levels at Duck Creek, to protect surrounding properties from flood impacts. The Department also considers this approach would address submitters concerns of increased levels of flooding from fill locations.

Stage 1 work at The Bays metro station construction site would not result in additional flood impact to properties in the existing flooding footprint

The Bays metro station site would be subject to flooding impacts during coastal storm surges and overland flow events during both construction and operation. Drainage lines follow existing street infrastructure with the main area of water ponding predicted to occur along Robert Street.

The Proponent has committed to undertaking detailed construction planning to avoid conflicts with drainage work within Robert Street in consultation with Inner West Council. Improvements in drainage infrastructure would reduce velocity and depth of overland flow paths, reducing flood impacts occurring in and around the site.

Impacts from storm surges would be managed through the Proponent's commitment to detailed construction planning to minimise changes to existing levels. Detailed construction planning would consider measures to minimise reduction in flood plain storage to protect the low-lying properties to the north western side of the site from any potential increase in water associated with coastal impacts. The Department is satisfied that these measures are appropriate for the proposed work.

The proposed work at The Bays metro station construction site is not predicted to result in additional flood impact to properties outside the existing flooding footprint in areas beyond the project's operational boundary as part of the Stage 1 construction.

The Department is satisfied the potential flooding impacts can be managed through design and/or management during the detailed construction planning and would not result in additional impacts to surrounding properties.

Climate change has been considered and accommodated in the project design and would be further reviewed during the development and assessment of future stages

The impacts of climate change were assessed for the Concept and Stage 1 and would be further reviewed and refined in future stages. This would provide surface structure design information which would be subject to climate change impacts and could have greater and longer-term impacts to surrounding areas than temporary construction development and activities. The Department considers that the Proponent has made appropriate commitments during Stage 1 construction to assist in addressing the impacts of climate change.

Permanent infrastructure such as the dive tunnel at the Clyde stabling and maintenance facility to the main tunnel would be sited at 15 metres AHD above the predicted water level increase. This ensures this area is safeguarded from the effects of sea level rise. The Department considers that the Proponent has appropriately considered the longevity of permanent infrastructure across the alignment and also the immediate impacts to climate change.

6.4 Aboriginal and non-Aboriginal heritage

The study area includes a number of registered Aboriginal heritage sites, with the majority located in the Parramatta CBD. Potential for archaeological finds are primarily related to the Parramatta Sand Body and other undisturbed land. Satisfactory mitigation measures have been proposed and conditioned to protect and/or interpret Aboriginal heritage sites and archaeology.

While the study area includes a number of heritage items, the project has avoided direct and significant impacts to the majority of listed items. Stage 1 excavation has the potential to cause ground movement resulting in minor (cosmetic) impacts to structures and excavations have the potential to impact archaeological remains at Parramatta and The Bays. Heritage interpretation has been considered at a concept level and would be refined during future stages. Structural damage to heritage items is unlikely and conservative vibration damage screening levels have been adopted to minimise cosmetic damage. Potential archaeology at metro station sites would be managed through a comprehensive design and excavation methodology.

The Department has considered the relatively minor heritage impacts in the context of the benefits from the construction of this project overall. The Proponent's commitments for managing and reducing heritage impacts, with the Department's recommended conditions, would ensure that heritage impacts are appropriately managed and minimised to the greatest extent practicable.

Aboriginal Heritage

Issue

The study area includes a number of registered Aboriginal heritage sites, most located in Parramatta CBD

A total of 238 registered Aboriginal sites were identified from a desktop review across an extensive search area. Of these, 18 sites are known to have been destroyed, deleted or 'not a site'. The majority of sites are located within Parramatta CBD area. The construction sites are located away from areas with high concentrations of Aboriginal Heritage, with the exception of Westmead and Parramatta.

Figure 13 shows the distribution of the AHIMS registered sites.

Potential for archaeological finds are primarily related to the Parramatta Sand Body and other undisturbed land

Work at Parramatta and Westmead are near potential archaeological sites, with most construction sites extensively disturbed over the past 200 years.

The Parramatta high voltage power supply route is partly located in the identified extent of the Parramatta Sand Body (as well as a registered site). While substantial disturbance is considered likely to have already occurred within the proposed power supply route, it is possible that areas of intact natural soils are present. Intact sands across the power supply route are considered to be archaeologically sensitive and therefore the Parramatta power supply route is considered to have moderate archaeological potential and of moderate potential. A detailed assessment of significance would be prepared following archaeological excavation and assessment of unexpected finds.

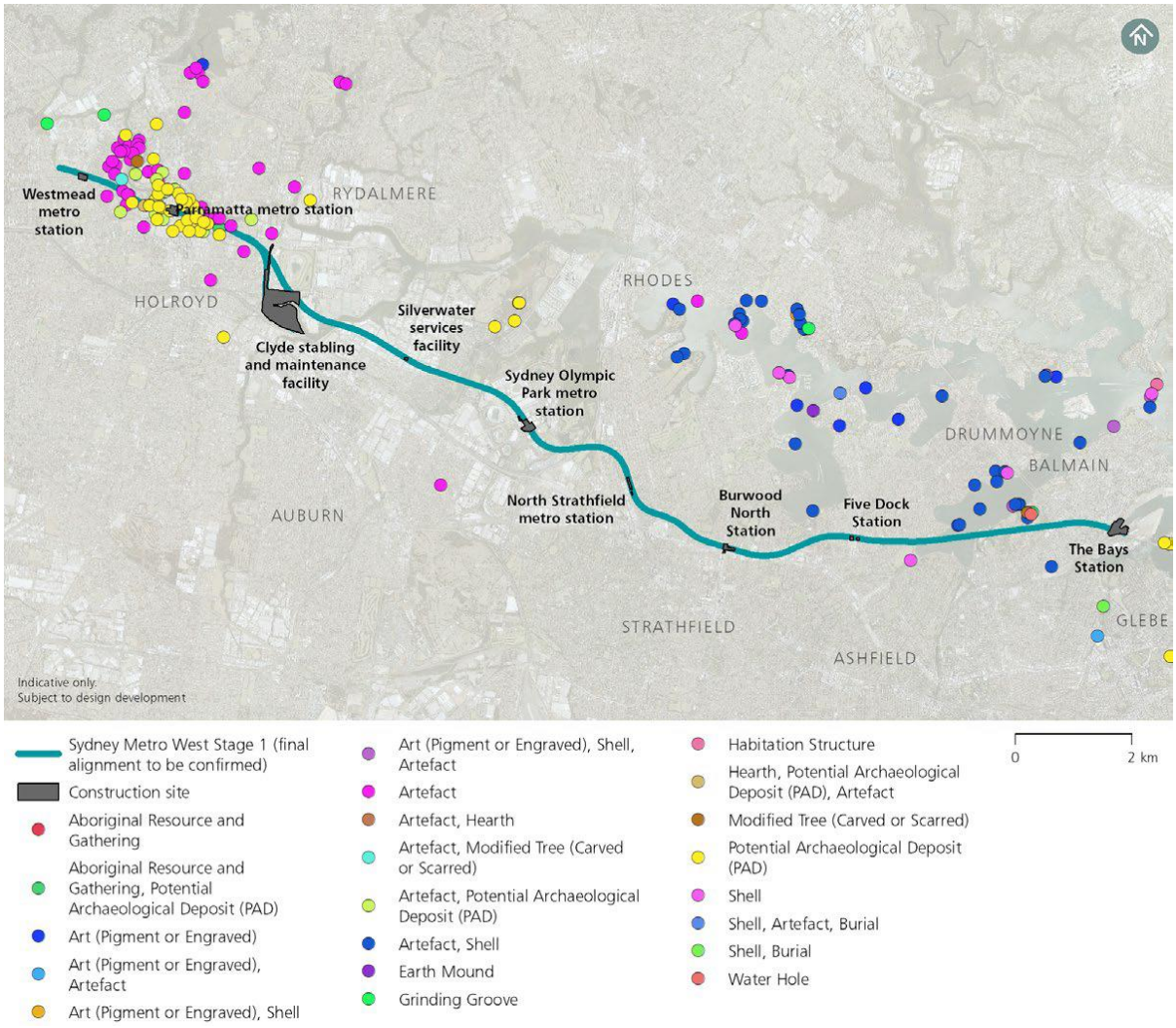

Figure 13 | Distribution of AHIMS registered sites (Source: Sydney Metro)

Parramatta metro station construction site has potential for contact with archaeology and prehistoric (Pleistocene) archaeological remains, as the eastern half of the site covers the edge of the deep undisturbed Parramatta Sand Body where stratified evidence of Aboriginal settlement may be found. This is of high research potential, scientific value, and has an overall significance of moderate-high.

Some generally undisturbed land around the speedway at Clyde has moderate potential for artefacts, while Burwood, Strathfield and Five Dock are considered to be low potential. The Bays has low-moderate potential from preserved former shorelines and marshes under the infill of the previous container terminal.

Submissions

Community and special interest groups

The community raised general concern regarding the comprehensiveness of Aboriginal cultural heritage assessment and cumulative impacts to Aboriginal cultural sites.

Councils and government agencies

Heritage NSW provided the following comments:

- a detailed archaeological test excavation methodology for Stage 1 should be prepared and forwarded to Heritage NSW to assess the adequacy of the proposed test excavations
- without the results of the test excavations it is not known if there are Aboriginal objects that require in-situ conservation or detailed archaeological salvage excavation
- an Aboriginal heritage management plan should be prepared to guide the Aboriginal heritage management requirements of this project.

Heritage NSW also commented that no assessment had been undertaken for the services facility between Five Dock and The Bays. The facility would be the subject of a future assessment process once the location has been determined.

Another concern raised by Heritage NSW is that archaeological test excavation in Stage 1 should be undertaken pre-approval across the full extent of the Concept corridor to properly inform the identification of Aboriginal cultural heritage values. Sydney Metro has responded that it is not possible to do most test excavations during pre-approval, due to the need to demolish existing structures, which in turn cannot be undertaken until the project is approved. The Department accepts this response, as most metro station sites are currently occupied by buildings and agrees that test excavation would not be possible or would have a negative impact on existing uses.

Consideration

Parramatta Sand Body with significant archaeological resource may overlap the Parramatta metro station site

The Parramatta Sand Body is a relatively deep and significant archaeological resource with evidence of historical Aboriginal activities. It may retain a stratified deposit that documents long term Aboriginal occupation and changes in climatic and other environmental conditions. Some portions may survive beneath the subsurface and may overlap the Parramatta metro station construction site where natural ground remains. There is potential for contact archaeology (*i.e.* between Aboriginal people and colonial settlers), but artefact density is likely to vary across the site.

The broader Parramatta precinct is recognised as a significant heritage precinct for Aboriginal occupation and as a site of first contact with colonial settlers. Potential of this site was assessed as moderate to high, in part due to its location near a permanent water source.

The non-tangible cultural heritage aspects and stories are also a significant element of the historical context which are not readily gained from archaeological investigation and can only be learned from consultation with the Aboriginal community. The Department strongly encourages an approach to cultural heritage which goes beyond the physical artefacts and tells the story of place.

Overall, the Department supports the approach adopted to locate areas of ground disturbance at this site to avoid the known boundaries of the Parramatta Sand Body, however the uncertainty of its extent requires a precautionary approach which includes:

- further consultation with Aboriginal stakeholders
- test excavation and salvage

- developing and implementing an unexpected heritage finds procedure
- interpretation of findings, including any changes to the known extent of the sandbed, contact archaeology and salvaged artefacts.

Conditions of approval reflect the process outlined above and are recommended to be adopted.

The Parramatta CBD is currently undergoing a period of extensive renewal, with many redevelopment projects happening concurrently. Therefore, it is considered particularly important that any heritage interpretation strategy for Metro West is not developed in isolation, but that it provides contextual and cumulative information uncovered from across the broader Parramatta area.

While the impacts to subsurface archaeology would largely occur during excavation of the metro station box, it is possible that further impacts would occur in future stages of the project. Further, the ability to provide permanent, contextual and physical interpretation of any findings would need to be incorporated into above ground station structures which would be considered as part of a future application and constructed in the latter stages.

Several mitigation measures have been proposed to address potential Aboriginal heritage and would be implemented across all sites. They include Aboriginal stakeholder consultation; Aboriginal heritage interpretation developed in consultation with registered Aboriginal parties; and the implementation of the Sydney Metro Exhumation Management Plan in the event that a potential burial site or remains are exposed. In addition to these measures, test excavation and salvage if required would be carried out at the Parramatta Metro site, the Clyde Stabling Yard site, The Bays metro station site and along the Parramatta Power Supply route.

The Department is satisfied with the Proponent's mitigation measures for the protection of sites of Aboriginal cultural significance. These requirements are covered by a range of conditions relating to archaeological excavation, consultation, management plans, and interpretation. An Aboriginal Archaeological Test Excavation Methodology(s) must be prepared and appropriately integrated with the revised Archaeological Research Design and Excavation Methodology.

To address outstanding issues with interpretation across all phases of the project, conditions have been recommended as part of the concept approval which acknowledges that the interpretation strategy relates to station design and that it must take into account the findings of other projects under construction in the area such as the Parramatta light rail, new Powerhouse Museum and the Civic Link. The strategy must be prepared in consultation with Heritage NSW and would outline how key Aboriginal heritage values and stories of heritage items, place and landscape; and would be interpreted in the project design, including metro station and precinct urban design.

Non-Aboriginal Heritage

Issue

The study area includes a number of heritage items; however, the project has avoided direct and significant impacts to most items

A total of 37 heritage items comprising four items of State significance and 33 items of local significance were identified in the study area. There would be no (or negligible) impact to 14 items of local significance and one item of state significance. Of the remaining items, 19 of local significance

and three of State significance would potentially experience either minor or moderate impacts. It is expected that there would be no major impacts on any listed items.

The four items of State significance identified in the EIS are listed in the table below.

Table 16 | Items of State significance identified in the EIS (Source: EIS)

Impacted Heritage Item	Location	Heritage listing	Type of impact
Roxy Theatre	Parramatta	State Heritage Register (SHR), Parramatta LEP 2011	**Minor** – vehicle and machinery operation, vibration, settlement, temporary visual
Redcoat's Mess House	Parramatta	SHR, Parramatta LEP 2011	**Neutral** – This item is more than 40 metres from the Parramatta construction site and will experience no direct impacts, vibration, and no impacts on sightlines.
State Abattoirs	Sydney Olympic Park	SEPP (State Significant Precincts)	**Minor** – vehicle and machinery operation, vibration, settlement, temporary visual
White Bay Power Station	The Bays	SHR, Urban Development Corporation S170, SREP No. 26	**Moderate** – partial demolition of hardstand and landscaping elements, vehicle and machinery operation, vibration, temporary visual

Stage 1 excavation has the potential to cause ground movement resulting in minor (cosmetic) impacts

Metro station excavation for Stage 1 has the potential to cause ground movement associated with the redistribution of stresses within the ground or through groundwater drawdown. Six items have been identified in the EIS as experiencing potential settlement impacts. However, damage to heritage items is expected to be unlikely or minor, with most damage expected to be superficial (cosmetic). The SHR listed Roxy Theatre may experience settlement of up to 25mm, potentially resulting in minor cosmetic damage.

Excavation has the potential to impact archaeological remains at Parramatta and at The Bays

There is the potential for archaeological remains to be uncovered across the project corridor, particularly at the Parramatta and The Bays metro station sites. It is unlikely that any archaeological remains of significance would be found outside of these locations.

There is a low to moderate potential for archaeology of State significance to be uncovered at Parramatta. This could potentially include convict huts, yards and gardens, buried historical soil deposits, and isolated artefact deposits. There is low to moderate potential for convict or early colonial remains and other items indicating various phases of development at Parramatta.

The Bays metro station site is primarily in reclaimed land filled through the 19th and early 20th centuries for industrial and port purposes. The archaeological potential of excavation at The Bays is listed from low, moderate to high across differing stages of development for reclamation fills, former industrial uses, former coastline and former goods yard remains, some potentially of local significance. No archaeology of State significance is expected to be impacted at The Bays.

There are items of potential heritage significance

Along the alignment, several impacted buildings within the construction sites have been identified as potential unlisted heritage items. Between Westmead and The Bays, five items have been identified as having potential heritage significance; two in Parramatta, two in Burwood North and one at The Bays. Due to these items being located within the metro station construction sites, demolition of these items is required, resulting in the complete removal of any heritage fabric.

As requested by Heritage NSW, the Heritage Construction Environmental Management sub-plan would assess the heritage significance of these potential heritage items.

Submissions

Community and special interest groups

The community raised concern regarding:

- the rectification of property damage to heritage items
- vibration impacts to heritage items during construction, particularly the Roxy Theatre and White Bay Power Station
- comprehensiveness of Aboriginal cultural heritage assessment and cumulative impacts to Aboriginal cultural sites
- potential impact on Callan Park not being addressed.

Councils and government agencies

City of Parramatta Council stated that there should be a firmer commitment to developing robust heritage interpretation principles, and a commitment to integration of heritage interpretation. Council also reaffirmed their wish that Kia Ora house be maintained, and the surrounding curtilage and public domain reflect or further enhance the outcomes outlined in the draft Civic Link Development Control Plan.

The Department notes that Kia Ora would only experience temporary indirect impacts during construction. The design of the public domain surrounding Parramatta metro station would be addressed in future stages of the project.

Heritage NSW provided the following comments:

- a smaller construction zone should be considered within the State Heritage Register curtilage of the White Bay Power Station
- reducing the height of acoustic sheds should be considered to the east of the White Bay Power Station and their placement positioned to minimise visual impacts to the White Bay Power Station
- concern about vibration impacts on the Roxy Theatre and the White Bay Power Station
- concern that the EIS is not based on adequate site-specific research consistent with an historical archaeological assessment

- there is potential that archaeological evidence of State and local heritage significance would be impacted at the Parramatta metro station
- there is potential that locally significant archaeology would be impacted at The Bays metro station.

Heritage NSW also commented on the potential impacts of the over station developments on state listed heritage items, such as the Roxy Theatre and the White Bay Power Station. Over station development is not being considered as a part of this application and would be subject to future planning assessment.

Sydney Water raised concerns about the potential impacts on the Beatie Street Stormwater Channel at The Bays metro station and recommended that monitoring (including vibration monitoring) should be considered to prevent adverse effects.

City of Canada Bay Council made the following comments:

- cosmetic or superficial damage, particularly to St Alban's Church in Five Dock
- owners of heritage items should be made aware of and encouraged to have a condition survey undertaken
- protect street trees at North Strathfield metro station
- undertake archival recording of the Pine Inn Hotel.

Inner West Council requested that Sydney Metro note the historical significance of The Bays area, including the structures and previous uses.

SOPA requested that Sydney Metro engage a suitably qualified person to prepare a Pre-Construction Dilapidation Report including all buildings and significant fabric within the Abattoir Heritage Precinct, infrastructure and roads within the 'zone of influence'.

National Trust of Australia (NSW) requested assurance that there would be no adverse impacts on Old Government House and the historic landscape of Parramatta Park.

Consideration

Structural damage to heritage items is unlikely and conservative vibration damage screening levels have been adopted to minimise cosmetic damage

Vibration and settlement impacts may be realised due to tunnel boring along the alignment and during excavation at metro station sites. Sydney Metro has committed to:

- adopting a conservative vibration damage screening level of 7.5 millimetres per second peak particle velocity (ppv) for heritage items
- complete condition surveys of potentially affected buildings and structures near to the tunnel and excavations before the commencement of excavation, where appropriate
- where heritage items are found to be structurally unsound, a more conservative cosmetic damage screening level of 2.5 millimetres per second peak particle velocity would be applied.

Several stakeholders raised concerns about potential cosmetic and structural impacts from tunnelling and excavation on the Roxy Theatre, White Bay Power Station, and the State Abattoirs (at Sydney Olympic Park). Conditions requiring vibration testing to be conducted during vibration generating activities that have the potential to impact on heritage items have been recommended. This would identify minimum working distances to prevent cosmetic damage. In the event that the vibration testing and attended monitoring shows that the preferred values for vibration are likely to be exceeded, the Proponent must review the construction methodology. Preliminary investigations included in the EIS identify that vibration and settlement impacts on heritage items would likely be superficial at worst, and the recommended conditions would minimise superficial damage. Structural damage to heritage items is unlikely.

Several public submissions raised concerns about the potential impact of tunnelling on the SHR listed Callan Park Conservation Area. Sydney Metro responded that during tunnelling, it is anticipated that ground-borne vibration associated with tunnel boring machine use would be much lower than the adopted 7.5 millimetres per second peak particle velocity cosmetic damage screening criterion. Due to the depth of the tunnelling, Stage 1 would have no direct impacts from vibration on Callan Park. No Stage 1 surface work would occur within Callan Park.

The Department is confident that vibration or settlement can be managed, as has been demonstrated on other projects such as Sydney Metro work at Martin Place.

Impacts to the Roxy Theatre are minor and visual impacts would be temporary

The Roxy Theatre is located directly adjacent the Parramatta metro station construction site, is State heritage listed and of high cultural significance to both Parramatta and New South Wales. It is listed as rare on the SHR and is the best surviving example in Australia of the adaptation of this style of architecture to a large public building, making the most consistent use of the Spanish Mission style throughout. As noted, it is expected to experience vibration levels with the potential to cause cosmetic damage.

Station excavation and building demolition would have a temporary impact on the item's views and vistas. Stage 1 would demolish most structures within the block bound by George Street, Church Street, Macquarie Street and Smith Street. This includes buildings directly to the west and south of Roxy Theatre, which would change the wider context of the historic theatre. This context has been previously altered by modern development within and surrounding the construction site, and the adjacent buildings are not considered to represent a significant visual element in the surrounding setting of Roxy Theatre. The Department is satisfied that the demolition of the neighbouring buildings would only have a minor impact on the heritage values of the Roxy Theatre and provide an opportunity to replace the existing setting with something more sympathetic. **Figure 14** shows the Roxy Theatre's location in relation to the construction site.

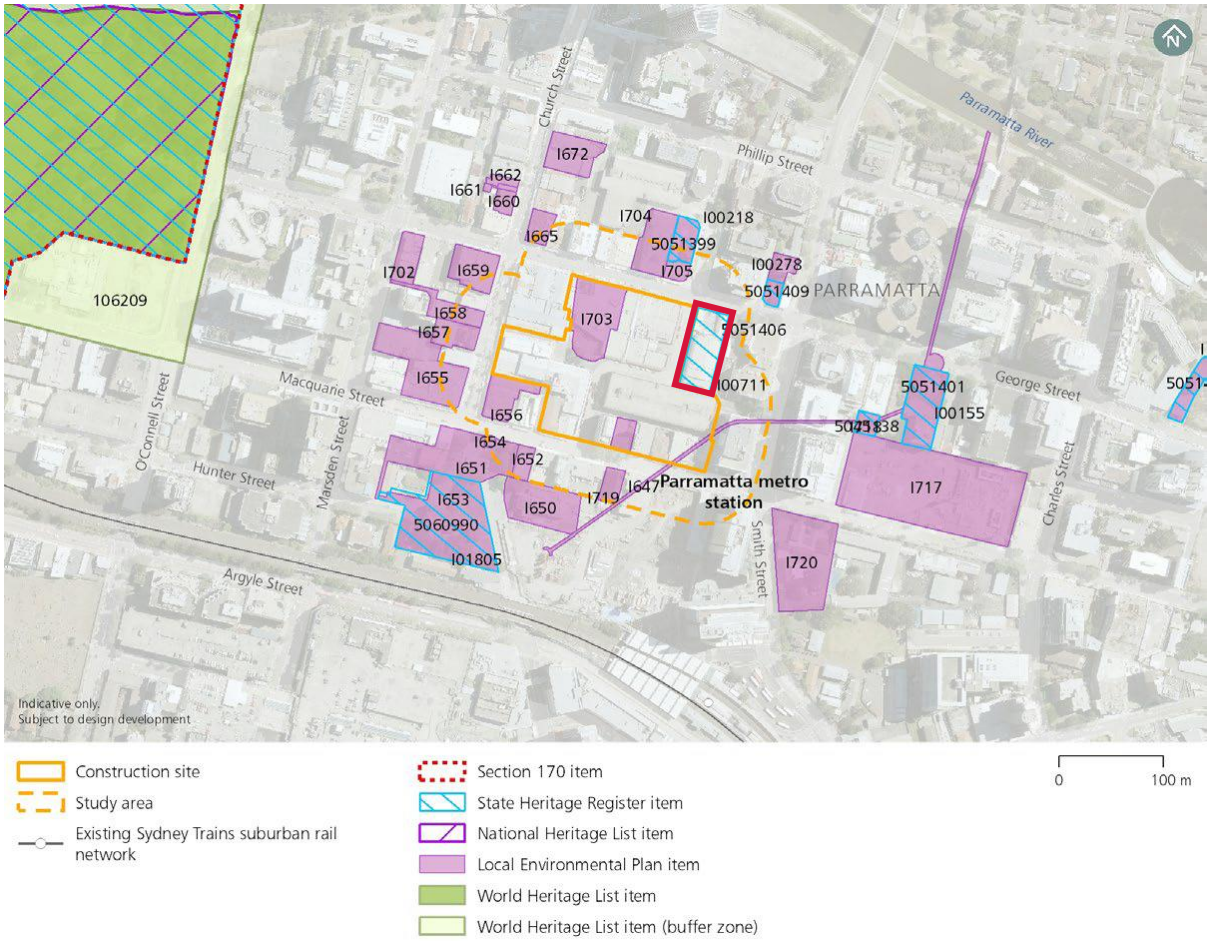

Figure 14 | The Parramatta metro station construction site. The Roxy is located at the north-eastern corner of the site identified as item 00711 and is outlined in red (Source: EIS)

No significant structures within the White Bay Power Station state heritage curtilage to be demolished

Stage 1 work at The Bays would encroach on about 0.7 ha of the White Bay Power Station heritage curtilage and involve demolition of all structures in this zone. This area largely comprises vacant land with no significant structures (hardstand and some landscaping). As the work is not expected to demolish any significant structures, the Department is satisfied with the proposed approach. A condition has been recommended that prohibits the demolition or modification of structures except as identified in the EIS and Amendment Report.

Moderate visual impacts are also expected at the White Bay Power Station, although the orientation of the metro station has been planned to retain heritage significant view lines to and from the White Bay Power Station. External spaces have identified spatial significance for their contribution to the scale and industrial quality of the item and its built components, and excavation and redevelopment of this land would have a visual impact. The visual impacts have been identified as being moderate as they would be permanent and would result in visual changes within the heritage curtilage.

Stage 1 work does not include station fitout and over-station development construction. This would be the subject of a future assessment process. A condition has been recommended requiring that Stage 1 be constructed in a manner that minimises visual impacts of construction sites, including avoiding impacts to identified significant view lines in respect of The Bays metro station construction site, and the orientation, size and height of the acoustic shed.

Amendment to construction methodology would reduce the need for surface work and impacts on the State Abattoirs Heritage Precinct

Sydney Olympic Park is the site of the former State Abattoirs and includes the state listed former abattoir buildings. The heritage items include a collection of five Federation style buildings set in a period landscaped gardens and trees.

The revised proposal assessed in the amendment report has changed the construction methodology for the northern pedestrian entry from cut-and-cover to a mined tunnel with a cut-and-cover shaft. The proposed pedestrian northern entry would be located within the curtilage of the State Abattoirs. The section of the shaft that would remain cut-and-cover while within the curtilage is limited to an area of road and footpath associated with the heritage item. The mined construction technique would not result in any surface work and no trees or vegetation would be removed. All significant garden elements (including mature plantings and palm grove, garden beds, kerbing and landscape elements) would be retained. Some temporary impacts during construction include the gardens no longer being viewable from the public domain. The Department considers this is acceptable as a temporary impact.

The Department is satisfied that any potential impacts on the State Abattoirs Heritage Precinct can be managed through the recommended conditions of approval.

Impacts of services facility near Callan Park are expected to be negligible and would be subject to assessment in future stages

Concerns were raised about locating a service facility in Callan Park. A services facility would be required between Five Dock and The Bays to provide fresh air and allow for access to the tunnels. The location of the services facility is currently being investigated and is not being assessed at this stage. Notwithstanding, the location and design criteria outlined in Appendix H of the EIS are considered to be appropriate to determine a suitable future location for the facility. The facility would be subject to a future assessment and approval process once the location has been determined.

Potential archaeology at metro station sites would be managed through a comprehensive design and excavation methodology

There is the potential for archaeological remains to be uncovered across the project corridor, with a particular focus at Parramatta and The Bays. Tunnel sections between metro stations and service facilities would generally be too deep to affect archaeological deposits, (with the exception of the tunnel dive and the service facility shaft at the Clyde stabling and maintenance facility), and therefore no detailed archaeological heritage assessment of these tunnelled sections has been included in the EIS. The Department considers this to be satisfactory because, due to tunnelling depth, it is unlikely that the TBMs would have an impact on archaeological deposits between the metro stations.

Both Heritage NSW and the National Trust raised concerns about the assessment detail. A recommended condition is included requiring a revised Archaeological Research Design and Excavation Methodology be prepared which includes:

- site specific research for the Parramatta and The Bays metro station construction sites
- comparative analysis from other archaeological investigations in Parramatta
- a reconsideration of archaeological methods to manage the sites based on this additional assessment.

A final Excavation Report must be prepared, following completion of archaeological excavation programs, that includes further detailed and site-specific historical research to enhance the final reporting and results of archaeological excavations, including responses to research questions. The report must include details of any significant artefacts recovered (salvaged), where they are located, and details of their ongoing conservation. The final Excavation Report must identify significant results and artefacts which may be re-used in heritage interpretation plans.

The Parramatta Convict Drain is unlikely to be impacted and is required to be located before work being undertaken with the objective of it being protected in-situ

The Convict Drain runs from Parramatta Square to the Parramatta River partially across the eastern edge of the metro station site and is incredibly rare, the oldest of its type in NSW. The Parramatta metro station construction site marginally encroaches on a portion of the curtilage of the convict drain beneath Macquarie Lane. The exact location and fabric condition of the portion of the drain is unknown. Previous archaeological studies have identified the drain at a variable depth in different locations in Parramatta.

It is possible that minor impact to the heritage item could occur due to vibration or accidental damage during construction, which could potentially result in localised physical impact, although this would be minor in nature due to the relatively small section of drain that could potentially be impacted.

Heritage NSW has requested that the drain remain undamaged and in situ. The Department has recommended a condition requiring that the drain be located before excavation commences at the Parramatta metro station site. All options available to retain the Parramatta Convict Drain in situ must be considered. If retention of any part of the Parramatta Convict Drain located in situ is not feasible, the Proponent must satisfactorily demonstrate to the Planning Secretary why its removal is unavoidable and archival recording is to be undertaken.

Heritage interpretation has been considered at a concept level

City of Parramatta Council requested that more robust heritage interpretation principles be considered. The Department has recommended that a Heritage Interpretation Strategy (HIS) be prepared in consultation with Heritage NSW, which outlines how key Aboriginal and non-Aboriginal heritage values and stories of heritage items would be interpreted in the project design, including metro station and precinct urban design. The Department has recommended that the HIS be prepared at a concept level and has included the HIS in the concept conditions. The recommended conditions outline what the HIS must include in addition to NSW Heritage guidelines.

6.5 Property, land use, social and economic considerations

The concept proposal would be a transformative project which enhances transport connections between communities and precincts once operational. The public transport network expansion and enhanced reliability across the rail network would provide significant benefits to local and regional communities. It would support the continued growth and development of Greater Sydney and outweigh any residual negative impacts of its construction and operation.

Stage 1 would have social and economic impacts that cannot be entirely mitigated, and property acquisition would be required. However, acquisition of property has been minimised by locating the

majority of the project underground. Acquisition would be undertaken in accordance with relevant land acquisition policy and with support services for affected parties.

The proposed Community Benefits Plan(s), Small Business Owners Engagement Plan(s) and environmental management measures would effectively mitigate amenity and accessibility impacts to businesses and the community, while ensuring access to public transport is maintained or improved through a variety of transport solutions.

The Department does recognise there would be cumulative impacts associated with concurrent or consecutive construction, especially around Westmead, Parramatta, Sydney Olympic Park and The Bays, which have the potential to exacerbate social and economic impacts. Although the social and economic impacts cannot be eliminated or offset entirely, recommended conditions of approval in conjunction with environmental mitigation measures and commitments, would manage residual impact to acceptable levels.

Issue

The area comprises a range of land uses including residential, industrial, commercial and private recreation. The concept is expected to cause a variety of social and economic impacts associated with traffic, transport and access, property acquisition, access to public spaces and community infrastructure, retail and business, employment, air quality, and noise and vibration. With regards to Stage 1 specifically, a summary of key positive and negative social and economic impacts is presented in

Submissions

Community and interest groups

Community submissions raised a number of concerns, mainly relating to:

- up zoning and redevelopment around metro station sites, particularly Westmead, North Strathfield and Burwood North
- concerns regarding property damage, compensation or rectification of damage
- loss of land value with sub-stratum land acquisition for tunnelling and reduced rental property income during construction

Table 17 | Social and economic impacts during Stage 1

Issue	Construction Impact
Traffic, transport and access	• temporary road closures and redirections around construction sites affecting road users, businesses, residents, loading zones and customers • temporary car parking loss affecting businesses, residents and road users • further details provided in **Section 6.1**.

Issue	Construction Impact
Property acquisition	• full acquisition of 154 properties (including 34 residential, 98 commercial and industrial) and partial acquisition of one property • transfer or termination of leases.
Access to public spaces and community infrastructure	• increased safety risk to pedestrians using community facilities, schools and public spaces from construction vehicle movements • reduced access to public spaces and community facilities • disrupted access to Westmead and North Strathfield train stations and relocation of bus stops • restrictions to pedestrian and cyclist access around surface work.
Air quality	• reduced air quality amenity from construction near residences, commercial and industrial properties.
Noise and vibration	• increased noise and vibration from construction near residences, commercial and industrial properties • further details provided in **Section 6.2**.
Retail and business	• changes to business access, deliveries and servicing as a result of road and access reconfigurations • loss of on-street parking in commercial and mixed-use areas • loss of overall amenity near construction sites may deter potential customers • business near construction sites would benefit from project workforce custom.
Employment	• direct and indirect employment opportunities on the project • indirect gains and losses in jobs as a result of the above environmental impacts.

Submissions

Community and interest groups

Community submissions raised a number of concerns, mainly relating to:

- up zoning and redevelopment around metro station sites, particularly Westmead, North Strathfield and Burwood North
- concerns regarding property damage, compensation or rectification of damage
- loss of land value with sub-stratum land acquisition for tunnelling and reduced rental property income during construction
- further assessment of impacts needed on local businesses during construction
- closure of Sydney Speedway, and recreational land earmarked for acquisition should be offset
- construction impacts on the community mentally, physically and financially.

Councils and government agencies

Sydney Water recommended close consultation throughout detailed design and construction regarding its property and access to it.

Crown Lands acknowledged that Crown Land at Clyde would be compulsorily acquired in accordance with NSW legislation.

SOPA recommended conditions relating to property dilapidation reporting and occupation and repair of its public domain.

Burwood Council raised concern with loss of street parking for businesses and the community.

City of Canada Bay Council advised of general concerns regarding operation of local businesses and social impacts.

City of Parramatta Council expressed its support for the proposal but raised concerns regarding social impacts, offsetting loss of recreation space in Clyde, property acquisition and business impacts.

Consideration

Acquisition of property has been minimised by locating the majority of the project underground; and acquisition would be undertaken in accordance with the relevant land acquisition policy and with support services for affected parties

Acquisition of land (on and below ground) would be required at Stage 1 to accommodate the station precincts and ancillary facilities between Westmead and The Bays. Stage 1 would require the full acquisition of 154 properties (including 34 residential and 98 commercial and industrial), partial acquisition of one property, and the transfer or termination of leases in buildings subject to acquisition. The process to acquire the necessary properties is ongoing. All property acquisitions would be managed in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991*. It would also be necessary to acquire stratum for the tunnels below properties under the *Transport Administration Act 1988*. Agreements would be made with relevant Government departments for the permanent or temporary use of Government-owned land.

Land acquisition is an unavoidable outcome of large linear transport projects in urban environments, but this has been greatly reduced with most of the project below ground. Regardless, it is acknowledged that anxiety, stress and other social wellbeing effects may arise from this.

The Proponent has committed to acquiring properties via negotiated purchase, including compensation for legal costs, valuations, relocation and removal expenses and mortgage costs. Assistance would also be provided to businesses in finding new premises. A number of management measures would also be implemented to facilitate this process such as dedicated Sydney Metro place managers and project-specific communication contact tools, including a 24-hour community information line, culturally and linguistically diverse translation services and community email address.

The Department recognises property acquisition on just terms is strictly governed by NSW legislation, and supports the supplementary measures committed to by the Proponent to ensure that the acquisition process does not cause additional anxiety and stress on affected property owners. The Department is satisfied that the processes in place would adequately mitigate social and economic impacts resulting from property acquisitions.

Land use changes as a result of the project can be mitigated with replacement facilities, enhanced open space and improved active transport connectivity

Accompanying the acquisition of private and public land, the concept proposal would result in the change of use of that land from residential, commercial, mixed use, educational, industrial and private recreation to transport and infrastructure uses. The change of land use would be most significant during Stage 1 when it would be used as construction sites for the purposes of tunnelling and building the metro stations and rail ancillary facilities.

As part of Stage 1, the Proponent proposes to acquire the heliport facility operated by Sydney Helicopters in Clyde. This private transport company provides a variety of commercial helicopter services including tourist flights, assistance to emergency services (such as NSW Rural Fire Service) and aerial pest control, from this location. Sydney Helicopters also operates services from the Central Coast and Mascot. In addition, other helicopter operators in the Sydney area are available to provide equivalent services. The Department also notes that Sydney Helicopters is seeking development consent for a replacement facility at Penrith Lakes.

The Department recognises the acquisition of the Sydney Speedway at Clyde is required. The Proponent has facilitated the relocation of Sydney Speedway to Eastern Creek. The new speedway facility was subject to a separate SSI application determined on 23 December 2020, which is currently under construction. This would ensure that speedway events can continue within the region in a new world class facility.

The land (owned and managed by Crown Lands) on which the speedway currently operates is zoned for private recreation and its change of use to transport and infrastructure would result in the loss of an opportunity to use this land in the future for other recreational purposes. The Department considers that the local community should not be disadvantaged by this loss and that this should be offset in some way.

The Rosehill-Camellia area is expected to undergo significant urban renewal in the future which may bring new and mixed uses into the area. Council and community voiced concerns regarding the need to preserve open and recreational space for future communities in the area. This opportunity loss should be recognised and addressed in the locality. Therefore, the Department has recommended that if there is any residual land following the development of the Clyde stabling and maintenance facility, the ability to use this for public recreational use should be considered. If this is not possible or appropriate, the Department has recommended an alternate and commensurate opportunity that achieves the objective of providing recreational uses and public space. Further, the Department is recommending that the Proponent provide active transport corridors immediately around the site adjoining James Ruse Drive that connects to existing and future links and open spaces and renaturalised portions of Duck Creek and A'Becketts Creek.

Submissions raised concern regarding subsequent rezoning and development, particularly around stations. While these issues are outside the scope of this assessment, the Department notes any such changes would be subject to relevant strategic planning and development assessment.

Amenity impacts caused by the acoustic shed to residential apartments adjoining the Five Dock metro station eastern construction site must be addressed

Significant potential for visual and overshadowing impact of the proposed eastern acoustic shed on residential apartments on the upper floors of the mixed used development at 110 Great North Road, Five Dock remains a concern.

The eastern Five Dock metro station construction site is located immediately to the east of 110 Great North Road and an acoustic shed of up to 15 metres high is proposed without any boundary set back. Some apartments have private open space and living rooms facing the proposed acoustic shed. To protect the amenity of the occupants, recommended conditions include requiring the acoustic shed be designed and constructed to minimise visual and overshadowing impacts, and a report prepared to identify the potential visual amenity, solar access and overshadowing impact of the acoustic shed on these residential apartments with consideration given to the relevant City of Canada Bay development controls. Appropriate mitigation measures must be identified, which may include temporary accommodation or installation of heliostat treatments (a device that includes a mirror which turns so as to keep reflecting sunlight toward a predetermined target) facing impacted windows, in consultation with apartment owners, if significant impacts to overshadowing and solar access are identified.

During construction, amenity impacts would be appropriately managed through environmental management plans and monitoring programs

The construction environmental management plans, ancillary sub-plans, construction transport management plans and the construction monitoring programs would provide adequate processes and safeguards to effectively manage construction impacts on the amenity and accessibility of businesses, social infrastructure (such as schools, churches and hospitals), community facilities and public spaces in proximity to construction.

Further details on the construction impacts associated with traffic and transport, noise and vibration, and air quality are addressed in the relevant sections of this assessment report.

Construction fatigue would be managed through coordination with other projects and recommended conditions for construction planning and proactive community engagement

A number of State significant infrastructure projects are in various phases of construction in the project corridor, including Parramatta Light Rail Stage 1, WestConnex M4-M5 Link and Western Harbour Tunnel. The Department acknowledges that residents near construction sites and haulage routes, in Parramatta and near The Bays in particular, may experience construction fatigue due to cumulative and consecutive construction activity.

The Proponent is committed to coordinate and consult with stakeholders to identify opportunities to manage potential cumulative impacts associated with projects under construction at the same time. The Department has also recommended conditions to appropriately manage cumulative impacts associated with construction fatigue, including coordination of utility management works, active community engagement, provision of periods of respite, and appointment of an Acoustics Advisor.

Access to social infrastructure, community facilities and open space would be pro-actively managed through consultation and construction planning and supported with the preparation and application of Community Benefit Plans

The concept proposal provides enhanced connectivity, including additional active transport infrastructure, and access to services and public spaces along the route, benefiting communities, businesses and residents through improved public transport. Despite the increased connectivity once the project is operational, the Department acknowledges the community and council concerns regarding amenity impacts and accessibility of community facilities and social infrastructure (such as schools and hospitals) during construction.

There are social infrastructure, community facilities and public spaces located near the Stage 1 construction footprint which may experience amenity impacts (in particular impacts associated with noise). Connectivity to and around some of these infrastructure, facilities and spaces would also be altered. Certain community facilities would be acquired, including the commercial building which the Parramatta Art Studio is currently sub-letting from council and is planned for demolition. Relevant parties would be consulted about timing and duration of construction and management of impacts to minimise potential disruptions.

As schools are located near construction sites, near the proposed tunnel alignment and along spoil haulage routes, NSW Department of Education would be engaged with respect to appropriate mitigation measures related to impacts to them. Emergency Services and NSW Health would be consulted to ensure emergency vehicle access is maintained to Westmead Hospital during construction. Through active stakeholder consultation, potential construction impacts to the running of festivals and events in Parramatta, Five Dock and Sydney Olympic Park, would be minimised as well.

To counteract amenity impacts to community facilities and groups and make a positive contribution to potentially affected communities along the project corridor, Community Benefit Plans would be prepared to guide development of community benefit initiatives. The Community Benefit Plans would respond to the local communities' priorities and needs and enhance community character, culture and the local surroundings. An initiative could comprise the provision of financial or skills assistance to local charities and non-profit organisations, to enhance their resilience when construction may cause some disruption of their services.

Business impacts would be effectively managed and social impacts related to the access of displaced businesses would be minimal

The concept proposal would provide benefits to local and regional business, including additional access and enhanced connections between business and employment areas, allowing faster travel for workers between home and employment and customers to goods and services. Despite this, it is recognised that access to some goods and services may be lost or disrupted during Stage 1 construction.

The loss of most businesses, such as retail shops, warehouses, restaurants and professional offices, on land to be acquired is unlikely to have a significant impact on the communities' access to similar services within proximity of construction. In this respect, the Proponent advises numerous businesses exist which offer the same or similar services in these localities, and businesses that are required to relocate would have support to do so.

To address concerns that construction could indirectly affect businesses trading, measures to maintain access, and loading and parking in the vicinity of businesses and affected properties are recommended. Where disruption cannot be avoided, alternative access, loading and parking arrangements must be developed in consultation with affected businesses and implemented before the disruption.

The Proponent has also committed to developing a Small Business Owners Engagement Plan to support small businesses near construction sites whose businesses may be impacted by construction. Support activities set out in this plan may include activation and business engagement events, assistance with marketing and promotion, and business education and mentoring. The Department supports this.

Impacts to property values would likely be temporary and reversed with enhanced public transport connectivity

The issue in public submissions regarding the effect on property values during construction (including tunnelling) is acknowledged. Ongoing project refinement, implementation of committed mitigation measures and recommended conditions, construction related residual impacts would be minimised, but cannot be eliminated. Further, a positive effect on land value is anticipated in the longer term in locations that have improved public transport access once the project is operational. Evidence has shown that the introduction of Sydney Metro services on the North West Line has contributed to property value growth in the suburbs surrounding that rail corridor.

6.6 Groundwater and settlement

Groundwater across the construction corridor is generally shallow, between one and five metres below ground level. Tunnels would be between 20 and 50 metres below ground level and tanked. The depth to tunnel, intervening (low permeability) geology and tunnel lining would minimise the likelihood of groundwater inflow to the tunnel and ground movement.

Ground movement is expected to be minimal as most project elements are designed as tanked structures reducing groundwater drawdown and subsequent ground movement. The proposal must meet established ground movement criteria and would be subject to independent property review. Groundwater would be treated before reuse or discharge.

Issue

Station excavation sites are likely to intercept groundwater at these depths, acting like sinks. Generally, sites low in the floodplain would be tanked preventing inflows (Clyde and Parramatta), while others are located higher in the landscape would not be tanked. Groundwater quality sampling shows that the 95 per cent trigger levels for freshwater aquatic systems are exceeded for ammonia and heavy metals. Lead levels are also high. It is likely that some inflows to excavations would be contaminated. A range of industry-standard measures would be employed to monitor ground movements, building integrity and inflow water quality such that adaptive management can be applied if required.

Ground movement is expected to be minimal as the majority of project elements are designed as tanked structures reducing groundwater drawdown

Ground movement may occur from either the release or redistribution of stress in rock formation or from ground consolidation following the drawdown of groundwater. Ground movement caused by stress redistribution in rock occurs shortly after excavation, while consolidation settlement from groundwater drawdown can occur over a longer period. The tunnels, and majority of the project elements, are designed as tanked structures, and long-term settlement effects associated with groundwater drawdown are not anticipated at most locations. For Stage 1, it is expected that any potential settlement associated with groundwater drawdown would be minimal as most underground excavation would be within rock that has low permeability. However, buildings may be impacted in areas that would require greater excavation such as the station excavation.

Groundwater drawdown and inflow of groundwater would be discharged after being treated to meet water quality standards

Groundwater flows in Sydney are generally high in iron, may contain manganese and other contaminants, relatively high salinity and slightly acidic pH.

During Stage 1 construction, tunnel water would need to be treated to comply with applicable guidelines and spill control, and water quality monitoring implemented to manage impacts on receiving water, though potential impacts are expected to be negligible. Where groundwater is not treated it has the potential to pollute natural waterways. Groundwater collected would be transferred to temporary water treatment plants for treatment before being discharged to the stormwater system.

Submissions

Community and special interest groups

Key issues raised in public submissions included:

- settlement risk and damage to property
- property condition surveys related to groundwater drawdown
- environmental impacts of groundwater drawdown
- tree watering to offset effects of drawdown on groundwater dependent species.

Councils and government agencies

EPA sought further information regarding groundwater monitoring, with specific reference to groundwater sampling and establishing baseline monitoring of hydrological attributes.

Both the EPA and DPIE Water recommended groundwater monitoring be undertaken during the project's construction, including mitigation measures where monitoring results indicated adverse impacts or levels above relevant criteria.

DPIE Water requested preparation of a revised hydrogeological model, assessment of impacts to groundwater systems and cumulative effects of other major projects during detailed design and construction planning.

A revised estimate of groundwater take for the full length of the tunnels and each and all station excavation to be licensed under the *Water Management Act 2000* was sought, including and the groundwater take.

City of Parramatta Council noted that clear arrangement should be made for permanent pumping of tunnels' seepage water and treatment before discharge.

City of Canada Bay Council requested further consideration of Council's recycled water system and base flow in St Luke's Canal with options to mitigate any change. Options for water reuse should also be discussed with Council.

Consideration

The proposal must meet established ground movement criteria and would be subject to independent property review

The Proponent has conducted a screening assessment-based criterion outlined by the Construction Industry Research and Information Association (1996), this criterion specifies maximum settlement of the building and maximum slope of the ground below and is rated between 1-4. Buildings and structures predominately fall within a risk level of 1 and would have negligible impact and the possibility of superficial damage unlikely.

A small number of buildings and structures were assessed as having a risk level of 2 or greater, which indicates a 'slight' potential for superficial damage, however unlikely to have structural significance. Settlement of less than 10 mm is expected across most of the alignment, within the range where superficial damage to buildings is unlikely. The Proponent has committed to measures to determine the potential for superficial or greater damage, including building strain and structural assessments.

The Department has recommended the development of a geotechnical model to refine settlement predictions and develop adaptive management measures to be applied. This is a similar approach adopted for the Sydney Metro (Chatswood to Sydenham) project.

While the Proponent has stated that an Independent Property Impact Assessment Panel would be established, the Department has recommended a condition detailing when the Panel must be established, what experts it must comprise, its responsibilities regarding the independent review of pre- and post-construction condition survey reports, and resolution of potential property damage disputes.

Groundwater would be treated before reuse or discharge

Activities and materials used during tunnel construction could impact groundwater quality. This includes drilling / cutting fluids required for TBMs and particulate material from tunnelling and cement concrete pollution from the application of shotcrete, grouting or the in-situ casting of concrete. Contaminant risk is considered to be low.

The *Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2018* (ANZG 2018) 90 per cent species protection level would be adopted for discharge criteria, except toxicants known to bioaccumulate which would be treated to meet the 95 percent species protection level.

Further, the project is unlikely to significantly impact surrounding groundwater users and would comply with applicable rules under the Water Sharing Plan for the Greater Metropolitan Groundwater Sources 2011. The Proponent would update its groundwater model during detailed design and monitor impacts in areas where the modelling suggests impacts greater than the target levels.

6.7 Other issues

The Proponent assessed the potential impacts of the project in relation to biodiversity and trees, place and design, air quality, fire hazards and risk, spoil management, sustainability and climate change, and waste management. The Department considers that the Proponent has adequately assessed these issues and that they can generally be managed through the Proponent's environmental management measures and recommended conditions of approval. **Table 18** summarises the Department's consideration and recommended conditions for these issues.

Table 18 | Department's consideration of other issues

Issue	Findings	Recommendations
Air quality	As a concept, the project would likely contribute to air quality improvement with an expected modal shift from road to rail. Fresh air would be drawn in, circulated through the tunnels and discharged from various facilities along the route and at stations. Negligible amounts of particulate matter maybe generated by brake pad wear and friction with rails. This would be vented with low concentrations of carbon dioxide, volatile organic compounds and other particulates generated during maintenance. Air quality impact assessments would be carried out as part of future applications. During construction, particulate matter would be mostly generated by demolition and excavation work, materials handling and material storage, along with the operation of on-site machinery. The tunnel boring machine is powered by electricity, minimising tunnel exhaust emissions. Air quality impacts would be managed through maintenance of vehicles and equipment and monitoring unsurfaced haul routes, stockpiles, and all vehicles carrying loose or dusty material to minimise dust generation. With the implementation of standard dust control measures and vehicle maintenance, the project would have a minor impact on local air quality during construction, and the effects on human health across the community would be minor and acceptable.	The Department has recommended a condition requiring all reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during construction.
Biodiversity and trees	Minimal disturbance of native vegetation is required for Stage 1 due to most of the project being located underground. However, there would be impacts to biodiversity where surface sites are cleared to enable station box and aboveground development for future stages. Vegetation is of poor to moderate quality and / or provides	The Department has recommended offset requirements consistent with the *BC Act 2016.* A condition is recommended to require remaining open channels at Clyde be rehabilitated and renaturalised, and riparian

Issue	Findings	Recommendations
	limited habitat for threatened species at these sites across the project corridor.	zones revegetated with Mangrove Forests species before operation.
	Despite limited biodiversity impacts some impacts would occur, concentrated at the Westmead metro station construction site and the Clyde stabling and maintenance facility construction site.	In relation to the Clyde facility, the Department has recommended that suitable habitat be inspected before vegetation clearing or demolition to locate and clear any roosting sites. Bat boxes or other suitable roosting options would need to be installed at the site if any roosting locations require removal. This approach is supported by DPIE Biodiversity Conservation Division.
	Approximately 0.18 hectares of native vegetation in poor condition would be removed during Stage 1. This includes 0.15 hectares of Mangrove Forests (along the banks of A'Becketts Creek and Duck Creek) at the Clyde stabling and maintenance facility site, which meets the definition of a threatened ecological community requiring offsetting under the *Biodiversity Conservation Act 2016* (BC Act).	Conditions to retain as many mature trees and as much tree canopy as practicable, and a net increase in the number of mature trees at a ratio of 2:1, have been recommended.
	There is high potential for terrestrial groundwater dependent ecosystems to be present around construction sites. However, these vegetation types are opportunistic and do not rely solely on groundwater to survive. Additional investigations would be conducted to confirm presence, potential impacts due to groundwater drawdown, and any required mitigation through design. The Department supports this approach.	
	Vegetation along Duck Creek and A'Becketts Creek at Clyde is highly disturbed. Redevelopment provides an opportunity for future revegetation and renaturalisation of the creeks.	
	Southern myotis, a fauna species listed as vulnerable under the *BC Act*, is assumed to be present at the Clyde stabling and maintenance facility construction site, based on the presence of suitable habitat. Proposed vegetation clearing and demolition of existing structures would impact on this habitat. A threatened (species credit) species offset is required. In addition, a condition is recommended requiring inspections and relocation of found fauna before any vegetation clearance or demolition.	
	Grey-headed Flying-fox, Swift Parrot, Little Lorikeet, Large Bent-winged Bat, Eastern Coastal Free-tailed Bat and Little Bent-winged Bat may use mangrove vegetation and / or street trees within the construction footprint for foraging; however, it is unlikely that	

Issue	Findings	Recommendations
	these would be affected as the construction sites are not considered important habitat. Loss of potential foraging as well as roosting habitat for the Eastern Coast Free-tailed Bat within the highly disturbed environment is likely to have minimal impact on these threatened fauna species given their higher mobility and the unnatural structure of the vegetation present. Any significant reliance on the fragmented and highly disturbed vegetation for their survival is considered unlikely. Stage 1 would require the removal of over 600 trees as part of site establishment across all construction sites. This includes approximately 100 at Westmead, approximately 300 at Clyde and approximately 100 at Sydney Olympic Park. A worst-case scenario has been assumed in relation to tree removal to accommodate significant transport infrastructure and future associated placemaking around the metro stations.	
Contamination and soils	Areas of moderate contamination risk were identified within construction sites or within 500 metres of sites and tunnel alignment. These include sites that are listed on the NSW EPA Contaminated Sites Register and the NSW EPA Protection of the Environment Operations Register. During construction there may be instances of soil, groundwater, vapour, odour and gas contamination, with high contamination risk identified at Silverwater and Sydney Olympic Park. Additional data reviews would be undertaken to confirm the potential contamination risk at sites of a moderate to very high risk of contamination. Where these reviews are not conclusive, detailed site investigations would be undertaken. If the risk of contamination at site is confirmed to be of a moderate to very high risk, a Remediation Action Plan (RAP) would be developed and a site auditor would be engaged to verify remediation. An EPA accredited site auditor would be engaged where contamination risk is considered highly complex (including significant groundwater or vapour contamination, or contamination requiring ongoing management). A site auditor would be required to review and approve the RAP	The Department has recommended conditions for contamination management which require Detailed Site Investigations at moderate to high risk contaminated sites, a Remedial Action Plan (RAP) and Site Audit Statements to confirm before remediation that the land can be made suitable for its proposed use, and that once remediation is completed that the land has been made suitable for its intended use.

Issue	Findings	Recommendations
	and develop a Site Audit Statement and Site Audit Report. The EPA requested that a Site Auditor be engaged throughout construction to ensure soil and groundwater contamination is appropriately managed. Detailed Site Investigations are required, and a Site Audit Statement stating the land is suitable for its intended purpose, must be submitted to the Planning Secretary and relevant Council before the commencement of operation. A variety of soil types are present along the alignment. It is highly likely that high to very high saline soils would be intercepted, and acid sulfate soils may be encountered at the Parramatta, Clyde and The Bays sites. If acid sulfate soils are encountered, they would be managed in accordance with the *Acid Sulfate Soil Manual* (Acid Sulfate Soils Management Advisory Committee, 1998). Testing would be undertaken in high soil salinity areas and, if found, would be managed in accordance with *Book 4 Dryland Salinity: Productive Use of Saline Land and Water* (NSW DECC 2008).	
Hazards and risk	There are potential hazards and risks from the storage, handling and transportation of hazardous and dangerous goods, damage to or disruption of underground utilities and services, potential ground movement, settlement or geotechnical uncertainty during the Stage 1 construction. The identified hazards and risks can be managed by adhering to relevant regulations, policies, standards and legislation, and the implementation of emergency management plans as relevant. Consultation with utility providers would continue during detailed construction design to mitigate the risk of unplanned and unexpected disturbance of utilities.	The Department has recommended a condition for the treatment and management of hazardous material to be outlined within the Construction Environment Management Plan. Management of other general construction hazards would be addressed in the CEMP and relevant sub-plans.
Place and design	While the concept locates most of the project underground, proposed above-ground metro station elements and ancillary infrastructure have place and visual impacts. The application provides a high-level concept design of the project, limited to location and use, with further design refinement to be provided in future applications. Despite this, a roadmap to achieving good place outcomes and	The Department has recommended that the following in relation to the Clyde facility: • incorporating a publicly accessible active transport corridor around the site adjoining James Ruse Drive, connecting to existing and planned future links and open space • prioritising public recreational use for residual land • renaturalisation of parts of Duck Creek and A'Becketts Creek and rehabilitation of the riparian corridor

Issue	Findings	Recommendations
	design excellence is provided, including establishing a design quality framework, design guidelines for project infrastructure and use of a design review panel. Preliminary place and design principles for each surface infrastructure facility site have been developed and indicative plans for station precincts. the Proponent would further refine these principles and precinct plans in its commitment to an iterative design process, including consultation with external stakeholders, would be further refined. Preliminary place and design principles for each site are supported. However, the Department seeks to strengthen these for the Clyde stabling and maintenance facility site, considering its location near Camellia, an area earmarked by Government for urban regeneration, as they do not reflect the place and design potential. Overall, the Department supports the proposed approach to place and design for the concept proposal and notes that precinct planning, urban design and placemaking would be assessed in future applications. Work done by the Proponent to date provides a solid basis for the future design of metro stations and station precincts to ensure design excellence and integration with the public domain and other transport modes. Place-based opportunities and outcomes for Stage 1 are limited (which primarily involves subterranean work, site establishment and early construction on the surface), but not entirely absent. There are measures that can be adopted to address the negative visual amenity and place impacts of construction. Stage 1 construction sites are in highly urbanised environments. Despite the temporary nature of construction, the Department recognises that Stage 1 construction would be prolonged, extending for several years and there would be a range of adverse impacts, with some sites (such as those in Parramatta and Five Dock) set in highly pedestrianised local town centres. Whilst the visual impacts associated with construction cannot be removed entirely, unreasonable negative visual impacts must be effectively managed.	• integration with strategic planning for the precinct in future applications for aboveground precinct work. The Department has recommended construction boundaries be used as opportunities to connect the project with its community for the duration of construction. The Department has recommended a condition requiring construction site frontages exposed to the public in Parramatta and Five Dock, be activated with temporary placemaking initiatives for the benefit of the community, such as commercial “pop up” spaces, information booths and art installations. These initiatives may include, for example, an opportunity to temporarily use retained and protected heritage items within the Parramatta site or the installation of shipping containers as multi-purpose spaces in areas of heavy foot-traffic instead of plain hoardings. The Department has also recommended that the perimeter of construction sites be dynamic and updated as construction progresses, to engage with and enhance the public’s understanding and experience of the project throughout construction.

Issue	Findings	Recommendations
	Hoardings are proposed around each site for public safety and boundary control. The Department supports their use to display local art and project information. Hoardings also provide an opportunity to convey wayfinding information guiding pedestrians around sites. There are opportunities to enhance boundaries using temporary landscaping, vegetative screening and architectural treatments such as awnings.	
Spoil management	Approximately 3.05 million cubic metres (m^3) of spoil is expected to be generated with 1,535,000 m^3 by tunnelling and transported from The Bays and Westmead. Spoil stockpiles would be stored at each construction site and managed to reduce dust and runoff impacts. Spoil generated would be managed for reuse in Stage 1, future stages or other developments. Where spoil is contaminated or contains acid sulfate soils, it would be managed in accordance with the *Contaminated Land Management Act 1997* and the *Waste Classification Guidelines* (EPA 2014). The impacts of spoil haulage and possible spoil barging are considered in **Section 6.1**.	The Department has recommended conditions requiring the Proponent prepare a Spoil Management Plan and to investigate opportunities to maximise spoil haulage by alternate methods.
Sustainability and climate change	A range of immediate measures to effectively manage potential climate change risks are proposed with the Stage 1 scope, including offsetting 25 per cent of greenhouse gas emissions associated with consumption of electricity. The Proponent has committed to an industry best practice level of performance using market performance tools. In addition, the Proponent has considered the impacts of rising water levels as part of climate change. The Proponent has committed to ensuring detailed design of the proposal would be sited outside of anticipated water level increases associated with climate change, allowing the proposal to withstand future climate impacts. These measures are appropriate and are supported to ensure longevity of the proposal to maintain sustainability. The proposal would be designed to withstand impacts for the service life until 2100.	The Department has recommended a condition for the proposal to be designed to withstand flooding and sea level rise associated with climate change to year 2100. The Department has also recommended that the project must achieve a minimum Infrastructure Sustainability Council of Australia Infrastructure Sustainability rating of 75 (Version 1.2) (or equivalent level of performance using a demonstrated equivalent rating tool) or a 5-Star Green Star rating (or equivalent level of performance using a demonstrated equivalent rating tool).

Issue	Findings	Recommendations
Waste management	Waste generated by the project would be managed in accordance with the *Waste Avoidance and Resource Recovery Act 2001* and *Protection of the Environmental Operations Act 1997*. The Department considers that waste generation and management can be adequately managed using standard mitigation measures such as the principles of avoid, reduce, reuse and recycle and the recommended conditions.	The Department has recommended standard conditions for the handling, reuse, disposal and tracking of waste.

7 Evaluation

The Department considers the project is in the public interest and should be approved, subject to conditions.

The Department's assessment has considered all relevant matters and objects of the *Environmental Planning and Assessment Act 1979*, the principles of ecological sustainable development, advice from government agencies and council, and strategic government policies and plans.

The project is consistent with key government policies and strategies including:

- *Future Transport 2056*
- *NSW State Infrastructure Strategy 2018-2038: Building Momentum*
- *Greater Sydney Region Plan: A Metropolis of Three Cities*
- *Eastern City District Plan* (Greater Sydney Commission, 2018)
- *Central City District Plan* (Greater Sydney Commission, 2018)
- *Sydney City Centre Access Strategy 2013* (Transport for NSW).

Key benefits provided by the project include:

- improved travel times, particularly between Greater Parramatta and the Sydney CBD
- expanding the '30-minute cities' of the Central River City and Eastern Harbour City
- increased rail network capacity on the western corridor between Westmead and Sydney CBD
- alleviation of constraints and reducing train and station crowding on the T1 Western Line, T9 Northern Line and T2 Inner West and Leppington Line
- increased accessibility to current and future planned key employment and housing growth centres including Westmead, Parramatta, Sydney Olympic Park and The Bays
- increased public transport network reach and use, linking precincts not serviced by passenger rail to meet forecast demand for passenger rail transport
- the provision of efficient transfers with Sydney Train lines in the suburban rail network, Sydney Metro City & Southwest in the Sydney CBD and the Parramatta Light Rail (Stage 1) at Westmead and Parramatta.

In its assessment, the Department reviewed the Environmental Impact Statement, public submissions, the Submissions Report and Amendment Report, and assessed the key issues arising from the concept and Stage 1 tunnelling, excavation and construction of the Clyde stabling and maintenance facility. This was undertaken with advice provided by the Proponent, public agencies and councils, and in consideration of key strategic government policies and plans.

Key issues associated with the project are:

- traffic and transport
- noise and vibration
- flooding and hydrology
- Aboriginal and non-Aboriginal heritage
- property, land use, social and economic considerations
- groundwater, settlement and water quality.

The Proponent identified a range of environmental mitigation measures which it has committed to applying to the project. Based on its assessment, the Department has recommended conditions of approval to reinforce these commitments and address outstanding or residual impacts.

The Department is satisfied that issues raised in submissions have been appropriately considered and responded to by the Proponent and the Department. Residual impacts can be mitigated, managed or offset through the implementation of the Proponent's commitments and recommended conditions to reinforce these commitments and address outstanding or residual impacts so there is no long term impact.

The project would provide a world class, safe, efficient and reliable metro rail line between Greater Parramatta and Sydney CBD, an effective response to existing and emerging constraints on the existing Sydney Trains rail network and Sydney's current and forecast population and economic growth. For the reasons outlined, it is considered that the project is in the public interest and should be approved subject to conditions.

8 Recommendation

It is recommended that the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report
- **accepts and adopts** all findings and recommendations in this report as the reasons for making the decision to approve the application
- **agrees** with the key reasons for approval listed in the notice of decision
- **grants approval** for the application in respect of SSI 10038, subject to the conditions in the attached approval
- **signs** the attached project approval and recommended conditions of approval (see attachment).

Recommended by:

Lisa Mitchell
Team Leader
Transport Assessments

Recommended by:

Glenn Snow
Director
Transport Assessments

9 Determination

The recommendation is **Adopted** / **Not adopted** by:

The Hon. Rob Stokes MP
Minister for Planning and Public Spaces

Appendices

Appendix A – List of referenced documents

1. *Future Transport 2056* (TfNSW, 2018)
2. *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (Greater Sydney Commission, 2018)
3. *2020 Infrastructure Priority List* (Infrastructure Australia, 2020)
4. *Building Momentum: NSW State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
5. *Eastern City District Plan* (Greater Sydney Commission, 2018)
6. *Central City District Plan* (Greater Sydney Commission, 2018)
7. *Sydney City Centre Access 2018* (TfNSW, 2018)
8. *Sydney Metro West – Westmead to The Bays and Sydney CBD Environmental Impact Statement* dated 15 April 2020 (the EIS)
9. *Sydney Metro West – Westmead to The Bays and Sydney CBD Submissions Report* dated 20 November 2020 (the Submissions Report)
10. *Sydney Metro West – Westmead to The Bays and Sydney CBD Amendment Report* dated 20 November 2020 (the Amendment Report)
11. *Sydney Metro West The Bays Road Relocation Works Review of Environmental Factors* dated April 2020
12. *Sydney Metro West The Bays Road Relocation Works Review of Environmental Factors Determination Report* dated August 2020
13. *Sydney Metro West Eastern Creek Precast Facilities Review of Environmental Factors* dated November 2020
14. *Sydney International Speedway State Significant Infrastructure (SSI 10048) Assessment Report* dated December 2020
15. *Sydney International Speedway State Significant Infrastructure (SSI 10048) Instrument of Approval* dated 23 December 2020

Appendix B – Environmental Impact Statement

https://www.planningportal.nsw.gov.au/major-projects/project/9056

Appendix C – Submissions

https://www.planningportal.nsw.gov.au/major-projects/project/9056

Appendix D – Submissions Report

https://www.planningportal.nsw.gov.au/major-projects/project/9056

Appendix E – Amendment Report

https://www.planningportal.nsw.gov.au/major-projects/project/9056

Appendix F – Community views for Notice of Decision

The key issues raised by the community and considered in the Planning Secretary's Assessment Report and by the decision maker include project design; traffic, transport and access; socio-economic, land use and property; noise and vibration; public spaces and placemaking; air quality; heritage; engagement and consultation; soils, groundwater and flooding; cumulative impacts; project justification and procedure; and biodiversity and trees.

Issue	Consideration
Project design • Location of additional metro stations and connections, particularly around Rydalmere, Camellia, Pyrmont, Wentworth Point, Rosehill, Leichhardt, Silverwater and the location of the Sydney CBD connection • Project route duplicates the Sydney Trains western line and has metro stations in suburbs already serviced by Sydney Trains stations • Provisions should be made to allow for future connections / extensions to University of Sydney, Western Sydney Airport and the Eastern Suburbs • Comments on station access, configuration and integration with other public transport services.	*Assessment* • The project is consistent with strategic land use and transport documents. • This project has been endorsed by the NSW Government and is a key component of strategic infrastructure and planning documents including *Future Transport 2056* and *the Greater Sydney Region Plan - A Metropolis of Three Cities.* • Sydney Metro West would help implement the vision for 30-minute cities as outlined in the Greater Sydney Region Plan, by providing customers an easy connection to key destinations including cities, health and education precincts, diverse employment centres and residential areas. • Sydney Metro has considered additional metro station locations between Westmead and Sydney CBD. The current number of metro stations has been determined as being the ideal number for delivering the best customer outcomes. • Sydney Metro is investigating the location of the new Sydney CBD metro station. The new Sydney CBD location is expected to enable interchange between Metro West, Sydney Metro City & Southwest, Sydney Trains, light rail and the bus network. • Station access, configuration and integration with other public transport services would be considered in depth under future SSI application(s) for the project relating to construction of the metro stations and their surrounds. *Recommended Conditions / Response* • No conditions are needed in relation to this matter.
Traffic, transport and access *Construction* • Pedestrian safety around construction sites, particularly around Great North Road at Five Dock and the primary school at Westmead • Added traffic, particularly heavy vehicles, causing congestion and bus delays • Access to residential and commercial properties • Need for appropriate wayfinding, safe access and disability access around	*Assessment* • There would be traffic impacts during construction, however these impacts can be mitigated through the implementation of the Proponent's committed management measures and recommended conditions of approval. • Most construction sites have direct access to the arterial road network, and although intersection delays would occur, this network is the best equipped to accommodate construction traffic. • A limited number of parking spaces are provided in construction sites. However, most construction sites are near public transport services and construction workers would be encouraged to use these services.

Issue	Consideration
proposed metro station construction sites • Most construction sites would not have enough on-site car parking for the construction workforce resulting in parking on local streets. *Operation* • Importance of appropriate active and public transport connections to future metro stations, including feeder bus and bike infrastructure • More entrances to metro stations required • Impacts on cycleways around Westmead and Clyde.	• Operational concerns raised would be addressed in future applications. *Recommended Conditions / Response* • Measures to limit / avoid use of local roads past schools, aged care facilities and childcare facilities during their peak operation times. • Access to utilities and properties must be maintained, unless otherwise agreed with the relevant utility owner, landowner or occupier. • Construction vehicles (including light vehicles) must not use Robert Street, Rozelle to access The Bays construction site unless in an emergency or in relation to the delivery of the power supply line. • The locations of all heavy vehicles used for spoil haulage must be monitored in real time and the records of monitoring be made available electronically to the Planning Secretary and the EPA upon request. • Safe pedestrian and cyclist access must be maintained around construction sites or an alternative route must be provided. • A Construction Parking and Access Strategy must be prepared and implemented to manage impacts from on and off-street parking changes and construction worker parking. • Wayfinding information must be incorporated on temporary hoardings to guide pedestrians around construction sites. • Opportunities to maximise spoil material removal by non-road methods must be investigated and implemented where reasonably practicable to minimise movements by road.
<u>Socio-economic, land use and property</u> *Construction* • Concerns regarding property damage, compensation for / rectification of damage • Concerns regarding loss of land value with sub-stratum land acquisition for tunnelling and reduced rental property income during construction • Requested further assessment of impacts to local businesses • Closure of Sydney Speedway; recreational land earmarked for acquisition should be offset • Concerns regarding impacts on the community mentally, physically and financially. *Operation* • Up zoning and redevelopment requested around metro stations, particularly Westmead and North Strathfield	*Assessment* • Land acquisition is an unavoidable outcome of large linear transport projects in urban environments. This impact has been greatly reduced with most of the project being below ground. • Property to be acquired on just terms in accordance with legislation. • The project would provide socio-economic benefits through enhanced connectivity and access to goods and services and public spaces along the route, benefiting communities, businesses and residents through improved public transport. • Despite these operational benefits, local communities may lose access to a limited range of businesses and services during construction. However, there are other businesses in the surrounding area that can provide these services to effectively meet the demand. • Affected businesses and services would be appropriately compensated for the loss of their premises and could be relocated within the surrounding areas. • The Proponent will relocate Sydney Speedway to Western Sydney Parklands. While this offsets the loss of the speedway itself, there is still a loss of private recreation land in the Parramatta area.

Issue	Consideration
• Concerns with up zoning and redevelopment around metro stations, particularly Burwood North.	*Recommended Conditions / Response* • Construction environmental management plans and ancillary sub-plans and other strategies must provide adequate processes and safeguards to effectively manage indirect impacts on the amenity and accessibility of business, social infrastructure, community facilities and public spaces within proximity to construction. • Community Benefit Plans must be developed to guide development of community benefit initiatives. • Impacts to the operation of festivals and events must be avoided. • Small Business Owners Engagement Plans must be implemented to minimise construction impacts on small businesses. • The removal of private recreation land in Clyde must be offset. Residual land at the Clyde stabling and maintenance facility site must be considered for public space for recreational use, or any alternate and commensurate opportunity that achieves the objective and provides value for money. • Pre-construction and post-construction condition surveys must be undertaken on buildings, structures and infrastructure that may potentially be affected by construction vibration. Any damage would require rectification or compensation to the relevant property owner. • Before any local road is used by a heavy vehicle for the purposes of construction of Stage 1, a Road Dilapidation Report must be prepared for the road. Any damage caused would require rectification or compensation to the relevant road authority.
<u>Noise and vibration</u> • Construction impacts to sensitive land uses, including schools and places of worship • Impacts to amenity and wellbeing of households during tunnelling and excavation • Concern with operational train noise • Construction vibration impacts on residential accommodation, shops and heritage buildings, including structural damage • Concern with lack of mitigation measures in the EIS • Impacts to wellbeing of horses at Rosehill Racecourse during construction.	*Assessment* • Construction noise and vibration impacts are unavoidable for a project of this magnitude in a highly complex and urban environment. The impacts would be managed using industry best practice and a community consultation strategy. • The Proponent proposes to build acoustic sheds at all metro station locations (excluding Parramatta and North Strathfield where work would be undertaken during standard hours only). • Tunnel Boring Machines (TBM) are expected to progress at a rate of between 20 to 50 metres per day. This means the worst-case ground-borne noise impacts from tunnelling at a receiver would likely only be apparent for a few days for each TBM as the tunnelling work passes beneath. • The Proponent has committed to consult with Rosehill Racecourse to ensure that construction does not detrimentally impact the wellbeing of horses. *Recommended Conditions / Response* • Active and ongoing consultation, flexibility in construction techniques, at source and at property mitigation, and coordinating and scheduling work to provide respite must be applied to manage construction noise impacts.

Issue	Consideration
	• Station box excavations (unless undertaken within acoustic sheds with acceptable noise levels) must be limited to daytime construction hours to provide respite to adjoining residents. • Heavy vehicle movements must be limited to ensure night time respite for residents. • Residents along local roads in Westmead that experience increased noise due to diverted traffic during construction must be offered at-property treatment. • Out of hours work must be approved and regulated through an Environment Protection Licence for work that cannot be performed during standard construction hours. • Noise generating work in the vicinity of sensitive receivers, including schools, that result in noise levels above noise management levels must not occur during sensitive periods, such as exams.
<u>Public spaces and placemaking</u> • Seek high quality placemaking and urban design around future metro stations • Loss of green space and gardens in North Strathfield • Implement temporary placemaking measures during construction • Concern with how placemaking would be addressed in Stage 1.	*Assessment* • While the Concept project locates most of the project underground, there would be above-ground infrastructure, in the form of metro stations and ancillary infrastructure, that would have place and visual impacts on the urban domain. • The Department accepts that the application under assessment provides a high-level concept design of the project, limited to location and land use, with further design details to follow in later applications. • Temporary measures can be undertaken during construction to ensure that visual amenity and design impacts to public spaces and around construction sites are managed. *Recommended Conditions / Response* • Supplemental place and design principles for the Clyde stabling and maintenance facility site are recommended. • Delivery of part of the Parramatta Civic Link on the Parramatta metro station site before operation. • Temporary landscaping, vegetative screening, hoardings and other temporary structures must be used to minimise visual impacts of construction sites. • Around construction sites, hoardings must provide wayfinding information and temporary activation initiatives for the benefit of the community. • Temporary placemaking initiatives must be provided for the benefit of the community around the perimeter or in the vicinity of construction sites at Parramatta and Five Dock, with the objective of temporarily enhancing visual amenity, providing gathering places in the local area and creating temporary active frontages to construction sites.

Issue	Consideration
Air quality • Construction dust and odour impacts	*Assessment* • The Proponent has committed to implementing dust suppression management measures to minimise windblown dust and odour impacts. • The Department is satisfied that the project is unlikely to result in significant adverse impacts on ambient air quality or significant increases in health risks. *Recommended Conditions / Response* • All reasonably practicable measures must be implemented to minimise the emission of dust and other air pollutants during and odours during construction.
Heritage • Vibration impacts to heritage items during construction, particularly the Roxy Theatre and White Bay Power Station • Comprehensiveness of Aboriginal cultural heritage assessment and cumulative impacts to Aboriginal cultural sites • Rectification of property damage to heritage items.	*Assessment* • The design of Stage 1 has been developed to avoid or minimise potential impacts on heritage items. The Proponent has committed to exploring opportunities to further reduce any impacts to known heritage items. • The EIS identified heritage items that may be impacted by vibration during construction. All potential vibration impacts are expected to be at or below cosmetic levels. *Recommended Conditions / Response* • The Heritage CEMP Sub-plan must set out means of rectification of any damage by the project to certain heritage items and include Aboriginal cultural heritage management and mitigation measures. • The Proponent must conduct vibration testing before and during vibration generating activities that have the potential to impact on heritage items to identify minimum working distances to prevent cosmetic damage.
Engagement and Consultation • Further consultation and workshops, including future metro stations • Comprehensiveness of engagement during the COVID-19 pandemic • Ongoing consultation and direct engagement through construction, with a single point of contact.	*Assessment* • The EIS was exhibited from 30 April 2020 until 26 June 2020 (a total of 58 days) on the Department's Major Projects website, twice the statutory requirement for State significant infrastructure projects. • The Department is satisfied the views of the community were adequately heard and conveyed to the Proponent. • There would be further opportunities for consultation and engagement after determination of this application and during the assessment process of later stages. *Recommended Conditions / Response* • The Overarching Community Consultation Strategy sets out the guidelines for ongoing consultation with the community.
Soil, groundwater and flooding • Water table drawdown • Impacts to waterways from run-off and discharges • Disturbance of contaminated soils.	*Assessment* • Mitigation measures proposed by the Proponent, and recommended conditions of approval, are sufficient to manage groundwater drawdown, water quality, soil and contamination risks *Recommended Conditions / Response*

Issue	Consideration
	• Groundwater monitoring must be undertaken at each construction excavation site. • Detailed site investigations must be undertaken before the commencement of any construction that would result in the disturbance of moderate to high risk contaminated sites.
<u>Cumulative impacts</u> • Construction fatigue arising from the project (and the installation of the Rozelle power supply line) and other infrastructure projects, such as WestConnex and Western Harbour Tunnel • Cumulative noise, vibration, traffic and air pollution impacts to residences near construction sites • Construction of over station development not adequately considered	*Assessment* • The Proponent consulted with the community and coordinated with TfNSW, Ausgrid and the Port Authority of NSW on the Rozelle power supply line to reduce the overall construction period around Callan Street. • The Proponent would coordinate and consult with stakeholders to manage the interface of projects under construction at the same time. • Over station development would be assessed under separate applications. • The Department is satisfied that the proposed mitigation measures would address the concerns raised about cumulative impacts. *Recommended Conditions / Response* No conditions are required in relation to this matter.
<u>Project justification</u> • Increased working from home would render the project not needed, as demand for service / patronage on the future metro line would not be there due to the COVID-19 pandemic • Planning and cost benefit analysis does not justify the project.	*Assessment* • This project has been endorsed by the NSW Government and is a key component of strategic infrastructure and planning documents including *Future Transport 2056* and *The Greater Sydney Region Plan.* • A business case was prepared for the Sydney Metro West and endorsed by the NSW Government. *Recommended Conditions / Response* No conditions are required in relation to this matter.
<u>Biodiversity and trees</u> • Loss of trees • Native vegetation should be planted.	*Assessment* • The project is unlikely to cause significant biodiversity impacts and any residual impacts can be appropriately offset. • The project has been designed to avoid significant disturbances to the natural environment by locating the metro rail corridor underground with above-ground infrastructure placed in existing highly urbanised areas. *Recommended Conditions / Response* • An offset is required for the impacts to plant community types and threatened (species credit) species. • A fauna and flora CEMP Sub-plan must be prepared. • Pre-clearing and pre-demolition inspections must be undertaken for Southern Myotis and provision of bat boxes or suitable habitat built if roosting sites are identified. • As many mature trees, and as much urban canopy as practicable, must be retained.

Issue	Consideration
	• An increase in tree canopy coverage and an increase in number of mature trees at a ratio of 2:1 is required. • Parts of Duck Creek and A'Becketts Creek that remain open channels must be rehabilitated and renaturalised. • Only species representative of the mangrove forests must be used the revegetate the riparian zone.

Appendix G – Recommended Instrument of Approval

https://www.planningportal.nsw.gov.au/major-projects/project/9056