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M4-M5 Link

Environmental Impact Statement

August 2017

Appendices O to P

Volume 2G

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Hindi

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Greek

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Volume 2G

Appendices

WestConnex

Appendix O

Technical working paper: Landscape and visual impact

WestConnex

Roads and Maritime Services

WestConnex – M4-M5 Link

Technical working paper: Landscape and visual impact

August 2017

Client: Roads and Maritime Services

ABN: 76 236 371 088

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Glossary of terms and abbreviations

Term	Definition
A	
Aboriginal Heritage Information Management System (AHIMS)	A register of NSW Aboriginal heritage information maintained by the NSW Office of Environment and Heritage
Alignment	The geometric layout (eg of a road) in plan (horizontal) and elevation (vertical)
AM peak hour	Unless otherwise stated, this refers to vehicle trips arriving at their destination during the average one-hour peak period between 7am-9am on a normal working weekday
Arterial roads	The main or trunk roads of the State road network
At-grade	A road at ground level, not on an embankment or in a cutting
B	
Bioretention facility	Landscaped depression designed to treat stormwater runoff to remove contaminants and sediment
C	
Campbell Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project at St Peters
Campbell Road motorway operations complex	An area where operational ancillary facilities are established. Located within the St Peters interchange, south of Campbell Road at St Peters, on land occupied during construction by the Campbell Road civil and tunnel site
Campbell Road ventilation facility	Ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels. Located at St Peters, within the St Peters interchange site
Carriageway	The portion of a roadway used by vehicles including shoulders and ancillary lanes
Concept design	Initial functional layout of a road/road system or other infrastructure. Used to facilitate understanding of a project, establish feasibility and provide basis for estimating and to determine further investigations needed for detailed design
Congruent / congruous	A term used within the context of landscape character assessment meaning to agree or be harmonious or consistent in character
Construction	Includes all physical work required to construct the project
Construction ancillary facilities	Temporary facilities during construction that include, but are not limited to construction sites (civil and tunnel), sediment basins, temporary water treatment plants, pre-cast yards and material stockpiles, laydown areas, parking, maintenance workshops and offices
Cul-de-sac	A street or road that is open for vehicular traffic at one end only
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own
Cut-and-cover	A method of tunnel construction whereby the structure is built in an open excavation and subsequently covered
Cutting	Formation resulting from the construction of the road below existing ground level, the material is cut out or excavated
D	
Darley Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Leichhardt

Term	Definition
Darley Road motorway operations complex	An area where operational ancillary facilities are established. Located at Leichhardt, south of City West Link and the Inner West Light Rail line on land occupied during construction by the Darley Road civil and tunnel site
NSW Department of Planning and Environment (DP&E)	A department of the NSW Government responsible for effective and sustainable planning to support the growth in the state
Detailed design	The phase of the project following concept design where the design is refined, and plans, specifications and estimates are produced, suitable for construction
E	
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock
Egress	Exit
Embankment	An earthen structure where the road (or other infrastructure) subgrade level is about the natural surface
Enabling works	Works which are required to enable the commencement of the main construction works
Entry ramp	A ramp by which one enters a limited-access highway/tunnel
Exit ramp	A ramp by which one exits a limited-access highway/tunnel
F	
F6 Extension (previously referred to as SouthLink)	A proposed motorway link between the New M5 at Arncliffe and the existing M1 Princes Highway at Loftus, generally along the alignment known as the F6 corridor. The project is being delivered by NSW Roads and Maritime Services and would be subject to separate assessment and planning approval
Feasible and reasonable	Consideration of standard or good practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. 'Feasible' relates to engineering considerations and what is practical to build. 'Reasonable' relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements
G	
Grade	The rate of longitudinal rise (or fall) with respect to the horizontal expressed as a percentage or ratio
Grade separation	The separation of road, rail or other traffic so that crossing movements at intersections are at different levels
H	
Haberfield civil and tunnel site/Haberfield civil site	Construction ancillary facilities for the M4-M5 Link project located at Haberfield
Heritage item	Any place, building or object listed on a statutory heritage register
I	
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
Inner West Council/ Inner West LGA	The amalgamation of the former local government areas of Ashfield Leichhardt and Marrickville, proclaimed on 12 May 2016
Inner West subsurface interchange	A subsurface interchange at Leichhardt and Annandale that would link the mainline tunnels with the Rozelle interchange and the Iron Cove Link

Term	Definition
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways
Intrusive item	Place within a heritage conservation area that detracts from its heritage significance
Iron Cove Link	A one kilometre twin two-lane tunnel link to provide a connection between the Rozelle interchange and Victoria Road near the eastern abutment of Iron Cove Bridge
Iron Cove Link civil site	A construction ancillary facility for the M4-M5 Link project located at Rozelle
Iron Cove Link motorway operations complex	An area where operational ancillary facilities are established. Located south of the realigned Victoria Road carriageway between Callan Street and Springside Street at Rozelle, on land occupied during construction by the Iron Cove Link civil site
Iron Cove Link ventilation facility	Ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels. Located at Rozelle
K	
King Georges Road Interchange Upgrade	A component of the WestConnex program of works. Upgrade of the King Georges Road interchange between the M5 West and the M5 East at Beverly Hills, in preparation for the New M5 project
L	
Landscape character	The aggregate of built, natural and cultural aspects that make up an area and provide a sense of place. Includes all aspects of a tract of land – built, planted and natural topographical and ecological features
Landscape design	The design of the natural and built environment. Soft landscape design involves design using vegetative materials such as trees, shrubs, groundcovers. Hard landscape design involves design using hard materials such as pavement, walls and ramps
Lane	A portion of the carriageway allotted for the use of a single line of vehicles
Landscape character zone or LCZ	An area of landscape with similar properties or strongly defined spatial qualities, distinct from areas immediately adjacent
M	
M4 East Motorway/project	A component of the WestConnex program of works. Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange
M4 Widening	A component of the WestConnex program of works. Widening of the existing M4 Motorway from Parramatta to Homebush
M4-M5 Link	The project which is the subject of this EIS. A component of the WestConnex program of works
M5 East Motorway	Part of the M5 Motorway corridor. Located between Beverly Hills and Sydney Airport (General Holmes Drive)
M5 Motorway corridor	The M5 East Motorway and the M5 South West Motorway
M5 South West Motorway	Part of the M5 Motorway corridor. Located between Prestons and Beverly Hills
Mainline tunnels	The M4-M5 Link mainline tunnels connecting with the M4 East at Haberfield and the New M5 at St Peters
Median	The central reservation which separates carriageways from traffic travelling in the opposite direction

Term	Definition
Methodology	The method for analysis and evaluation of the relevant subject matter
Motorway	Fast, high volume controlled access roads. May be tolled or untolled
N	
New M5 Motorway/project	A component of the WestConnex program of works. Located from Kingsgrove to St Peters (under construction)
Northcote Street civil site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
O	
Overbridge	Bridge which conveys another road, rail or pedestrians over the described road
P	
Parcel of land	Refers to an individual lot number (lot) and deposited plan (DP)
Parramatta Road corridor	The Parramatta Road corridor is the area from Parramatta CBD to Sydney CBD, generally between the Main Western Rail Line in the south and the Parramatta River to the north
Parramatta Road East civil site	A construction ancillary facility for the M4-M5 Link project at Haberfield
Parramatta Road ventilation facility	A ventilation facility located on the south-eastern corner of the Parramatta Road / Wattle Street intersection (referred to as the Eastern ventilation facility in the M4 East project EIS). The facility is being built as part of the M4 East project. As part of the M4-M5 Link project, fitout works would be carried out on a section of this facility
Parramatta Road West civil and tunnel site	A construction ancillary facility for the M4-M5 Link project at Ashfield
Pavement	The portion of a carriageway placed above the subgrade for the support of, and to form a running surface for, vehicular traffic
PM peak hour	Unless otherwise stated, this refers to trips travelling on the network during the average one-hour peak period between 3pm–6pm on a weekday
Portals	The locations where a tunnel meets a surface road
Project	A new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange
Project footprint	The land required to construct and operate the project. This includes permanent operational infrastructure (including the tunnels), and land required temporarily for construction
Project land	Land that would be required to construction and operate the project
Property	Based on ownership, with the potential to contain more than one lot and Deposited Plan (DP)
Proponent	The person or organisation that proposes to carry out the project or activity. For the purpose of the project, the proponent is NSW Roads and Maritime Services
Pyrmont Bridge Road tunnel site	A construction ancillary facility for the M4-M5 Link project at Annandale

Term	Definition
R	
Remaining project land	Subject to future detailed design and the requirements of the project, parts of the project footprint not required for operational infrastructure and/or landscaping may be contemplated for separate future redevelopment. In some instances, areas of land may also be retained by Roads and Maritime for future (separate) road infrastructure projects. Where this is the case, the land would be rehabilitated and stabilised in preparation for the potential future use. This land is identified as remaining project land
Residual land	Land used to construct the project that is not required to operate the project or any other future (separate) road infrastructure project
Road reserve	A legally defined area of land where facilities such as roads, footpaths and associated features may be constructed for public travel
Roads and Maritime	NSW Roads and Maritime Services
Rozelle civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Lilyfield and Rozelle
Rozelle East motorway operations complex	An area where operational ancillary facilities are established. Located at the western end of the Rozelle Rail Yards on land occupied during construction by the Rozelle civil and tunnel site
Rozelle interchange	A new interchange at Lilyfield and Rozelle that would connect the M4-M5 Link mainline tunnels with City West Link, Anzac Bridge, the Iron Cove Link and the proposed future Western Harbour Tunnel and Beaches Link
Rozelle Rail Yards	The Rozelle Rail Yards is bound by City West Link to the south, Lilyfield Road to the north, Balmain Road to the west, and White Bay to the east Note that the project only occupies part of the Rozelle Rail Yards site
Rozelle ventilation facility	Ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels. Located at the Rozelle Rail Yards, the ventilation supply facility is located at the Rozelle West motorway operations complex and a ventilation exhaust facility at the Rozelle East motorway operations complex
Rozelle West motorway operations complex	An area where operational ancillary facilities are established. Located at the central/eastern end of the Rozelle Rail Yards, on land occupied during construction by the Rozelle civil and tunnel site
S	
Secretary's Environmental Assessment Requirements	Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning and Environment under section 115Y of the *Environmental Planning and Assessment Act 1979* (NSW)
Sensitive receiver/receptor	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching), active recreation areas (including parks and sports grounds), commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, retail spaces and industrial premises)
SMC	Sydney Motorway Corporation

Term	Definition
St Peters interchange	A component of the New M5 project, located at the former Alexandria Landfill site at St Peters. Approved and under construction as part of the New M5 project. Additional construction works proposed as part of the M4-M5 Link project
Staging	Refers to the division of the project into multiple contract packages for construction purposes, and/or the construction or operation of the overall project in discrete phases
Stockpile	Temporary stored materials such as soil, sand, gravel, spoil/waste
Stub tunnel	Driven tunnels constructed to connect to potential future motorway links
Sydney Gateway	A high-capacity connection between the St Peters interchange (under construction as part of the New M5 project) and the Sydney Airport and Port Botany precinct
T	
The Crescent civil site	A construction ancillary facility for the M4-M5 Link project located at Annandale
Tunnel portal	The entrance/exit to the tunnel
Typical cross section	A cross section of a carriageway showing typical dimensional details, furniture locations and features of the pavement construction
U	
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments. Soft urban design involves design using vegetative materials such as trees, shrubs, groundcovers. Hard urban design involves design using hard materials such as pavement, walls and ramps
UDLP	Urban Design and Landscape Plan
V	
Ventilation facility	Facility for the mechanical removal of air from the mainline tunnels, or mechanical introduction of air into the tunnels. May comprise one or more ventilation outlets
Ventilation outlet	The location and structure from which air within a tunnel is expelled
Victoria Road civil site	A construction ancillary facility for the M4-M5 Link project located at Rozelle
Visual absorption capacity	This refers to the capacity of a landscape to accept a particular type of change without that change adversely impacting upon its character
Visual amenity	Pleasantness or attractiveness of a place or area
Visual ‘fit’	A term used within the context of landscape character assessment, describing the extent to which a project would be visually congruent with or absorbed into an existing landscape
VIA	Visual impact assessment
W	
Wattle Street civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
Wattle Street interchange	An interchange to connect Wattle Street (City West Link) with the M4 East and the M4-M5 Link tunnels. Approved and under construction as part of the M4 East project. Additional construction works proposed as part of the M4-M5 Link project

Term	Definition
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel component would connect to the M4-M5 Link at the Rozelle interchange, cross underneath Sydney Harbour between the Birchgrove and Waverton areas, and connect with the Warringah Freeway at North Sydney. The Beaches Link component would comprise a tunnel that would connect to the Warringah Freeway, cross underneath Middle Harbour and connect with the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Seaforth. It would also involve the duplication of the Wakehurst Parkway between Seaforth and Frenchs Forest
WestConnex program of works	A program of works that includes the M4 Widening, King Georges Road Interchange Upgrade, M4 East, New M5 and M4-M5 Link projects

Executive summary

Project overview

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to construct and operate the WestConnex M4-M5 Link (the project), which would comprise a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange.

The concept design for the project is the subject of this Landscape and Visual Impact Assessment (LVIA) which provides:

- A project footprint, including for construction and operation
- A clear description of project elements and extent of impacts
- Design principles to inform development of the detailed design to a standard required to support project delivery.

The concept design presented in this report would continue to be refined through detailed design where relevant to improve road network and safety performance, minimise impacts on receptors and the environment and in response to feedback from the community and stakeholders.

Approach to landscape character and visual impact assessment

Secretary's Environmental Assessment Requirements (SEARs) have been issued for the project. This report responds to these requirements as they relate to visual amenity matters, specifically:

- Assessment of the visual impact of the project and any ancillary infrastructure on:
  - Views and vistas
  - Streetscapes, key sites and buildings
  - Heritage conservation areas and heritage items including Aboriginal places and environmental heritage
  - The local community (including view loss and overshadowing)
- Artist impressions and perspective drawings of the project from a variety of locations along and adjacent to the route to illustrate how the project has responded to the visual impact through urban design.

The study area comprises land surrounding the project footprint where there is potential for landscape and visual impact. Specifically, the study area comprises a range of Landscape Character Zones (LCZs) that surround areas where operational facilities are proposed. These LCZs are determined based on factors such as topography, mix and period of housing types, diversity and mix of land uses. The study area also incorporates all identified sensitive visual receptor locations. The study area extents are shown in **Figure 5-1**, **Figure 5-12**, **Figure 5-64** and **Figure 5-87**.

Potential impacts on landscape character and sensitive visual receptors within the study area were assessed using the methods and techniques described in the *Environmental Impact Assessment Practice Note – Guidelines for Landscape Character and Visual Impact Assessment* (Roads and Maritime, 2013).

Existing environment

The existing environment of the study area is highly urbanised, comprising broadly of:

- Major roads such as City West Link and Parramatta Road and road/ commercial corridors such as Victoria Road and Princes Highway
- Residential areas including established low-density residential areas in parts of Lilyfield, Rozelle and Leichhardt and medium-density and high-density residential development, including parts of Rozelle and St Peters
- Commercial and industrial areas, predominantly alongside Sydney Park, Victoria Road, Rozelle Rail Yards and the marine and port areas of Rozelle Bay and White Bay
- Open space including King George Park and Easton Park in Rozelle, Buruwan Park and the Whites Creek corridor in Annandale, Blackmore Oval in Leichhardt and Sydney Park in St Peters.

This assessment assumes that the Rozelle Rail Yards site management works have been completed. These works include removal of waste, existing stockpiles and vegetation, removal of existing above ground rail infrastructure, and site stabilisation.

Overview of potential impacts

Impacts avoided or minimised

The project has gone through a process of design development, gradually refining it to the concept design that is presented within the environmental impact statement (EIS). The concept design has been developed and refined to avoid or minimise impacts where possible, including:

- The majority of road infrastructure is located below ground
- The Rozelle interchange was moved mostly underground, reducing visual impacts and facilitating the provision of open space including two major north south pedestrian / cycle connections over City West Link, linking Lilyfield with Rozelle, and one east west pedestrian / cycle connection under Victoria Road, with potential for future connection to The Bays Precinct
- Proposed ramps on Parramatta Road at Camperdown (the Camperdown interchange) were removed from the project which avoided visual impacts in a heritage sensitive area adjacent to the University of Sydney and Victoria Park
- Development of urban design master plans for Rozelle and Iron Cove, to guide future creation of landscaping and open space. Future development of the landscaping and open space areas would be subject to urban design and landscape plans (UDLP) as part of the detailed design of the project
- Relocation of proposed construction sites to avoid construction impacts to Easton Park, Blackmore Oval and Sydney Secondary College (Leichhardt)
- Revised design in the area east of Victoria Road to reduce land take surrounding the White Bay Power Station which is a State heritage listed item
- Re-use of existing construction sites from the M4 East at Haberfield and the New M5 at St Peters, to avoid further property acquisitions in those areas
- Investigation of the use of the M4 East mainline tunnels (when open to traffic) to remove/reduce spoil haulage from the surface road network where possible
- Where feasible, ventilation facilities have been located to provide reasonable separation distance to the closest sensitive receivers (at Rozelle, Iron Cove and St Peters).

Construction impacts

Through the assessment of construction sites, construction visual impacts have been identified to be highest (rated as either High or High-Moderate) for residential receptors. In particular, receptors in close proximity to the Wattle Street (C1a), Haberfield (C2a/C2b), Parramatta Road West (C1b), Darley Road (C4), Rozelle (C5), The Crescent (C6), Victoria Road (C7), Iron Cove Link (C8), Pyrmont Bridge Road (C9) and Campbell Road (C10) construction ancillary facilities.

Visual impacts during construction relate to building and tree removal, proximity of construction works to residences, potential visual impacts and overshadowing of residences from acoustic sheds, noise walls and hoardings, proximity to the construction of large elements such as ventilation facilities and night-time lighting impacts.

Operational impacts

Landscape character impact assessment

A total of 33 LCZs have been identified as described in **section 5.3**. The assessment of LCZs focuses on areas where permanent operational facilities are proposed. The assessment found the impacts on landscape character would be highest (rated as either High or High-Moderate) at the following locations (see **section 7.1**):

- LCZ 13 – Easton Park residential precinct (Rozelle) – while there would be no physical change or addition of project elements within this LCZ, the proposed ventilation facility and outlets within the Rozelle interchange (as part of the motorway operations complex) would comprise a new and uncharacteristic element in the outlook from this LCZ in terms of scale, mass and form of the structures
- LCZ 15 – White Bay Power Station precinct (Rozelle) – existing Victoria Road bridge (identified as a potential local heritage item) would be demolished and replaced with a new structure. Proposed planting of trees along Victoria Road south of power station would seek to minimise the visual impacts of the road infrastructure on the White Bay Power Station precinct. It is recommended that future planting in this area be undertaken in consultation with UrbanGrowth NSW to ensure a balanced outcome is achieved from a visual/landscape, heritage and active transport perspective
- LCZ 24 – Callan Park residential precinct (Rozelle) – comprising the loss of the 'protective' built form edge (from the demolition of properties along the southern side of Victoria Road) which provides visual and noise protection from the road corridor, with some residences likely to have increased views to Victoria Road. Land in this location that is not required for the operation of the project would be subject to future landscaping as outlined in the UDLP to be prepared in consultation with the local community
- LCZ 30 – Barwon Park precinct (St Peters) – adjoining Sydney Park. While this area will have undergone significant change in the landscape context due to the construction of the St Peters interchange and ancillary infrastructure and the widening of Campbell Road as part of the New M5 project, the ventilation facility proposed as part of the M4-M5 Link project (Campbell Road motorway operations complex) would nonetheless contribute to a substantial change in the outlook from, and backdrop, to this substantially residential precinct.

All State and locally listed Aboriginal and non-Aboriginal heritage items located within the LCZs have been taken into consideration when assessing the sensitivity of these zones and potential impacts. The desired future character for each of the LCZs was drawn from the objectives and controls/provisions set out in relevant strategic and statutory planning documents, and considered as part of the landscape character impact assessment.

Visual impact assessment

A total of 18 representative receptor locations with views across the project footprint were assessed for visual impact. Each of these was assessed for a range of different visual receptor types depending on the location. Visual receptor types include residents, pedestrians, public transport users, cyclists, motorists and recreational users.

The assessment identified that visual impacts may be beneficial in some instances (where the removal of industrial/commercial buildings may open or improve views, or the project would facilitate the development of open space, post-construction) and detrimental in other instances (where operational infrastructure is seen to be contrasting with existing views or settings). The assessment found that visual impacts of the project would be highest (rated as either High or High-Moderate) at the following locations:

- R5 (Rozelle Rail Yards (RRY)) – This receptor location is north of Easton Park. Visual impacts would be highest for residents surrounding Easton Park as well as recreational users of Easton Park, with a change to current views in response to the height and scale of the ventilation facility. The residences most impacted are between 250 and 350 metres from the ventilation facility, and are separated by some of the land within the Rozelle Rail Yards, Lilyfield Road and Easton Park. Recreational users, while experiencing a change in view, are temporary visitors to the area and would have shorter viewing durations of the project
- R6 (RRY) – This receptor location is Glebe Foreshore Parklands and represents views from passive and active recreational users (ie no residential receptors are represented by this view). Visual impacts to recreational users are anticipated, with a change to the current view across Rozelle Bay. This view currently includes the existing City West Link and The Crescent, and other significant infrastructure such as working port areas, White Bay Power Station, Glebe Island grain silos and Anzac Bridge. Visual impacts relate to the inability to screen a significant length of the project along the Victoria Road intersection, along the south side of City West Link between Anzac Bridge and James Craig Road. While the ventilation outlets would comprise contrasting elements within the immediate context, the separation distance (a minimum of 500 metres) and the overall extent of this view (having regard to the existing built form elements within the viewshed), would increase the capacity for the landscape to visually absorb these elements
- R7 (RRY) – This receptor location is the Rozelle Bay light rail stop adjacent to The Crescent, about 60 metres from the new land bridge crossing City West Link. Visual impacts would be highest for pedestrians, light rail patrons and nearby residents in Bayview Crescent and Railway Parade. These impacts relate to the change in view to the north, where the project would introduce new visual elements associated with the scale and contrasting form of the ventilation facility in the background, and the new pedestrian bridge in the foreground. The ventilation outlets would be highly visible given the removal of existing trees adjacent to the light rail stop, which currently provide visual screening from this outlook. However, landscaping has been recommended around all operational infrastructure within the new open space, which would provide screening of night lighting impacts viewed from this location and offer some softening of visual impacts of this infrastructure

  Increased night lighting impacts are also anticipated at this receptor location due to removal of screening vegetation at intersection of The Crescent/City West Link as viewed from multiple locations within nearby streets such as Bayview Crescent and Railway Parade, in contrast to the existing generally well screened and visually contained environment of Annandale
- IC4 (Iron Cove Link) – This receptor location is along Terry Street about 50 metres north of Victoria Road. Visual impacts would be highest for residents along the west side of Terry Street, as the ventilation outlet encroaches into the existing view seen from apartment balconies, partly obscuring distant views to Callan Park.

Two locations, located between 100 and 200 metres from the ventilation outlets, were assessed as having a high view loss impact as follows:

- Free-standing dwellings located on Foucart Street near the corner of Lilyfield Road – these dwellings look east across part of the Rozelle Rail Yards, and some have intermittent views of the city skyline
- Residences within the vicinity of Hutcheson Street and Denison Street near Lilyfield Road – these dwellings look south across the western part of the Rozelle Rail Yards, and have views east across Easton Park and part of the Rozelle Rail Yards to the city skyline.

The skyline views toward the city from these two locations have the potential to be interrupted by the ventilation facility, given the angle of view and the height and scale of the outlets extending into the view. Overall, the visual impacts of the project need to be considered within the context of the beneficial outcomes also arising from the project, including:

- The provision of open space by the project which would open up new views and active transport connections through the Rozelle Rail Yards
- Landscaping to enhance previously degraded areas and provide visual screening where appropriate
- Remaining project land that will be subject of UDLP, and developed in consultation with the local community.

Summary of mitigation response

Mitigation measures have been determined in response to identified local visual impacts. Some of these impacts can be mitigated by refinement of some aspects of the design during the detailed design phase. These include:

- Integrating the new open space at Rozelle with the Lilyfield Road streetscape through considered tree planting and associated landscape works
- Investigating measures during detailed design to reduce the height, bulk and scale of ventilation outlets at Rozelle, Iron Cove and St Peters, and provide materials/finishes that reduce impacts to sensitive visual receiver locations
- Consultation with UrbanGrowth NSW to ensure that in the area where the project interfaces with the White Bay Power Station precinct, the design achieves appropriate integration from a landscaping/ visual, heritage and active transport connectivity perspective
- At the St Peters interchange, making provision for soft landscape works within the motorway operations complex, which has substantial areas of hardstand visible from the public domain.

This landscape and visual impact assessment has taken a conservative approach within the context of the urban design process of the project. Infrastructure elements and facilities such as the ventilation outlets, water treatment plant and substations are at a conceptual stage of development, and are yet to have an architectural and urban design process applied to them. These infrastructure elements would be developed further during detailed design in accordance with the design principles detailed in the M4-M5 Link Urban Design Report Within this context, many of the assessment ratings within this report can be expected to be reduced as part of the detailed design phase.

1 Introduction

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to construct and operate the WestConnex M4-M5 Link (the project), which would comprise a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange.

Together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) for the project. A request has been made for the NSW Minister for Planning to specifically declare the project to be State significant infrastructure (SSI) and also critical State significant infrastructure (CSSI). An environmental impact statement (EIS) is therefore required.

1.1 Overview of WestConnex and related projects

The M4-M5 Link is part of the WestConnex program of works. Separate planning applications and assessments have been completed for each of the approved WestConnex projects. Roads and Maritime has commissioned Sydney Motorway Corporation (SMC) to deliver WestConnex, on behalf of the NSW Government. However, Roads and Maritime is the proponent for the project.

In addition to linking to other WestConnex projects, the M4-M5 Link would provide connections to the proposed future Western Harbour Tunnel and Beaches Link, the Sydney Gateway (via the St Peters interchange) and the F6 Extension (via the New M5).

The WestConnex program of works, as well as related projects, are shown in **Figure 1-1** and described in **Table 1-1**.

Table 1-1 WestConnex and related projects

Project	Description	Status
WestConnex program of works		
M4 Widening	Widening of the existing M4 Motorway from Parramatta to Homebush.	Planning approval under the EP&A Act granted on 21 December 2014. Open to traffic.
M4 East	Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange.	Planning approval under the EP&A Act granted on 11 February 2016. Under construction.
King Georges Road Interchange Upgrade	Upgrade of the King Georges Road interchange between the M5 West and the M5 East at Beverly Hills, in preparation for the New M5 project.	Planning approval under the EP&A Act granted on 3 March 2015. Open to traffic.

Project	Description	Status
New M5	Duplication of the M5 East from King Georges Road in Beverly Hills with tunnels from Kingsgrove to a new interchange at St Peters. The St Peters interchange allows for connections to the proposed future Sydney Gateway project and an underground connection to the M4-M5 Link. The New M5 tunnels also include provision for a future connection to the proposed future F6 Extension.	Planning approval under the EP&A Act granted on 20 April 2016. Commonwealth approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) granted on 11 July 2016. Under construction.
M4-M5 Link (the project)	Tunnels connecting to the M4 East at Haberfield (via the Wattle Street interchange) and the New M5 at St Peters (via the St Peters interchange), a new interchange at Rozelle and a link to Victoria Road (the Iron Cove Link). Also includes ramps and stub tunnels for the proposed future Western Harbour Tunnel and Beaches Link project.	The subject of this EIS.
Related projects		
Sydney Gateway	A high capacity connection between the St Peters interchange (under construction as part of the New M5 project) and the Sydney Airport and Port Botany precinct.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel component would connect to the M4-M5 Link at the Rozelle interchange, cross underneath Sydney Harbour between the Birchgrove and Waverton areas, and connect with the Warringah Freeway at North Sydney. The Beaches Link component would comprise a tunnel that would connect to the Warringah Freeway, cross underneath Middle Harbour and connect with the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Seaforth. It would also involve the duplication of the Wakehurst Parkway between Seaforth and Frenchs Forest.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
F6 Extension	A proposed motorway link between the New M5 at Arncliffe and the existing M1 Princes Highway at Loftus, generally along the alignment known as the F6 corridor.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.

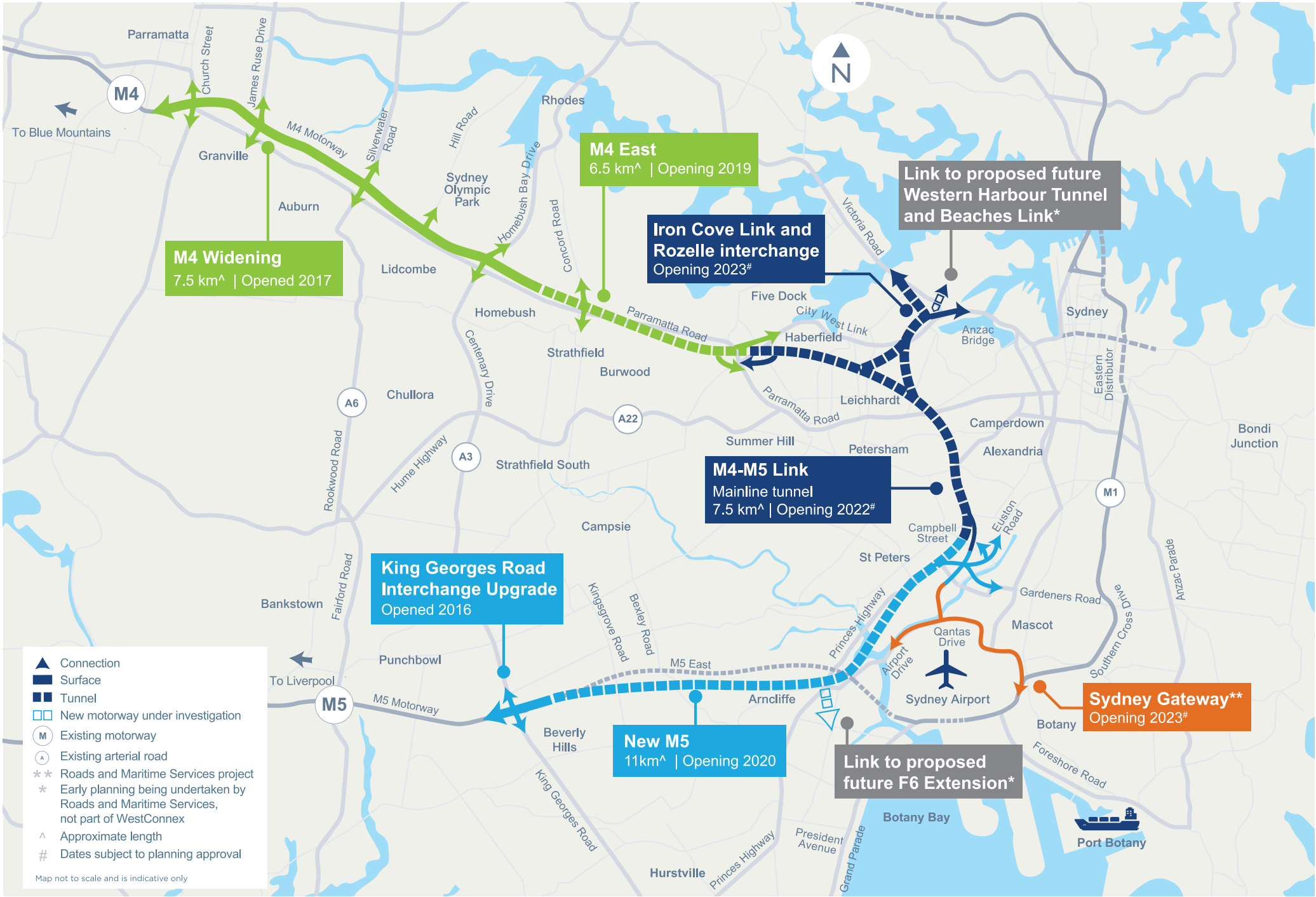


Figure 1-1 Overview of WestConnex and related projects

1.2 Purpose of this report

The purpose of this report is to inform the EIS for the project, including:

- Addressing the Secretary's Environmental Assessment Requirements (SEARs)
- Provision of a landscape character and visual impact assessment that considers the potential impacts (adverse and beneficial) that are likely to occur as a result of the project
- Identifying mitigation measures and design recommendations to avoid, minimise or improve, potential landscape and visual impacts.

It is noted that for the M4-M5 Link project, a design and construction contractor would be appointed to undertake the detailed design and construction planning following determination of this EIS, should it be approved. This means that the detail of the design and construction approach presented in this EIS (and this Landscape and Visual Impact Assessment (LVIA)) is indicative only and is subject to detailed design and construction planning to be undertaken by the successful contractor. However, the design presented by the contractor would need to be consistent with any environmental management measures and conditions of approval for the project.

1.3 Secretary's Environmental Assessments Requirements

The NSW Department of Planning and Environment (DP&E) has issued revised SEARs on 3 May 2017 that inform the environmental impact assessment. **Table 1-2** displays the SEARs that are specific to landscape and visual impact assessment, and also provides a cross reference to the relevant section(s) of this report that address these requirements.

Table 1-2 Relevant SEARs addressed in this report

SEARs		
Visual Amenity Requirements		
Requirement	**Desired Performance Outcome**	**Section where addressed in report**
8. Visual Amenity 1) Assess the visual impact of the project and any ancillary infrastructure on: a) views and vistas; b) streetscapes, key sites and buildings; c) heritage conservation areas and heritage items including Aboriginal places and environmental heritage; and d) the local community (including view loss and overshadowing). 2) Provide artist impressions and perspective drawings of the project from a variety of locations along and adjacent to the route to illustrate how the project has responded to the visual impact through urban design and landscaping.	The project minimises adverse impacts on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.	**Chapter 6** and **Chapter 7** **Appendix U** (Technical working paper: Non-Aboriginal heritage) of the EIS **Appendix M** (Shadow diagrams and overshadowing) of the EIS **Chapter 7** and **Chapter 9**

SEARs		
Urban Design Requirements		
Requirement	**Desired Performance Outcome**	**Section where addressed in report**
7. Urban Design a) Identify the urban design and landscaping aspects of the project and its components to enhance the appearance of ventilation outlets, interchanges, potential connections to the Bays Precinct and transport linkages, tunnel portals, bridges, noise walls, ancillary buildings, and any additional surface infrastructure, 'cut and cover' arrangements b) Identify measures aimed at improving 'north-south' connectivity between Balmain/Rozelle and Sydney Harbour c) Identify measures aimed at preserving the 'east-west' connectivity between White Bay and the Rozelle Rail Yards d) Consider resulting residual land treatments, and demonstrate how the proposed hard and soft urban design elements of the proposal would be consistent with the existing and desired future character of the area traversed or affected by the proposal e) Identify opportunities to utilise surplus or residual land, particularly for the provision of community space (passive and recreational) and utilise key structures (such as ventilation outlets) for multiple uses i.e. integration with other structures f) Evaluate the visual impacts and urban design aspects of the proposal and its components (such as the ventilation outlets and interchanges) on surrounding areas, taking into consideration the urban and landscape design of the M4 East and New M5 Motorways and WestConnex Urban Design Corridor Framework g) Explore the use of Crime Prevention Through Environmental Design (CPTED) principles during the design development process, including natural surveillance, lighting, walkways, signage and landscape h) Identify urban design strategies and opportunities to enhance healthy, cohesive and inclusive communities i) Describe urban design and landscape mitigation measures, having regard to the urban design and landscape objectives for the proposal	The project design complements the visual amenity, character and quality of the surrounding environment. The project contributes to the accessibility and connectivity of communities.	These requirements are addressed in **Appendix L** (Urban Design Report) of the EIS Evaluation of the visual impacts and urban design aspects of the proposal (7f) is addressed in this Landscape and Visual Impact Assessment Report in Sections 7.1 and 7.2. Urban design and landscape mitigation measures (i) are addressed in this Landscape and Visual Impact Assessment Report in **Chapter 9**.

1.4 Relationship to other reports in the EIS

The LVIA should be read in conjunction with the following EIS chapters and appendices:

- EIS **Chapter 5** (Project description): this chapter describes the project, including detailed description of infrastructure to be delivered by the project through to operation
- EIS **Chapter 6** (Construction work): this chapter describes the activities to be undertaken within the construction footprint for the project
- EIS **Chapter 12** (Land use and property): this chapter details the assumptions for future use of sites not required for the ongoing use of the motorway
- EIS **Appendix L** (Urban Design Report): this describes the master plan for the Rozelle interchange and Iron Cove Link, as well as the urban design principles to be adopted by the project throughout design development
- EIS **Appendix M** (Shadow diagrams and overshadowing): this provides shadow diagrams that depict potential overshadowing impacts provided by the key built form elements of the project
- EIS **Appendix N** (Technical working paper: Active transport strategy): this report details the future active transport network (pedestrian and cycle access) to be provided by the project, as well as future links that could be created by others to complete the network
- EIS **Appendix U** (Technical working paper: Non-Aboriginal heritage): this report identifies listed and potential heritage items that may be impacted by the project, and provides an assessment of these items with regard to direct (ie demolition) and indirect (ie visual, vibration) impacts.

1.5 Structure of this report

The document has been divided into the following key sections:

Chapter 2 – Describes the project

Chapter 3 – Outlines the assessment methodology undertaken

Chapter 4 – Describes the policy and planning framework context for the landscape and design elements of the project

Chapter 5 – Describes the existing landscape character and visual setting of the project

Chapter 6 – Assesses the potential visual impacts of the project during construction

Chapter 7 – Assesses the potential visual and landscape character impacts and urban design components of the project during operation

Chapter 8 – Assesses the potential cumulative impacts of the project

Chapter 9 – Details the proposed management measures required to mitigate impacts

Chapter 10 – Provides a conclusion to the report.

2 The project

2.1 Project location

The project would be generally located within the City of Sydney and Inner West local government areas (LGAs). The project is located about two to seven kilometres south, southwest and west of the Sydney central business district (CBD) and would cross the suburbs of Ashfield, Haberfield, Leichhardt, Lilyfield, Rozelle, Annandale, Stanmore, Camperdown, Newtown and St Peters. The local context of the project is shown in **Figure 2-1**.

2.2 Overview of the project

Key components of the project are shown in **Figure 2-1** and would include:

- Twin mainline motorway tunnels between the M4 East at Haberfield and the New M5 at St Peters. Each tunnel would be around 7.5 kilometres long and would generally accommodate up to four lanes of traffic in each direction
- Connections of the mainline tunnels to the M4 East project, comprising:
  - A tunnel-to-tunnel connection to the M4 East mainline stub tunnels east of Parramatta Road near Alt Street at Haberfield
  - Entry and exit ramp connections between the mainline tunnels and the Wattle Street interchange at Haberfield. With the exception of the entry and exit ramp connections, the Wattle Street interchange is being constructed as part of the M4 East project
  - Minor physical integration works with the surface road network at the Wattle Street interchange (constructed as part of the M4 East project) including road pavement and line marking
- Connections of the mainline tunnels to the New M5 project, comprising:
  - A tunnel-to-tunnel connection to the New M5 mainline stub tunnels north of the Princes Highway, near the intersection of Canal Road and Bakers Lane at St Peters
  - Entry and exit ramp connections between the mainline tunnels and the St Peters interchange at St Peters. The St Peters interchange will be built as part of the New M5 project
  - Minor physical integration works with the surface road network at the St Peters interchange (constructed as part of the New M5 project) including road pavement and line marking
- An underground interchange at Leichhardt and Annandale (the Inner West subsurface interchange) that would link the mainline tunnels with the Rozelle interchange and the Iron Cove Link (see below)
- A new interchange at Lilyfield and Rozelle (the Rozelle interchange) that would connect the M4-M5 mainline tunnels with:
  - City West Link
  - Anzac Bridge
  - The Iron Cove Link (see below)
  - The proposed future Western Harbour Tunnel and Beaches Link (see below)
- Construction of connections to the proposed future Western Harbour Tunnel and Beaches Link project as part of the Rozelle interchange, including:
  - Tunnels that would allow for underground mainline connections between the M4 East and New M5 motorways and the proposed future Western Harbour Tunnel and Beaches Link (via the M4-M5 Link mainline tunnels)
  - A dive structure and tunnel portals within the Rozelle Rail Yards, north of the City West Link / The Crescent intersection

  - Entry and exit ramps that would extend north underground from the tunnel portals in the Rozelle Rail Yards to join the mainline connections to the proposed future Western Harbour Tunnel and Beaches Link
  - A ventilation outlet and ancillary facilities as part of the Rozelle ventilation facility (see below)
- Twin tunnels that would connect Victoria Road near the eastern abutment of Iron Cove Bridge and Anzac Bridge (the Iron Cove Link). Underground entry and exit ramps would also provide a tunnel connection between the Iron Cove Link and the New M5 / St Peters interchange (via the M4-M5 Link mainline tunnels)
- The Rozelle surface works, including:
  - Realigning The Crescent at Annandale, including a new bridge over Whites Creek and modifications to the intersection with City West Link
  - A new intersection on City West Link around 300 metres west of the realigned position of The Crescent, which would provide a connection to and from the New M5/St Peters interchange (via the M4-M5 Link mainline tunnels)
  - Widening and improvement works to the channel and bank of Whites Creek between the light rail bridge and Rozelle Bay at Annandale, to manage flooding and drainage for the surface road network
  - Reconstructing the intersection of The Crescent and Victoria Road at Rozelle, including construction of a new bridge at Victoria Road
  - New and upgraded pedestrian and cyclist infrastructure
  - Landscaping, including the provision of new open space within the Rozelle Rail Yards
- The Iron Cove Link surface works, including:
  - Dive structures and tunnel portals between the westbound and eastbound Victoria Road carriageways, to connect Victoria Road east of Iron Cove Bridge with the Iron Cove Link
  - Realignment of the westbound (southern) carriageway of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge
  - Modifications to the existing intersections between Victoria Road and Terry, Clubb, Toelle and Callan streets
  - Landscaping and the establishment of pedestrian and cycle infrastructure
- Five motorway operations complexes; one at Leichhardt (MOC1), three at Rozelle (Rozelle West (MOC2), Rozelle East (MOC3) and Iron Cove Link (MOC4)), and one at St Peters (MOC5). The types of facilities that would be contained within the motorway operations complexes would include substations, water treatment plants, ventilation facilities and outlets, offices, on-site storage and parking for employees
- Tunnel ventilation systems, including ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels
- Three new ventilation facilities, including:
  - The Rozelle ventilation facility at Rozelle
  - The Iron Cove Link ventilation facility at Rozelle
  - The Campbell Road ventilation facility at St Peters
- Fitout (mechanical and electrical) of part of the Parramatta Road ventilation facility at Haberfield (which is currently being constructed as part of M4 East project) for use by the M4-M5 Link project
- Drainage infrastructure to collect surface and groundwater for treatment at dedicated facilities. Water treatment would occur at
  - Two operational water treatment facilities (at Leichhardt and Rozelle)
  - The constructed wetland within the Rozelle Rail Yards

  - A bioretention facility for stormwater runoff within the informal car park at King George Park at Rozelle (adjacent to Manning Street). A section of the existing informal car park would also be upgraded, including sealing the car park surface and landscaping
- Treated water would flow back to existing watercourses via new, upgraded and existing infrastructure
- Ancillary infrastructure and operational facilities for electronic tolling and traffic control and signage (including electronic signage)
- Emergency access and evacuation facilities, including pedestrian and vehicular cross and long passages and fire and life safety systems
- Utility works, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities. A Utilities Management Strategy has been prepared for the project that identifies management options for utilities, including relocation or adjustment. Refer to **Appendix F** (Utilities Management Strategy) of the EIS.

The project does not include:

- Site management works at the Rozelle Rail Yards. These works were separately assessed and determined by Roads and Maritime through a Review of Environmental Factors under Part 5 of the EP&A Act (refer to **Chapter 2** (Assessment process) of the EIS)
- Ongoing motorway maintenance activities during operation
- Operation of the components of the Rozelle interchange which are the tunnels, ramps and associated infrastructure being constructed to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project.

Temporary construction ancillary facilities and temporary works to facilitate the construction of the project would also be required.

2.2.1 Staged construction and opening of the project

It is anticipated the project would be constructed and opened to traffic in two stages (as shown in **Figure 2-1**).

Stage 1 would include:

- Construction of the mainline tunnels between the M4 East at Haberfield and the New M5 at St Peters, stub tunnels to the Rozelle interchange (at the Inner West subsurface interchange) and ancillary infrastructure at the Darley Road motorway operations complex (MOC1) and Campbell Road motorway operations complex (MOC5)
- These works are anticipated to commence in 2018 with the mainline tunnels open to traffic in 2022. At the completion of Stage 1, the mainline tunnels would operate with two traffic lanes in each direction. This would increase to generally four lanes at the completion of Stage 2, when the full project is operational.

Stage 2 would include:

- Construction of the Rozelle interchange and Iron Cove Link including:
  - Connections to the stub tunnels at the Inner West subsurface interchange (built during Stage 1)
  - Ancillary infrastructure at the Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3) and Iron Cove Link motorway operations complex (MOC4)
  - Connections to the surface road network at Lilyfield and Rozelle
  - Construction of tunnels, ramps and associated infrastructure as part of the Rozelle interchange to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project
- Stage 2 works are expected to commence in 2019 with these components of the project open to traffic in 2023.

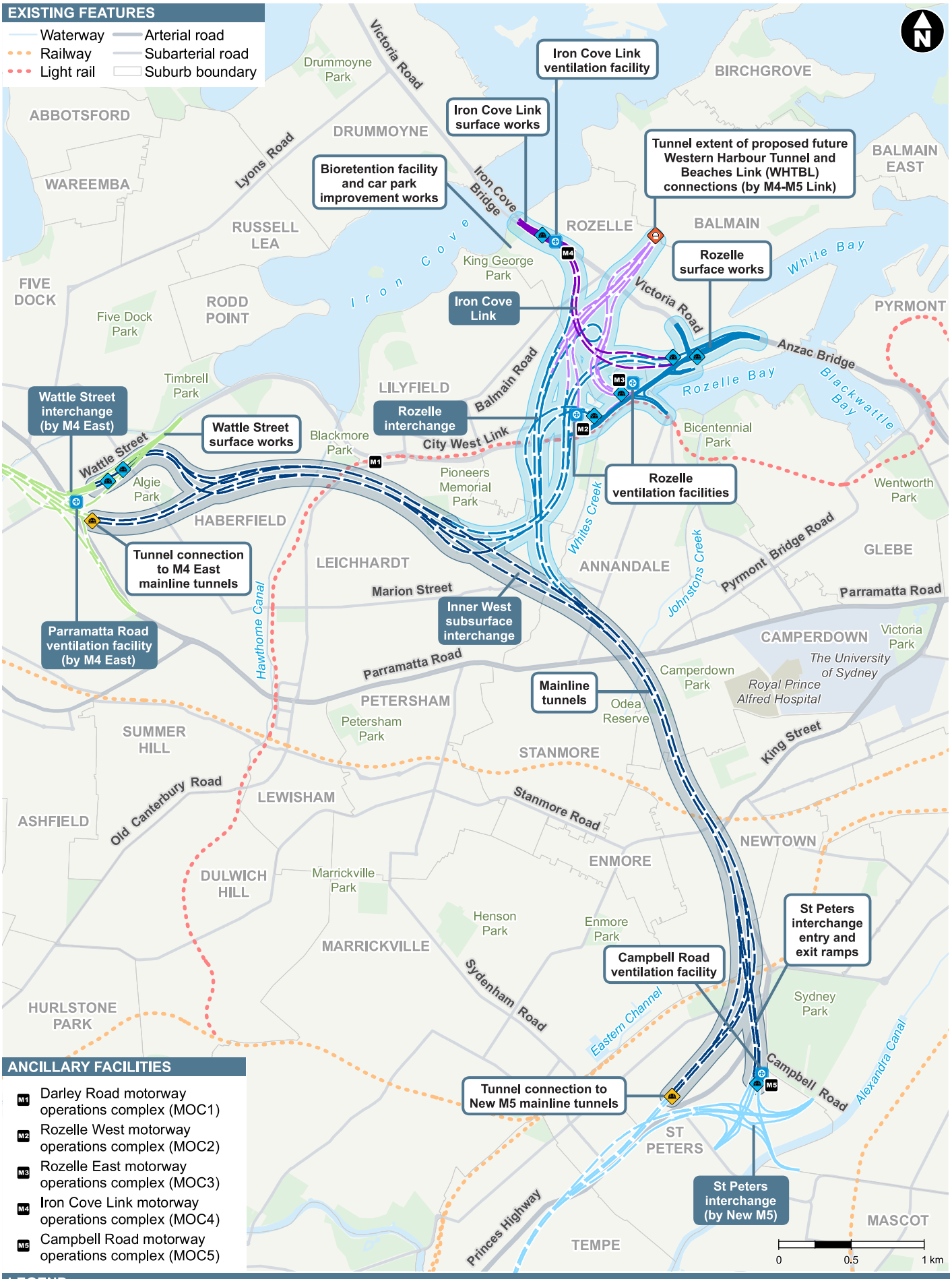


Figure 2-1 Overview of the project

2.3 Construction activities

An overview of the key construction features of the project is shown in **Figure 2-2** and would generally include:

- Enabling and temporary works, including provision of construction power and water supply, ancillary site establishment including establishment of acoustic sheds and construction hoarding, demolition works, property adjustments and public and active transport modifications (if required)
- Construction of the road tunnels, interchanges, intersections and roadside infrastructure
- Haulage of spoil generated during tunnelling and excavation activities
- Fitout of the road tunnels and support infrastructure, including ventilation and emergency response systems
- Construction and fitout of the motorway operations complexes and other ancillary operations buildings
- Realignment, modification or replacement of surface roads, bridges and underpasses
- Implementation of environmental management and pollution control facilities for the project.

A more detailed overview of construction activities is provided in **Table 2-1**.

Table 2-1: Overview of construction activities

Component	Typical activities
Site establishment and enabling works	• Vegetation clearing • Utility works • Traffic management changes and measures • Install safety and environmental controls • Install site fencing and hoarding • Demolition of buildings and structures and site clearing • Heritage salvage or conservation works (if required) • Establish construction ancillary facilities and access • Supply utilities (including construction power) to construction facilities • Establish temporary pedestrian and cyclist diversions
Tunneling	• Construct temporary access tunnels • Excavation of mainline tunnels, ramps and associated tunneled infrastructure • Spoil management and haulage • Finishing works in tunnel and provision of permanent tunnel services • Testing of plant and equipment
Surface earthworks and structures	• Vegetation clearance and topsoil stripping • Excavate new cut and fill areas • Construct dive and cut-and-cover tunnel structures • Construct required retaining structures • Excavate new road levels
Bridge works	• Construct piers and abutments • Construct headstock • Construct bridge deck, slab and girders • Demolish and remove redundant bridges

Component	Typical activities
Drainage	• Construct new pits and pipes • Construct new groundwater drainage system • Connect drainage to existing network • Construct sumps in tunnels as required • Construct water quality basins, constructed wetlands and bioretention facility • Construct drainage channels • Construct spill containment basin • Construct onsite detention tanks • Adjustments to existing drainage infrastructure where impacted • Carry out widening and naturalisation of a section of Whites Creek • Demolish and remove redundant drainage
Pavement	• Lay select layers and base • Lay road pavement surfacing • Construct pavement drainage
Operational ancillary facilities	• Install ventilation systems and facilities • Construct water treatment facilities • Construct fire pump rooms and install water tanks • Test and commission plant and equipment • Construct electrical substations to supply permanent power to the project
Finishing works	• Line marking of new road surfaces • Erect directional and other signage and other roadside furniture such as street lighting • Erect toll gantries and other control systems • Construct pedestrian and cycle paths and walkways • Earthworks at disturbed areas to establish the finished landform • Landscaping works • Site demobilisation and preparation of the site for a permissible future use

Twelve construction ancillary facilities are described in this EIS (as listed below). To assist in informing the development of a construction methodology that would manage constructability constraints and the need for construction to occur in a safe and efficient manner, while minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks, two possible combinations of construction ancillary facilities at Haberfield and Ashfield have been assessed in this EIS. The construction ancillary facilities that comprise these options have been grouped together in this EIS and are denoted by the suffix a (for Option A) or b (for Option B).

The construction ancillary facilities required to support construction of the project include:

- Construction ancillary facilities at Haberfield (Option A), comprising:
  - Wattle Street civil and tunnel site (C1a)
  - Haberfield civil and tunnel site (C2a)
  - Northcote Street civil site (C3a)
- Construction ancillary facilities at Ashfield and Haberfield (Option B), comprising:
  - Parramatta Road West civil and tunnel site (C1b)
  - Haberfield civil site (C2b)
  - Parramatta Road East civil site (C3b)
- Darley Road civil and tunnel site (C4)

- Rozelle civil and tunnel site (C5)
- The Crescent civil site (C6)
- Victoria Road civil site (C7)
- Iron Cove Link civil site (C8)
- Pyrmont Bridge Road tunnel site (C9)
- Campbell Road civil and tunnel site (C10).

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval.

The construction ancillary facilities would be used for a mix of civil surface works, tunnelling support, construction workforce parking and administrative purposes. Wherever possible, construction sites would be co-located with the operational footprint to minimise property acquisition and temporary disruption. The layout and access arrangements for the construction ancillary facilities are based on the concept design only and would be confirmed and refined in response to submissions received during the exhibition of this EIS and during detailed design.

2.3.1 Construction program

The total period of construction works for the project is expected to be around five years, with commissioning occurring concurrently with the final stages of construction. An indicative construction program is shown in **Table 2-2**.

Table 2-2: Indicative construction program

Construction activity	Indicative construction timeframe																							
	2018				2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Mainline tunnels																								
Site establishment and establishment of construction ancillary facilities			■	■	■	■	■	■	■	■														
Utility works and connections			■	■	■	■	■	■																
Tunnel construction				■	■	■	■	■	■	■	■	■	■											
Portal construction				■	■	■	■	■																
Construction of permanent operational facilities												■	■	■	■	■								
Mechanical and electrical fitout works														■	■	■								
Establishment of tolling facilities															■	■								
Site rehabilitation and landscaping																■	■	■	■					
Surface road works																	■	■	■	■				
Demobilisation and rehabilitation																			■	■				
Testing and commissioning																■	■	■	■	■				
Rozelle interchange and Iron Cove Link																								
Site establishment and establishment of construction ancillary facilities				■	■	■	■	■																
Utility works and connections and site remediation				■	■	■	■	■																
Tunnel construction									■	■	■	■	■	■	■	■	■							
Portal construction						■	■	■	■															
Construction of surface road works						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■			
Construction of permanent operational facilities						■	■	■	■	■	■	■	■	■	■	■								
Mechanical and electrical fitout works													■	■	■	■	■	■	■	■				
Establishment of tolling facilities																	■	■						
Site rehabilitation and landscaping																			■	■	■			
Demobilisation and rehabilitation																						■	■	
Testing and commissioning																			■	■	■	■	■	

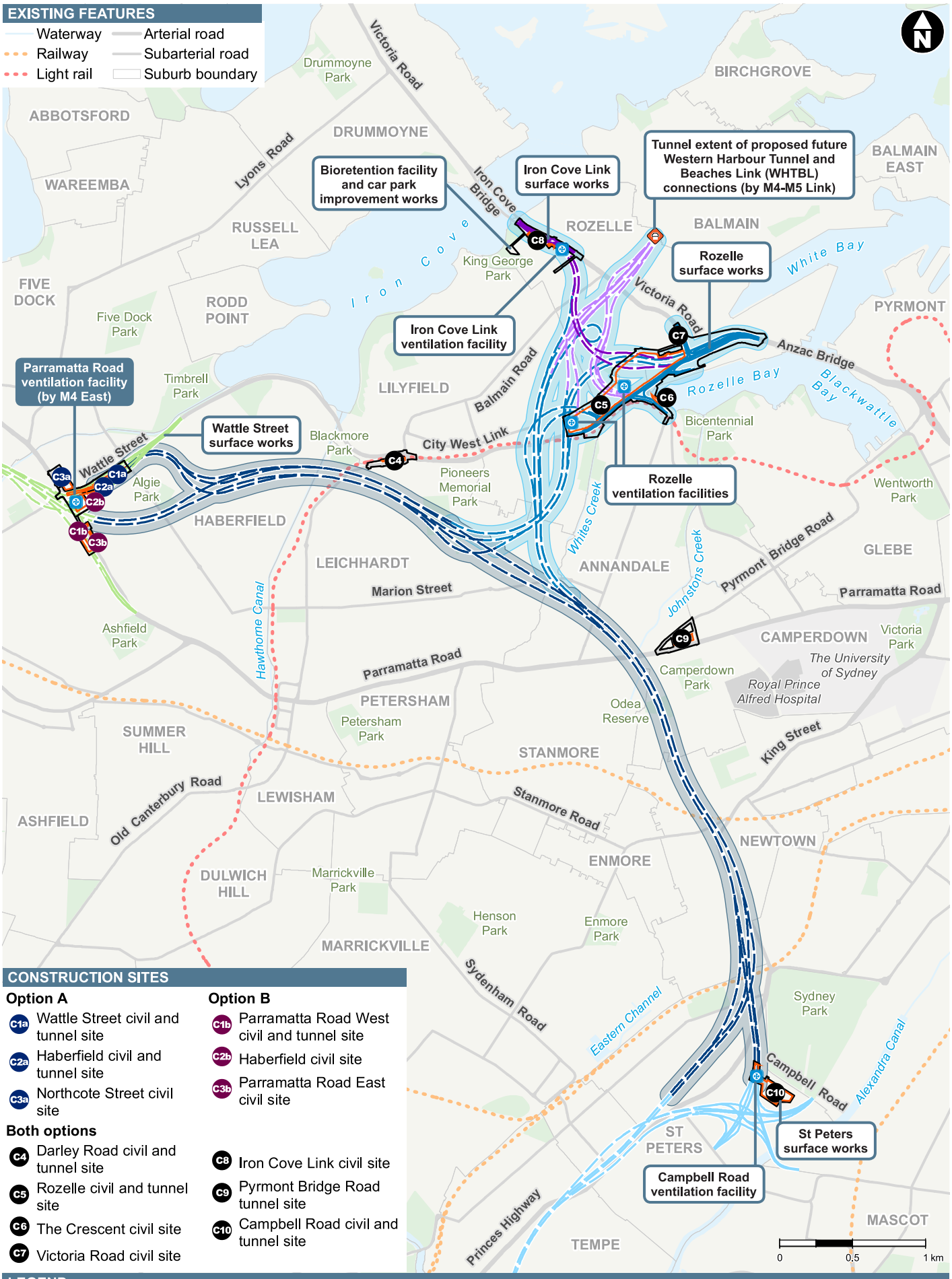


Figure 2-2 Overview of project footprint and ancillary facilities

2.4 Overview of urban design

This section provides a brief summary of the urban design for the project. For further detailed information, refer to **Appendix L** (Urban Design Report) of the EIS. The urban design of the M4-M5 Link project is concentrated on the following locations where permanent infrastructure would be constructed:

- Wattle Street interchange at Haberfield (subject of the M4 East urban design and landscape plan (UDLP))
- Darley Road motorway operations complex (MOC1) at Leichhardt
- Rozelle interchange at Lilyfield and Rozelle and ancillary infrastructure including the Rozelle West motorway operations complex (MOC2) and the Rozelle East motorway operations complex (MOC3), including the ventilation outlets
- Iron Cove Link tunnel portals and ancillary infrastructure comprising the Iron Cove Link motorway operations complex (MOC4), including the ventilation outlet, at Rozelle
- St Peters interchange at St Peters (subject of the New M5 UDLP) and ancillary infrastructure comprising the Campbell Road motorway operations complex (MOC5), including the ventilation outlets (subject to UDLP for M4-M5 Link project)
- Other areas of remaining project land that would be subject to the M4-M5 Link UDLP.

The concepts and principles outlined in the M4-M5 Link UDLP would be developed during detailed design. The M4-M5 Link UDLP would relate to the UDLPs that would be prepared for the other stages of WestConnex, particularly at Haberfield and St Peters. The detailed design for these sites would include:

- Land use for remaining project land
- Design and material composition for built form structures
- Landscape design
- Heritage interpretation where nominated
- Crime Prevention Through Environmental Design (CPTED) review of design.

The urban design of the M4-M5 Link project would seek to integrate with surrounding neighbourhoods, particularly at these areas of surface intervention, guided by the urban design principles outlined in **Appendix L** (Urban Design Report) of the EIS. The urban design principles that have been developed for the project are consistent with the key urban design guidelines and policies including *Beyond the Pavement: Urban Design Procedures and Design Principles* (Roads and Maritime, 2014) and include:

- An integrated and collective approach: Create holistic and integrated design solutions generated by collaboration across disciplines, the community, stakeholders and government bodies
- An environmental vision: Create a sustainable and enduring design response which enhances and connects local ecologies, and green space
- Cross scale connection of spaces: Prioritise both local and regionally significant connections that respond to broader issues, aims and initiatives of the local neighbourhoods and the city
- A motorway integrated within its context: Understand the existing landscape and respond in a respectful manner that seeks to enhance and contribute to its context
- Place sensitive design: Celebrate and work with the character of each place and destination, responding to their unique histories, materiality, architecture, built fabric, cultural context, landform and topography
- A multidimensional user focus: Consider holistically how a diversity of users experience space including all ages, abilities and transport modes for a truly inclusive, universally accessible and safe outcome

- Revitalisation, opportunity and economics: Establish opportunities for development that supports and connects existing neighbourhoods, complements and stimulates local economies and provides opportunity for growth across existing and future local industries.

Further detail on these urban design principles can be found in **Appendix L** (Urban Design Report) of the EIS.

2.4.1 Wattle Street interchange

The urban design outcome at the Wattle Street interchange would be delivered to be consistent with the M4 East UDLP, which is being prepared to be consistent with the EIS and conditions of approval for the M4 East project. The design for the Wattle Street interchange as outlined in the Draft M4 East UDLP (Hassell, 2016) draws on the character of the adjoining Reg Coady Reserve and the parklands that run alongside Iron Cove Creek, which consist of large canopy trees and open grassed parkland. It includes widened verges and a widened central median area of the reconstructed Wattle Street to present significant and extensive new areas of 'green volume'.

The proposed landscape works of the Wattle Street interchange, taken from **Appendix L** (Urban Design Report) of the EIS, is shown in **Figure 2-3**. An artist impression of the Wattle Street interchange, as presented in the Draft M4 East UDLP (Hassell, 2016), is provided in **Figure 2-4**.

Figure 2-3 Haberfield master plan (source: Appendix L (Urban Design Report) of the EIS)

Figure 2-4 Artists impression of the Wattle Street interchange (source: Draft M4 East UDLP (Hassell, 2016)

2.4.2 Darley Road

A motorway operations complex would be located at Leichhardt, at part of the Darley Road site, on land between City West Link to the north and Darley Road to the south, adjacent to the Leichhardt North Light rail stop. The motorway operations complex would be located on the western portion of the site and would include the following elements as shown on **Figure 2-5**:

- Water treatment plant
- Substation
- Car parking for maintenance staff
- Access from Darley Road into the site.

Key urban design and landscape principles proposed for the motorway operations complex would include ensuring the scale of built form respects the existing landscape character with materiality that is sympathetic to the quality of the local area, and providing landscape works around the motorway operations complex. The remainder of the Darley Road site would be remaining project land and rehabilitated for future development or use in accordance with the Residual Land Management Plan (RLMP).

Figure 2-5 Artist's impression at 12–18 months of operation from near the corner of Darley Road and Charles Street looking east to the Darley Road motorway operations complex

Note: Photomontage prepared by McGregor Coxall (2017)

2.4.3 Rozelle Interchange and surrounding surface works

A new interchange at Lilyfield and Rozelle would connect the mainline tunnels with the Iron Cove Link and the surface road network at City West Link and Victoria Road/Anzac Bridge. It would also allow for the future connection to the Western Harbour Tunnel and Beaches Link.

The final urban design form being delivered by the project for the Rozelle interchange, comprising open space, landscaping and active transport links, would be refined during detailed design. The urban design master plan in Figure 2-6 has been prepared to demonstrate how the principles established for the final end state would be implemented in the development and refinement of the project. This is shown in more detail on **Figure 2-7** to **Figure 2-11**. Future development possibilities within the new open space created by the project at Rozelle are presented in Chapter 6 of **Appendix L** (Urban Design Report) of the EIS. While such future development is not proposed to be delivered by the project, the project would help facilitate such development opportunities, including active recreational uses, to be coordinated and delivered by others.

Above ground motorway structures

The three ventilation outlets at the Rozelle ventilation facility would be 35 metres in height (above existing ground level) and would be sited near the intersection of City West Link, The Crescent and the proposed future Western Harbour Tunnel and Beaches Link entry and exit ramps. Their design, including material and colour choice, would respond to the local character which includes the White Bay Power Station chimneys and Anzac Bridge pylons.

The air intake facility, water treatment facility and electricity substation within the Rozelle interchange would be designed in a manner that allows them to become recessive elements within the overall park design. Elements such as the water treatment facility and ventilation facilities are co-located within the landscape to offer more functional space to the community.

The City West Link to New M5 tunnel portals would be located at the western end of the Rozelle Rail Yards and be largely shielded by vegetation. The portals themselves would be simple structures and largely unadorned to ensure the landscape forms the most dominant feature.

Active transport links

The design for the interchange aims to connect currently separated communities by the inclusion of new active transport links. Connections are proposed between Rozelle, White Bay and the Inner West Light Rail, with active transport links along the spine of the site. This includes two bridges which would create north–south connections across City West Link - a pedestrian and cycle land bridge near The Crescent which would feature planting across its span and a bridge further to the west near Brennan Street.

Recreational open space

With the intended future growth in the area (particularly with regard to The Bays Precinct), the Rozelle master plan aims to deliver much needed quality open space and passive recreational space. This open space could be further developed in the future for specific recreational purposes based on community consultation/feedback. Significant tree planting along the perimeter of the site would continue the canopy of surrounding areas. Large grassed areas would be complemented by tree planting and garden beds to create a series of spaces that could accommodate a range of future uses according to community needs.

Whites Creek naturalisation

Flood mitigation works would be undertaken along Whites Creek between the light rail bridge and Rozelle Bay. The flood mitigation works would include widening and improvement works to the channel and naturalisation of the creek banks downstream of the new The Crescent bridge. The creek design would aim to deliver a similar outcome to that of the planned Sydney Water – Whites Creek Naturalisation works upstream, including sandstone block walls and saltmarsh area.

Heritage interpretation

Heritage interpretation would be developed as part of the UDLP and implemented to identify and interpret the key heritage values and stories of the heritage areas affected by the project, in accordance with the NSW Heritage Division guidelines. This may include interpretative initiatives including integration of the rail related infrastructure (lighting tower and rail gantries) which are being salvaged as part of the Rozelle Rail Yards site management works into the design of the open space at the Rozelle Rail Yards, where possible.

Figure 2-6 Rozelle interchange Master Plan

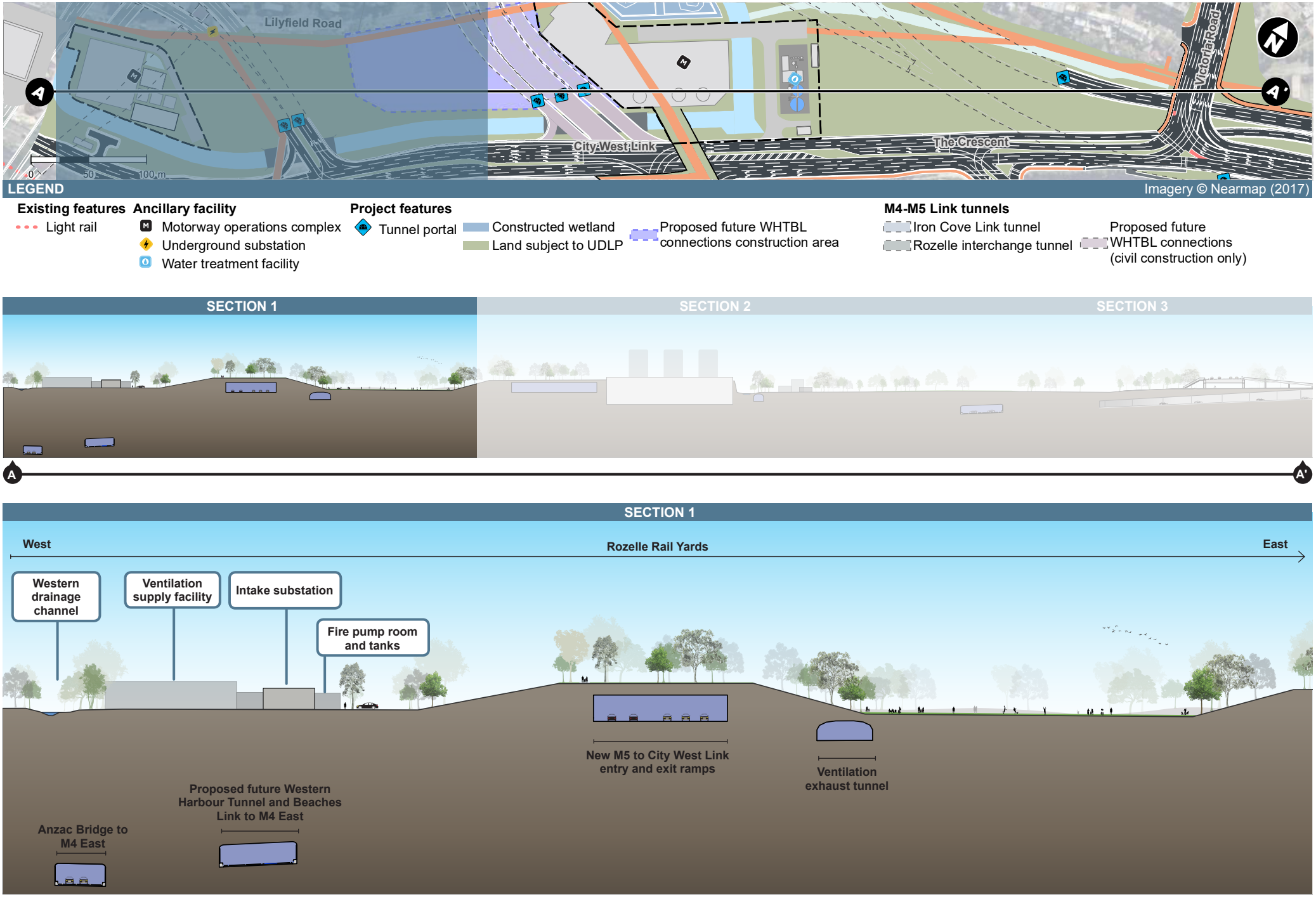


Figure 2-7 Long-section of the Rozelle Rail Yards - east-west - section 1

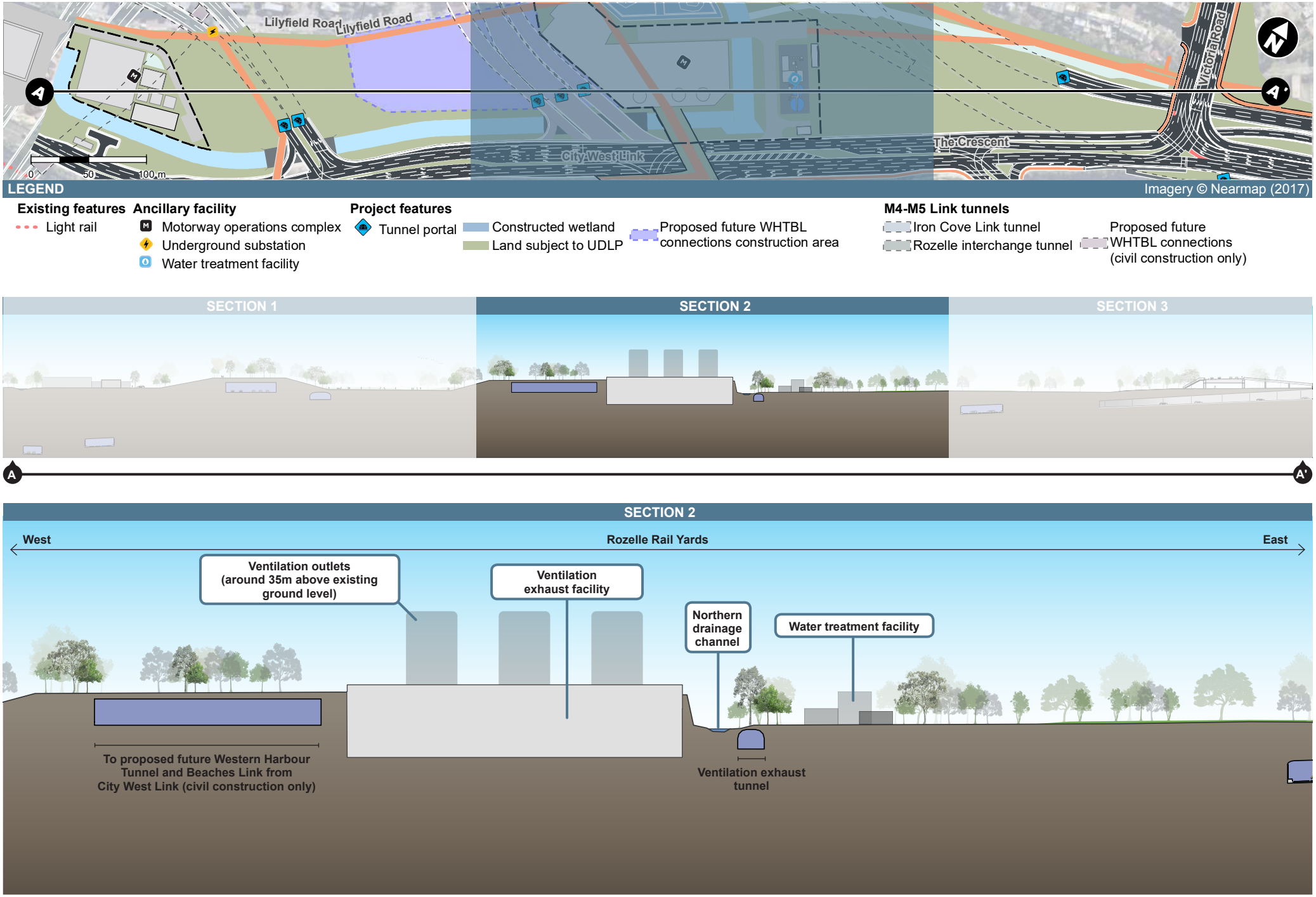


Figure 2-8 Long-section of the Rozelle Rail Yards - east-west - section 2

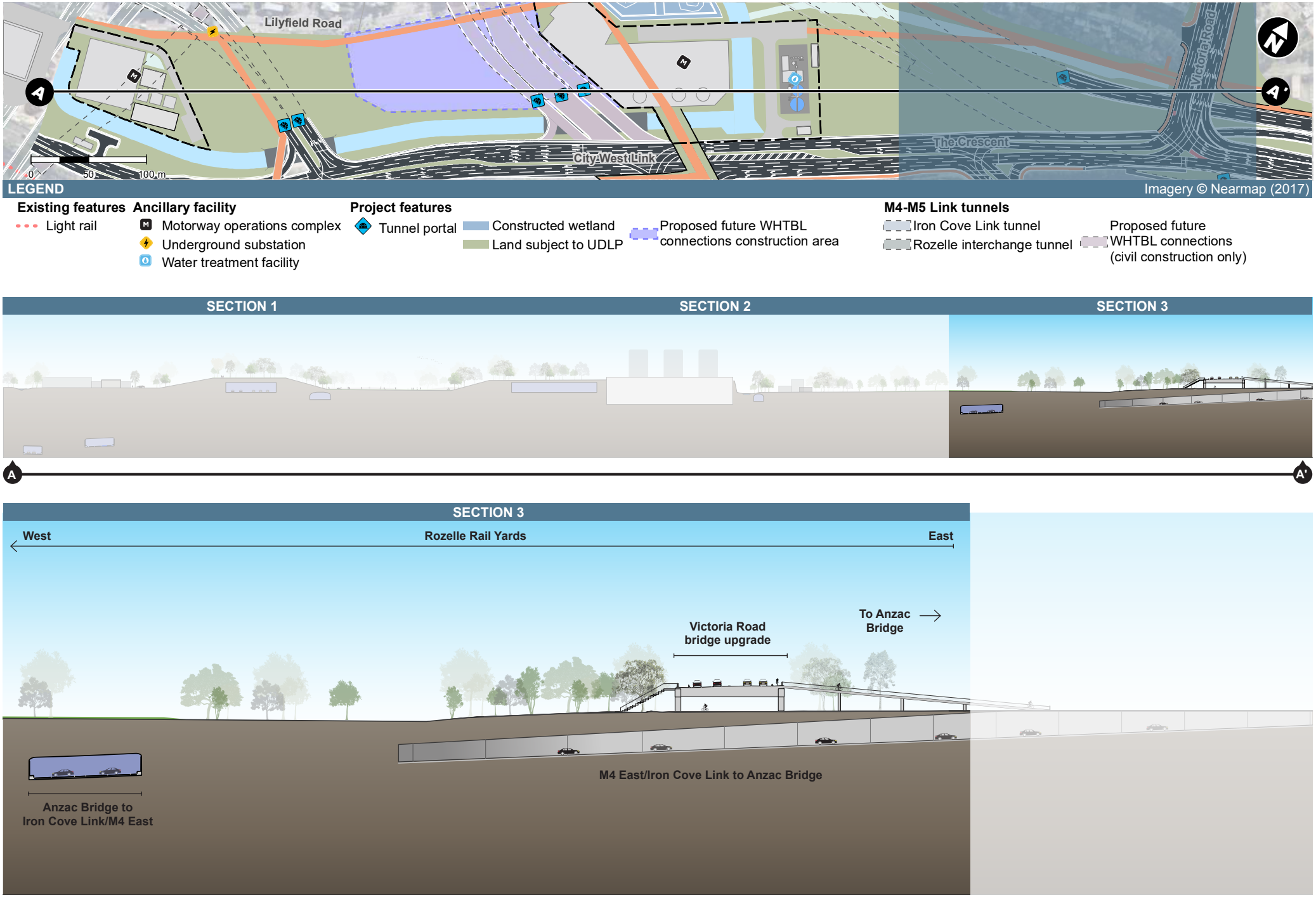
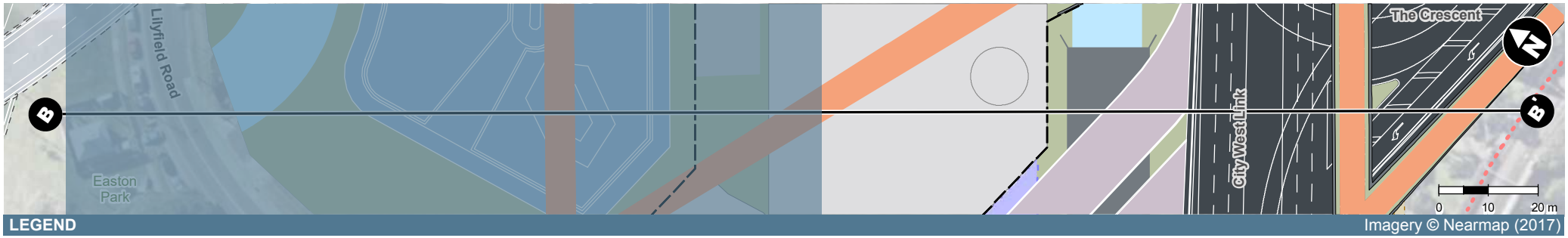
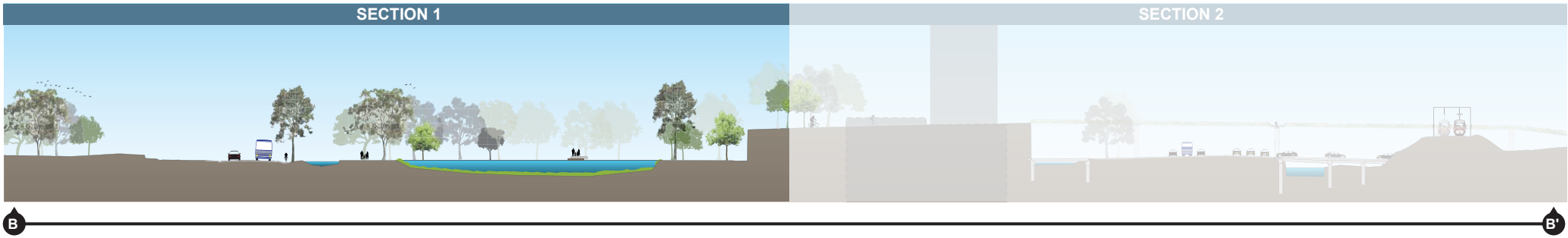


Figure 2-9 Long-section of the Rozelle Rail Yards - east-west - section 3





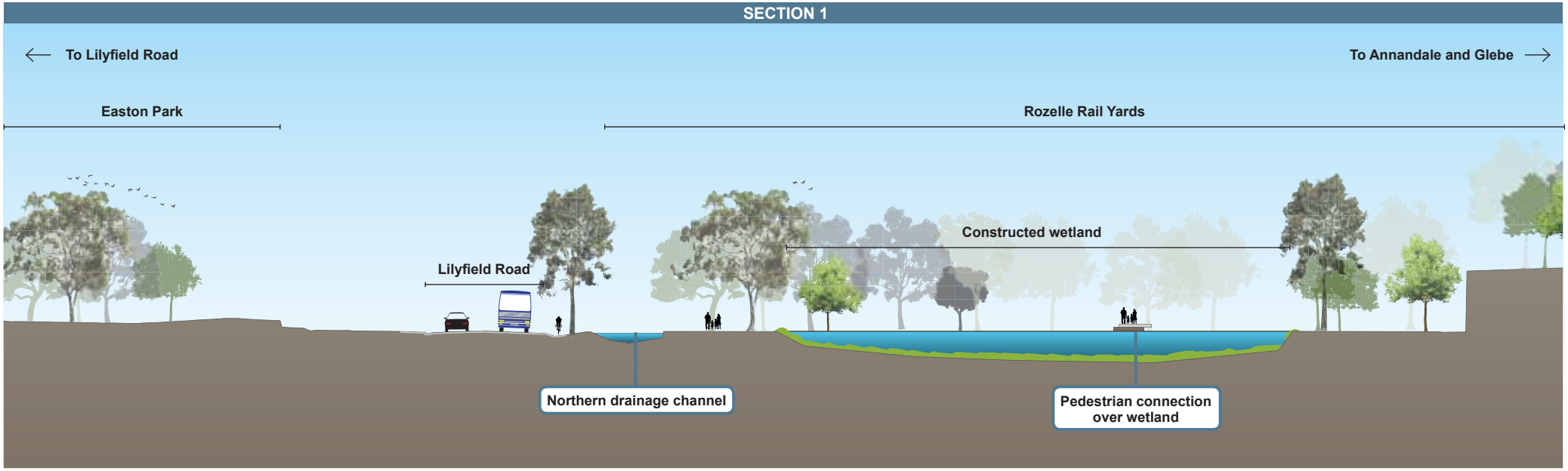


Figure 2-10 Long-section of the Rozelle Rail Yards - north-south - section 1

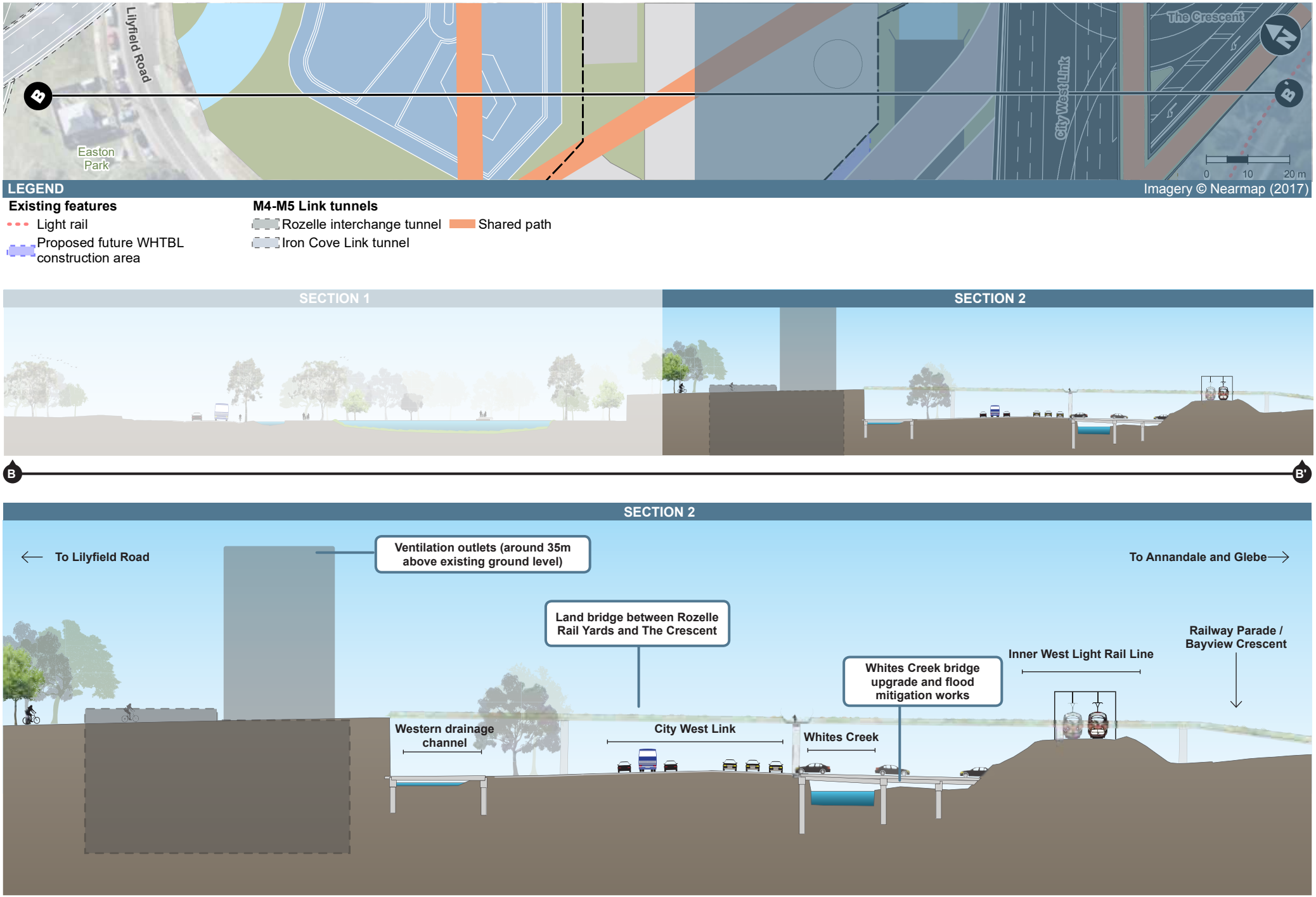


Figure 2-11 Long-section of the Rozelle Rail Yards - north-south - section 2

2.4.4 Iron Cove Link and surrounds

Key urban design and landscape features proposed around the Iron Cove Link are shown in the Iron Cove Link master plan at **Figure 2-12** and include:

- New exit and entry tunnel portals and a ventilation facility at the eastern abutment of Iron Cove Bridge are proposed as well as the realignment, widening and resurfacing of the southern carriageway of Victoria Road. To meet the urban design aim of integrating the built form into the surrounding environment, tunnel, entry and exit portals would be designed as recessive components within the landscape
- The Iron Cove Link ventilation facility (located between Springside and Moodie streets) and electricity substation (located between Callan and Springside streets) would also be designed to become recessive elements, with facades that allow them to blend with surrounding built form. The ventilation outlet would be 20 metres in height (above existing ground level) and would be located within the Victoria Road carriageway near Terry Street to ensure it is furthest away from surrounding land uses
- Land on the southern side of Victoria Road not required for permanent operational infrastructure following construction provides the opportunity to create new open space and active transport connections for the community, which connect with King George Park to the west and the local street network. This land would be landscaped and developed in accordance with the UDLP that would be prepared for the project in consultation with the local community
- To enhance the connection of spaces, the tunnel entry and exit portals would terminate to the west of the Terry and Toelle streets alignment maintaining the pedestrian connection across Victoria Road. A new pedestrian footpath and separated cycleway would be provided between Springside Street and Byrnes Street, connecting to The Bay Run on the western side of Victoria Road
- To enhance green links, the southern side of Victoria Road would feature street tree plantings and a vegetated verge that separates the vehicle movements of Victoria Road from the pedestrian and cycle paths. The area above the portals would be planted with street trees to provide canopy cover
- Water sensitive urban design (WSUD) is proposed to be integrated into the design to utilise the topography along Victoria Road and the residual spaces to harvest and polish water runoff. A bioretention swale would be constructed within King George Park on Manning Street within land currently utilised for informal car parking
- The project would assist in future urban renewal along sections of Victoria Road. It is outside the current scope of works however, the forecast reduction in traffic along sections of Victoria Road, resulting from the Iron Cove Link presents a number of opportunities, including a revitalised ‘street’ for businesses, locals and visitors.

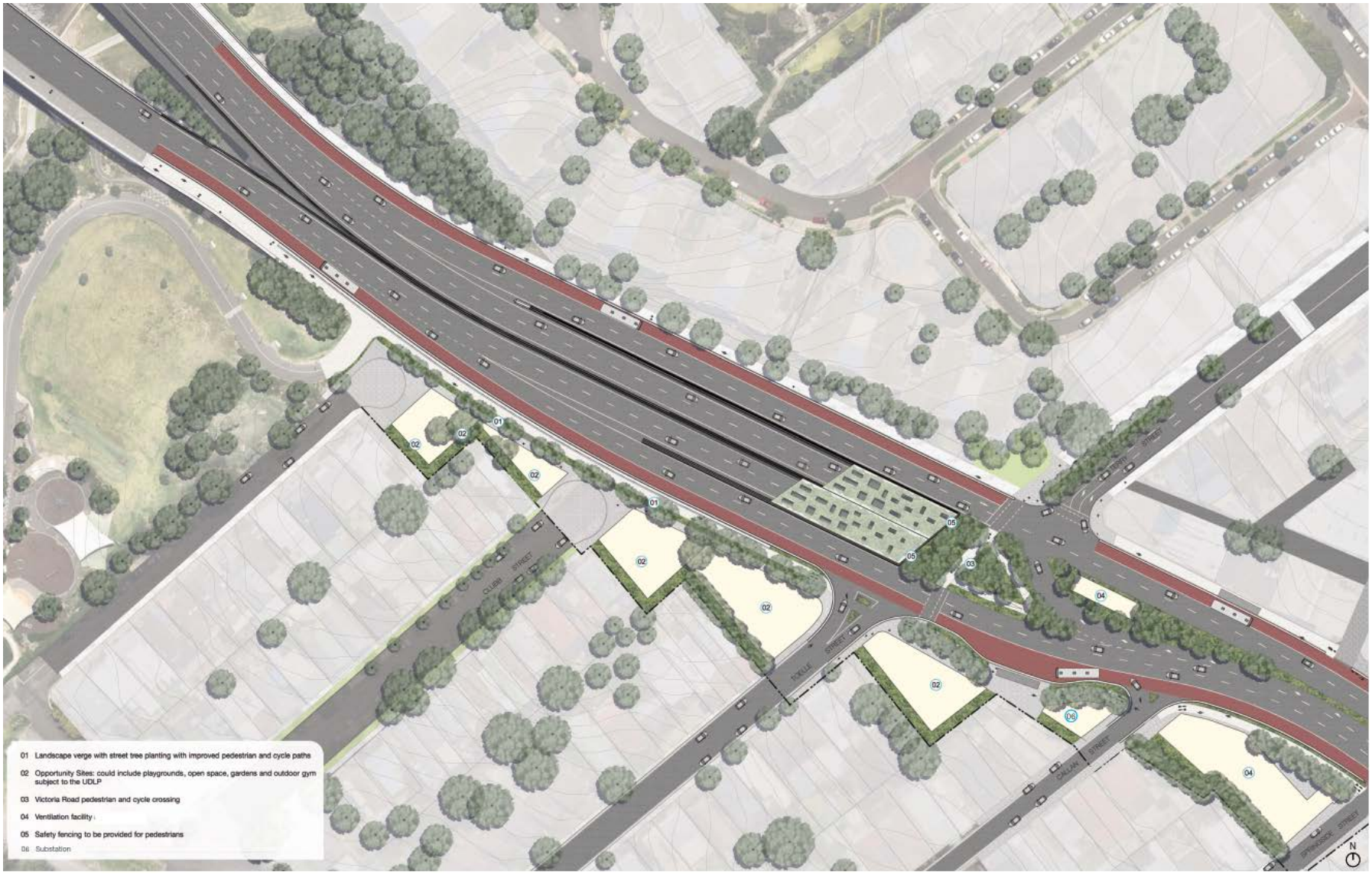


Figure 2-12 Iron Cove Link Master Plan

2.4.5 St Peters interchange

A UDLP has been prepared for the St Peters interchange as part of the New M5 project. **Figure 2-13** provides an overview of the master plan for the interchange developed as part of this work. However, the New M5 UDLP does not include the Campbell Road motorway operations complex (MOC5) which comprises the new ventilation facility, which would be delivered by the M4-M5 Link project. These elements would be subject to a separate UDLP and would be delivered to be consistent with the New M5 UDLP (Hassell, 2016) and the conditions of approval for the New M5 project.

The M4-M5 Link would include a ventilation facility above the portals in the northwest corner of the site. The ventilation facility has been designed to minimise land take from the St Peters interchange open space areas (which will be built as part of the New M5 project). The ventilation outlets would be 22 metres above existing ground level and the facility would also include structures to accommodate worker amenities, parking, and an electricity substation.

The design for the St Peters interchange as outlined in the New M5 UDLP provides extensive vegetation that would soften the scale of the proposed infrastructure. It also provides enhanced pedestrian and cyclist linkages into existing networks that would promote links to green open space within the wider precinct.

Roads and Maritime, as proponent for the New M5 EIS, has responsibility for the design of a land bridge connecting Sydney Park to the St Peters interchange. Delivery of the land bridge would occur upon completion of the M4-M5 Link.

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Figure 2-13 St Peters interchange master plan

3 Assessment methodology

3.1 Overview

The landscape and visual impact assessment has been undertaken in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note – Guidelines for Landscape Character and Visual Impact Assessment* (2013) (EIAG). This method is widely accepted by NSW Government authorities and is relevant to this project in that it addresses changes to corridor infrastructure within an urban setting.

The EIAG distinguishes between landscape character impact and visual impact as:

'… landscape character assessment – the assessment of impact on the aggregate of an area's built, natural and cultural character or sense of place, and

visual impact assessment – the assessment of impact on views.

Landscape character and visual assessment are equally important. Landscape character assessment helps determine the overall impact of a project on an area's character and sense of place. Visual impact assessment helps define the day-to-day effects of a project on people's views. '

In accordance with these guidelines, key steps in the landscape character and visual impact assessment include:

- Analysis of the landscape and visual context, including:
  - Review and summary of relevant policy and planning documents, specifically in regard to existing and future character and context
  - Definition of Landscape Character Zones (LCZ)
  - Identification of visibility and potential views to the project during construction and operation
  - Identification of urban design and landscape objectives
- Assessment of landscape character and visual impacts of the concept design
- Assessment of visual impacts during construction, including night lighting impacts
- Identification of reasonable and feasible mitigation measures.

The method to assess both landscape character and visual impacts has been based on a combination of 'sensitivity' of the existing landscape character zone or view subject to change, and the 'magnitude' of change on that zone or view (refer to **section 3.3** and **Table 3-1**).

The visual impact assessment evaluates the impact of the construction and operation of the project on receptor views, including potential impacts associated with lighting. The visual impact assessment considers views from neighbouring properties, including residential, commercial, industrial, and users of public open space, as well as from passing motorists, pedestrians and cyclists.

Key assumptions

This assessment of potential landscape and visual impacts has been undertaken on the urban design concept presented in **Appendix L** (Urban Design Report) for the project, within the context of the existing conditions of the surrounding areas. It also considers proposed conditions as detailed in the M4 East UDLP at Haberfield and in the New M5 UDLP at St Peters respectively.

The Rozelle Rail Yards site management works would result in the removal of vegetation, waste, stockpiles of materials, existing rail infrastructure, buildings and redundant services. This would significantly alter the character of the LCZ. The site management works have commenced and would take about 12 months. The assessment for this report within and surrounding the Rozelle Rail Yards has been undertaken based on these works being completed prior to construction of the M4-M5 Link commencing.

Proposed landscape treatments shown in this report are assessed as being at an early stage of growth (12–18 months) to ensure a reasonable, conservative approach to any beneficial effects of vegetative screening on the project. Artist's impressions are provided for key visual receptor locations at 12-18 months as above, and at 10 years for general information purposes.

On the basis of the above, it can be expected that the landscape character and visual impact assessment ratings derived within this report would improve when:

- Buildings and infrastructure are architecturally designed and rendered in accordance with the guiding principles identified in **Appendix L** (Urban Design Report) of the EIS
- The project landscape works mature
- Mitigation measures are put in place
- Remaining project land is developed in the future with regard to the urban design objectives and principles with the WestConnex Urban Design Framework (WUDF), other relevant planning documents, and council planning codes.

Residual impacts

For the purposes of this assessment and in accordance with the EIAG, the basic project concept - its location, form and key elements – has been assessed. Where there are unavoidable landscape or visual impacts that cannot be fully mitigated by the urban design measures incorporated into the concept design (subject of this assessment), these are considered to be residual impacts. These residual impacts would be mitigated where possible, once the recommended measures are integrated into the detailed design.

In accordance with the EIAG, rating of residual impacts is not undertaken. It can be expected that the impact assessment ratings would improve as a result of developing project land in accordance with the UDLP; maturing of the landscape; and implementing of mitigation measures. However, given that the level of success with which these elements would be implemented cannot be measured at this stage as a contractor has not been appointed and detailed design is still to be undertaken, the EIAG defers to a position of assumed likely improved outcomes only.

An integrated urban design and engineering process

The concept design for the project defines:

- The property acquisition requirements for the project sufficient for the current design and construction planning
- A project footprint, comprising land required for construction and operation of the project
- A clear description of the design principles, extent of potential visual impacts and impact management requirements
- A sound and clear basis for refinement of the detailed design to a standard required to minimise visual impacts of the permanent infrastructure as much as possible.

The concept design would continue to be refined where relevant to improve road network and safety performance, minimise impacts on receptors and the environment, and in response to feedback from stakeholders. In accordance with Beyond the Pavement: Urban Design Procedures and Design Principles (Roads and Maritime Services 2014) and the EIAG, urban designers and engineering teams have worked together to develop this integrated, collaborative outcome. Key elements of this process included:

- Identification of urban design objectives of the project to enhance the interchanges, tunnels, cut-and-cover and slot arrangements
- Analysis of the built and natural fabric of the local and regional context
- Provision of an overview urban design concept for the project

- Consideration of project land and treatments, including identification of opportunities to use remaining project land, particularly for the provision of community space (passive and recreational) and utilise structures (such as ventilation facilities) for multiple uses
- Identification of measures to create, promote and enhance connectivity, for example where connectivity is currently limited by the Rozelle Rail Yards and City West Link
- Demonstration of how the proposed urban design would be consistent with the existing and desired future character of the area
- The landscape character assessment evaluates the potential impacts of the operation of the project on the combined quality of the built, natural and cultural aspects that make up an area and provide its unique sense of place.

3.2 Analysis of existing environment

The existing landscape and visual environment along the project has been assessed through a desktop review of aerial photography, geographic information system (GIS) mapping of topography and vegetation, land use mapping and site inspections.

The M4-M5 Link project is assessed in this EIS and the cumulative impacts of the project are also considered in the context of the broader WestConnex program of works in this assessment (refer to **Chapter 8**).

3.2.1 Document review and government liaison

Key documents reviewed for this project are listed in section 1.5 and Chapter 11 (References), and include other specialist assessments relevant to this LVIA such as the Urban Design Report (McGregor Coxall, 2017), shadow diagrams (AECOM, 2017), Active Transport Strategy (AECOM, 2017), Non-Aboriginal Heritage Assessment (GML, 2017) and Arboricultural Impact Assessment (ELA, 2017). Key policy and planning documents were also reviewed and are further discussed in **Chapter 4**.

3.2.2 Definition of landscape character zones

In order to assess landscape character impact, LCZs have been identified across the project footprint in areas where surface works are proposed. Where available, existing LCZs identified within council Development Control Plans (DCPs) have been adopted for this assessment.

The LCZs are defined as areas of landscape with similar properties or strongly defined spatial qualities, which are distinct from adjoining areas. As much of the project would comprise of tunnelled motorway, the landscape character units were focussed around areas of proposed surface works, including the interchanges and the ventilation facilities. The existing environment, including landform, heritage and infrastructure, is detailed within these LCZs (refer to **section 5.3)**.

3.2.3 Existing views

In order to assess visual impact, existing views have been identified based on a range of criteria, including:

- Where there is potential for a significant change between the before and after view
- Where there is potential for a significant adverse visual outcome for sensitive receptors
- Where there is potential for a significant adverse visual outcome to locations of high visual amenity
- Where there is potential for a significant adverse visual outcome to heritage listed items or heritage conservation areas
- Where the view is representative of other similar settings, in which there was potential for a similar adverse outcome, eg on the character of a streetscape.

3.3 Landscape character and visual impact assessment

The method applied to measure both landscape character and visual impact comprised a sensitivity analysis of each existing landscape zone or view subject to change, and an assessment of the magnitude of change on that zone or view. Professional judgement and experience is applied on a case by case basis to identify qualitative levels of significance for each receptor (see **Table 3-1**).

Table 3-1 Landscape character and visual impact grading matrix

Visual impact		Magnitude of change			
		High	**Moderate**	**Low**	**Negligible**
Sensitivity	**High**	High	High–moderate	Moderate	Negligible
	Moderate	High–moderate	Moderate	Moderate–low	Negligible
	Low	Moderate	Moderate–low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Source: Roads and Maritime (March 2013)

3.3.1 Landscape character impact

Sensitivity
The sensitivity of a landscape is based upon the extent to which it can accept change of a particular type and scale without adverse impacts upon its character or value. Sensitivity is based on:

- Inherent landscape value, eg its condition, perceptual qualities, and cultural importance
- Likely congruency of the proposed change, i.e. the extent to which the proposal may 'fit' or be 'absorbed' into the landscape, e.g. in relation to line, colour, texture, form and scale.

Magnitude
The magnitude of change depends on factors such as the extent of:

- Loss, change or addition of any feature or element, or
- Change to the landscape itself or one nearby that affects its character
- The quality and extent of the concept design solution.

3.3.2 Visual impact

Sensitivity
The sensitivity of visual receptors and existing views to the proposed change is dependent on:

- Location and context of the receptor location
- Expectations and activity of the receptor
- Type and number of receptors
- Quality of the existing view
- Importance of the view
- Temporal duration of the view.

The most sensitive visual receptors may include:

- Users participating in outdoor passive recreational activities
- Communities where development results in changes in the landscape setting or valued views enjoyed by the community
- An area with a high frequency and range of users
- Residents with views affected by the project.

Magnitude
The magnitude of change on a view would depend on factors such as:

- Extent of visibility of the change (refer 'visual envelope mapping' below)
- The scale, size and character of the project
- Degree of obstruction of existing features
- Degree of contrast with the existing view
- The quality of the design outcome
- Angle of existing view
- Duration of view, and
- Distance from the project.

The magnitude of change can therefore range from a total view loss, to negligible or no change, to beneficial.

3.3.3 Visual envelope mapping

The likely visibility of the permanent project infrastructure from surrounding areas (visual catchment) has been broadly mapped, to create a visual envelope. This provides a measure of the extent of receptors with visibility of project infrastructure in the surrounding environment. The mapping typically shows 'worst case' as it primarily relates to existing landform, and does not allow for the obscuring effect of vegetation. For example, the visual envelope may suggest some receptors have visibility of a ventilation facility, however due to the location of existing vegetation and the receptor's orientation to the infrastructure, the view may in fact be obscured.

3.3.4 Visualisations

Photographic panoramas, created using a Canon 750D with an 18–55 millimetre wide angle lens, have been used as a base for graphic visualisations which depict elements of the project. Photographs were taken in late 2016 and early 2017 from key receptor locations. Where necessary, photos were stitched together. Each panorama was then zoomed into the area of interest within it. Artists impressions of project elements based on known information are then superimposed over the panoramas and the potential for view loss arising from the project is then assessed at this point.

3.3.5 Assessment of night lighting impacts

A broad assessment of the impacts of night lighting during both the construction and operation phases of the project was undertaken, by applying the methodology for assessment of visual impacts described above. Key visual receptors include neighbouring residential, commercial and industrial properties, users of recreational space, as well as from passing motorists, pedestrians and cyclists.

The following assumptions are made with regard to the assessment process:

- A detailed lighting concept will be based around the considerations identified in **Appendix L** (Urban Design Report) of the EIS, and would be developed in accordance with AS/NZS 1158 Lighting for roads and public spaces, AS 2560 Guide to sports lighting, AS 4282 Control of the obtrusive effects of outdoor lighting, and AS/NZS 60598 – Series Luminaires. The assessment of night lighting impacts is therefore not based on a lighting design, but rather assumptions have been made with regard to the types and extent of lighting likely to be installed for both the construction and operation phases consistent with applicable guidelines

- There is no assessment of existing or proposed luminance levels
- No detailed information regarding night lighting within construction ancillary facility is available at this stage of the assessment, however the proposed operating hours at each construction ancillary facility has been considered. Construction vehicles entering and leaving the facilities has been discussed in the assessment. Operational lighting during construction is assumed to be:
    - In operation seven days a week
    - At levels sufficient to meet occupational health and safety levels, and security levels.

3.3.6 Assessment of overshadowing impacts

An assessment of overshadowing impacts as a result of project buildings and structures was undertaken and is provided in **Appendix M** (Shadow diagrams and overshadowing) of the EIS. The assessment is summarised in **section 7.3.4**.

4 Policy and planning setting

4.1 Urban design, landscape character and visual amenity

The policy and planning setting for the landscape and visual aspects of the project has been established with regard to the following relevant planning documents.

- *A Plan for Growing Sydney* (NSW Government, 2014)
- *Draft Central District Plan* (NSW Government, 2016)
- *The Bays Transformation Plan* (UrbanGrowth NSW, 2015)
- *Parramatta Road Urban Transformation Strategy* (UrbanGrowth NSW, 2016)
- *Sydney Regional Environmental Plan 26 – City West*
- Ashfield Local Environmental Plan 2013 (Ashfield LEP 2013)
- Leichhardt Local Environmental Plan 2013 (Leichhardt LEP 2013)
- Sydney Local Environment Plan 2012 (Sydney LEP 2012)
- Marrickville Local Environmental Plan 2011 (Marrickville LEP 2012)
- Leichhardt Development Control Plan 2013 (Leichhardt DCP 2013)
- Sydney Development Control Plan 2012 (Sydney DCP 2012)
- Marrickville Development Control Plan 2011 (Marrickville DCP 2011).

The desired future character of the study area has been determined based on the statutory and strategic directions provided in these documents.

4.2 Regional policy and planning

At a regional level, *A Plan for Growing Sydney 2014* provides guidance on land use planning decisions in Sydney for the next 20 years. The plan describes where people are likely to live and work, and how they will move around the city and its subregions. The plan also guides district (previously referred to as subregional) planning by identifying the metropolitan priorities for each of the districts across Sydney. District planning demonstrates how the growth of the city will be closely integrated with long term transport and infrastructure planning, as major renewal and growth programs capitalise on existing and planned transport.

The Plan divides Sydney into six distinct planning regions based on geographic location and other features. District planning demonstrates how the growth of the city will be closely integrated with long term transport and infrastructure planning, as major renewal and growth programs capitalise on existing and planned transport.

The project is located within the City of Sydney and Inner West LGAs, which are contained within the Central District under A Plan for Growing Sydney. Each District is required to have a District Plan, which applies a further layer of strategic direction to that of A Plan for Growing Sydney. Exhibition of the Central District Plan for public comment concluded on 31 March 2017. The priorities for the Central subregion outlined in the Draft Central District Plan that are relevant to the project (when considered as part of the project) are to:

- Improve connections and amenity along the WestConnex corridor
- Identify the opportunities to create the capacity to deliver 20-year strategic housing supply targets
- Develop and implement an economic development strategy for the Eastern City
- Investigate opportunities to enhance east-west public transport connections
- Coordinate infrastructure planning and delivery for growing communities

- Incorporate the mitigation of the urban heat island effect into planning for urban renewal projects and Priority Growth Areas
- Identify and map potential high impact areas for noise and air pollution
- Use funding programs to deliver the Central District Green Grid priorities.

The strategy for the Central District identifies that the desired future character of the broader region is to be a global sustainability leader, managing growth while maintaining and enhancing the District's liveability, productivity and attractiveness for residents and visitors. Priorities for the District include:

- Enhancing the role of global Sydney
- Leveraging investment in transport infrastructure
- Improving freight, logistical and urban services
- Planning for demographic change
- Meeting housing demand with innovative solutions
- Enriching unique places and connections
- Promoting and celebrating cultural diversity
- Protecting the environment and enhancing sustainability.

4.3 Local policy and planning

At a local level, there are a number of LGA and precinct-specific policy and planning documents that articulate the desired future character for different areas within the project footprint. Relevant LEPs and DCPs are critical in detailing specific information regarding desired future character for the areas indirectly or directly impacted by the project. LEPs guide planning decisions for LGAs through zoning and development controls, which provide a framework for the way land can be used. The desired future character for an area is the basis upon which appropriate land uses are identified.

DCPs provide detailed planning and design guidelines that support the planning controls set out in the respective LEP. In this way, DCPs provide a further level of specific detail in regard to the desired future character for specific areas. Each DCP categorises the land within the LGA into distinct areas by virtue of topography, estate and street pattern or building form and outlines the objectives and desired future character for each of these specific areas. In the Leichhardt DCP these are termed *distinctive neighbourhoods*. In the Marrickville DCP these are termed *precincts*. The Sydney DCP identifies these different areas through *specific areas, localities and specific sites*.

Also of relevance to the M4-M5 Link project, a strategic planning process is currently being led by UrbanGrowth NSW for The Bays Precinct. The Bays Precinct comprises 5.5 kilometres of harbour frontage, around 95 hectares of largely government owned land and around 94 hectares of waterways in Sydney Harbour. There are eight sub-precincts within The Bays, including the Rozelle Rail Yards, the Rozelle Bay and Waterways and White Bay Power Station. These are within, adjoining or adjacent to the construction and operational elements of the M4-M5 Link project at the Rozelle interchange.

A Transformation Plan has been developed by UrbanGrowth NSW, providing a blueprint to transform The Bays Precinct into a hub of enterprise, activity and beautiful spaces. An overview of the Transformation Plan for each of the relevant sub-precincts is outlined as follows:

- Rozelle Rail Yards: potential to reconnect areas to the north and south of the Rozelle Rail Yards, and to improve connections from Lilyfield to the water. Identified features include providing greater housing choice, creating new open space and nature reserves to link to the harbour, integrating and reconnecting communities providing new pedestrian and cycle links between Lilyfield and Rozelle, intersecting with major infrastructure and raising awareness of and interpreting heritage of rail transport

- Rozelle Bays and Waterways: potential to integrate a viable mix of new land and maritime uses including a mix of commercial, open space and other living uses, with working harbour industries and on-water recreation facilities. It would also include better public access to the waterfront and waterways. Improvements to water quality are also a key objective. Identified features include integrating living and working side by side with maritime uses, providing new and upgraded maritime infrastructure, providing staged public waterfront access, improving water quality
- White Bay Power Station: unlock the potential of the White Bay Power Station to recognise its history in an authentic way. Identified features include providing a hub for knowledge-intensive and advanced technological industries, adaptively re-using the State-listed heritage of the White Bay Power Station, providing housing choices to support and attract talent for a knowledge-intensive destination, merging with the Bays Waterfront Promenade in a new activated forecourt that provides access to the water and reviewing opportunities for a new ferry service.

The Plan sets out immediate, medium term and long term priorities for the sub-precincts. Immediate Priority Destinations (works commencing 2015 – 2019 include the Bays Waterfront Promenade (Stage 1 Pyrmont to Blackwattle Bay and future stages consistent with medium and longer-term priorities) and the White Bay Power Station (including surround). Medium-term Priority Destination (works commencing 2019 – 2022) includes Rozelle Bay and Bays Waterways (Blackwattle and Johnston Bays). Longer-term Priority Destinations (works commencing 2022 and beyond) include: the Rozelle Rail Yards.

As planning for The Bays Precinct is not yet finalised, the Sydney Regional Environmental Plan 26 – City West (SREP 26) currently serves as a guide for the desired future character of the area providing high level planning principles for the precinct. This document represents the applicable statutory planning instrument for the area and will be superseded once the planning process for The Bays Precinct is finalised.

The desired future character of each of the identified LCZs drawn from the above outlined documents is detailed and assessed against potential landscape character impacts in **section 7.2**.

4.4 WestConnex Motorway Urban Design Framework (WUDF)

The urban design for the project has been developed in alignment with the objectives of the WUDF which are to deliver benefits to road users and the community. The following urban design vision, objectives and principles are derived from the WUDF.

4.4.1 Vision

‘The WestConnex motorway shall be a sustainable, high-quality and transformational project for the people of Sydney and NSW. Exhibiting design excellence as a whole and in all constituent parts, it should be sensitively integrated into the natural and built environment, help build communities and contribute to the future liveability of the city’.

The framework’s vision statement then states that ‘a “whole of corridor” design approach shall be adopted, to ensure the realisation of a memorable motorway experience that is legible, identifiable and integrated into the existing urban fabric’.

The successful project ‘integration within the existing urban fabric’ is critical to a well-managed response to potential visual impact and is of direct relevance to this assessment.

4.4.2 Urban design objectives

The WUDF adopts six objectives to implement the project vision and create a project that best benefits both the road users and the community. These objectives are being used to guide the project design and to benchmark project outcomes. Each of the objectives is supported by design principles and guidelines.

Objective 1: Leading edge environmental responsiveness

Planning, design, construction and long term management shall be based upon a natural systems approach, which is responsive to the environment and promotes the highest levels of sustainability.

Objective 2: Connectivity and legibility

Build connectivity across the city, beyond the boundaries of the motorway corridor and promote increased legibility of places, buildings, streets and landmarks.

Objective 3: Place making

Create beautiful places, streets, structures and landscapes that draw their form, character and materiality from local context, the intrinsic natural and cultural qualities of each locale.

Objective 4: Urban renewal and liveability

Enable opportunities for urban renewal and provide high levels of urban amenity and liveability.

Objective 5: Memorable identity and a safe, pleasant experience

Provide a memorable project identity and experiences for road users and adjacent stakeholders which are safe, convenient and enjoyable.

Objective 6: A new quality benchmark

Provide design and construction quality of world-class standard. WestConnex shall establish a new benchmark for integrated sustainability, engineering, art, architecture and urban design.

Implementing the urban design principles

The WUDF provides design direction for the key urban design elements of the project. Urban design elements refer to both the built and landscape works associated with road infrastructure and their composition as a whole. They embody the project vision, objectives and principles in a built outcome.

The WUDF builds on Roads and Maritime Urban Design Policy and the existing suite of urban design guidelines and is to be read in conjunction with these design documents (refer **Figure 4-1**):

- *Beyond the Pavement urban design policy procedures and design principles*, Roads and Maritime Services Centre for Urban Design, January 2014
- *Water Sensitive Urban Design Guideline: Applying water sensitive urban design principles to NSW transport projects*, Roads and Maritime Services Centre for Urban Design, May 2017
- *Bridge Aesthetics: Design guidelines to improve the appearance of bridges in NSW*, Roads and Maritime Services Centre for Urban Design, July 2012
- *Shotcrete Design Guidelines: Design guidelines to avoid, minimise and improve the appearance of shotcrete*, NSW Roads and Traffic Authority, March 2016
- *Noise Wall Design Guideline: Design guidelines to improve the appearance of noise walls in New South Wales*, NSW Roads and Traffic Authority, March 2016
- *Landscape Guideline: Landscape design and maintenance guidelines to improve the quality, safety and cost effectiveness of road corridor planting and seeding*, NSW Roads and Traffic Authority, June 2008
- *Biodiversity Guideline: Protecting and managing biodiversity on RTA projects*, NSW Roads and Traffic Authority, 2011
- *Tunnel Urban Design Guideline: Design guideline to improve the customer and community experience of road tunnels in built up urban areas, Roads and Maritime Services Centre for Urban Design*, Draft for discussion March 2014.

The WUDF provides design direction for each category of urban design element. This includes definition of an urban design approach and precedent images that benchmark the design quality expected in order to achieve the project vision and objectives. The key urban design elements are categorised as:

- Bridges, viaducts and underpasses
- Tunnel portals, ventilation outlets and control centres
- Tunnel interiors
- Landscape
- Walls
- Road furniture
- Lighting
- Art installations.

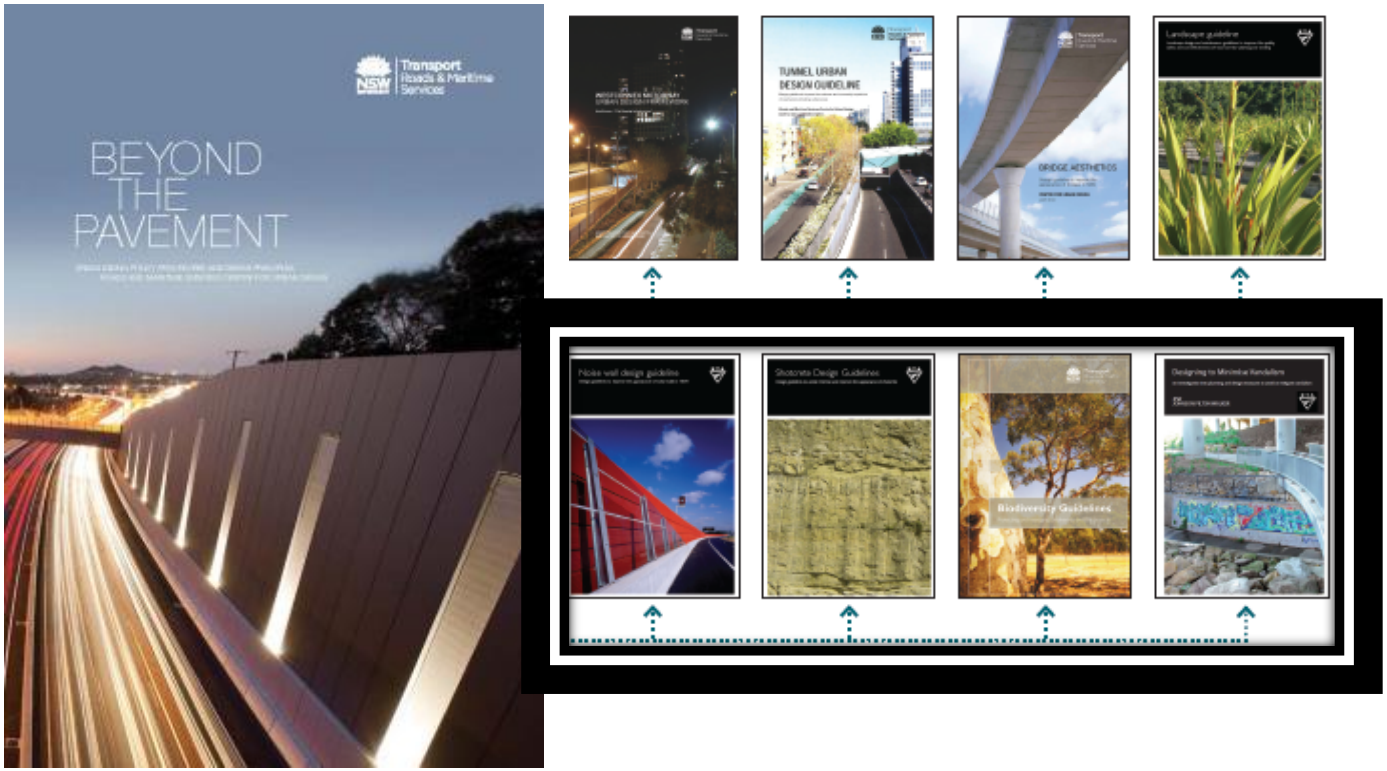


Figure 4-1 The WUDF builds on and expressly refers to the existing suite of Roads and Maritime urban design guidelines and policies, including the principle Beyond the Pavement guiding document

5 Existing environment

5.1 Introduction

The project spans the suburbs of Ashfield, Haberfield, Leichhardt, Lilyfield, Rozelle, Annandale, Stanmore, Camperdown, Newtown and St Peters (see **Figure 2-1**). For the purposes of this report, the project has been divided into four areas for analysis and assessment:

- Central west (Darley Road motorway operations complex)
- Central east (Rozelle interchange)
- Northern (Iron Cove Link)
- Southern (St Peters interchange).

While the project footprint includes construction ancillary facilities at Haberfield and Pyrmont Bridge Road (construction impacts are assessed in **Chapter 6**) these areas have not been assessed with regard to operational impacts. Permanent operational infrastructure is not proposed at Pyrmont Bridge Road. No new permanent operational infrastructure is proposed within Haberfield in addition to what is being constructed as part of the M4 East project other than pavement and finishing works along the Wattle Street ramps. The future uses of these sites are therefore unknown at this stage and would be subject to the either the M4 East or M4-M5 Link Residual Land Management Plans. These respective plans would be developed during detailed design as part of the relevant project.

5.2 Aboriginal and non-Aboriginal heritage

Significant heritage elements can, in their own right, define distinctive landscape character types within the broader urban context. Alternatively, recognition of their presence within a LCZ needs to be considered, as these may provide added weight when assessing receptor sensitivity to project impacts.

This report identifies all state and locally listed Aboriginal and non-Aboriginal heritage items and conservation areas located within identified landscape character zones. These items and conservation areas are then taken into consideration when assessing the sensitivity of these zones and potential impacts to important views. To inform this process, **Appendix U** (Technical working paper: Non-Aboriginal heritage) and **Appendix V** (Technical working paper: Aboriginal heritage) of the EIS were reviewed and are referred to in **section 5.3** of this LVIA report where relevant. It is noted that the LCZs used in this LVIA are broader than the heritage study areas identified in **Appendix U** (Technical Working Paper: Non-Aboriginal heritage) of the EIS, and as such this report may contain additional items and/or conservation areas that inform wider landscape values.

5.3 Landscape character zones

The existing environment of the project is highly urbanised, comprising broadly of:

- Major roads such as City West Link and Parramatta Road and road/ commercial corridors such as Victoria Road and Princes Highway
- Residential areas including established low-density residential areas in parts of Lilyfield, Rozelle and Leichhardt and medium-density and high-density residential development, including parts of Rozelle and St Peters
- Commercial and industrial areas, predominantly alongside Sydney Park, Victoria Road, Rozelle Rail Yards and the marine and port areas of Rozelle Bay and White Bay
- Open space including King George Park and Easton Park in Rozelle, Buruwan Park and the Whites Creek corridor in Annandale, Blackmore Oval in Leichhardt and Sydney Park in St Peters.

LCZs have been identified in those areas that have the potential to be impacted by the surface components of the project both directly and indirectly, during operation. Sites used for construction only have not been considered for LCZ assessments, as no operational infrastructure would remain on site and future use of the land is not known at this stage. The LCZs reflect the differences in character that are inherent in such a densely urbanised setting, due to factors such as the mix and period of housing types, interweaving of land uses, and the number of different land uses as described above. The following sections describe the 33 LCZs that have been identified within and surrounding the project footprint that may be directly or indirectly impacted by the operational project infrastructure.

Descriptions, desired future character and mapping of the LCZs have drawn either directly or with some modification (where appropriate) from DCPs, which identify and map distinct areas by virtue of topography, estate and street pattern or building form. The DCPs that apply to the project are the Leichhardt DCP, Marrickville DCP and Sydney DCP. Although Ashfield Council, Leichhardt Council and Marrickville Council have now been amalgamated as part of the new Inner West Council, a combined DCP is yet to be released and so the existing separate DCPs still apply.

In the Leichhardt DCP the distinct areas are referred to as *distinctive neighbourhoods*. In the Marrickville DCP they are termed *precincts*. The Sydney DCP identifies these different areas as *specific areas, localities* and *specific sites*. Each distinct area identified in the DCPs has relevant planning objectives and an articulated desired future character.

An exception to the above is for the areas of land and harbour that form part of what is known as The Bays Precinct (LCZ 15 White Bay Power Station, LCZ16 Rozelle Bay wharves precinct and LCZ 17 City West Link precinct) as outlined in **section 4.1**. As these areas are currently the subject of a strategic planning process, a combination of the key preliminary strategic planning document – *Transformation Plan – The Bays Sydney (UrbanGrowth, 2015)* and the Sydney Regional Environmental Plan 26 – City West (SREP 26) were drawn on for descriptions, desired future character and mapping of the relevant LCZs.

The LCZs in some instances extend a distance out from the project footprint. This is to ensure that the extent of potential project impacts on sensitive LCZs within proximity to the project are appropriately captured, for example the Glebe Foreshore Parklands. The parklands comprise an important recreational resource regularly visited by a large number of sensitive passive recreational receptors. It is important to determine the extent to which the project as a new landscape element would 'fit' with the parklands landscape, or be 'absorbed' into the retained background landscape when considered from the parklands. Other LCZs share a direct boundary with the project. These LCZs may be quite large with only a relatively short boundary connection with project. In these circumstances the LCZ is assessed along the adjoining edge.

A list of LCZs is provided in **Table 5-1** and detailed descriptions of each LCZ are provided in the following sections (**section 5.3.1** to **5.3.4**). LCZs related to the Wattle Street interchange in Haberfield were assessed as part of the M4 East project EIS. Description of LCZs identified for Haberfield can be found within *WestConnex M4 East Urban Design, Landscape Character and Visual Impact Assessment, September 2015* (refer to LCZ 10 and LCZ 12 for relevance to M4-M5 Link project). As no additional operational infrastructure is proposed as part of the M4-M5 Link project, these LCZs have not been re-assessed.

The Parramatta Road East civil site and Parramatta Road West civil and tunnel site are new sites that were not previously assessed as part of the M4 East project. As no permanent operational infrastructure is proposed at these sites and future use of these sites are unknown at this stage, LCZ assessments have not been undertaken. However, a description of the existing character of these areas is provided in **section 5.4**. These sites are separately assessed for construction visual impacts in **Chapter 6**.

Table 5-1: Landscape character zones

LCZ Number	LCZ Name
Central West LCZs – Darley Road MOC	
LCZ 1	Darley Road residential precinct
LCZ 2	Darley Road commercial precinct
LCZ 3	Leichhardt light rail precinct
Central East LCZs – Rozelle interchange	
LCZ 4	Glebe foreshore parklands precinct
LCZ 5	Annandale Street and Young Street precinct
LCZ 6	Johnston Street precinct
LCZ 7	Whites Creek valley precinct
LCZ 8	Catherine Street precinct
LCZ 9	Catherine Street neighbourhood centre precinct
LCZ 10	Balmain Road precinct
LCZ 11	Nanny Goat Hill residential precinct
LCZ 12	Halloran Street commercial precinct
LCZ 13	Easton Park residential precinct
LCZ 14	Victoria Road south precinct
LCZ 15	White Bay Power Station precinct
LCZ 16	Rozelle Bay wharves precinct
LCZ 17	City West Link precinct
LCZ 18	Rozelle light rail corridor and Whites Creek canal precinct
LCZ 19	Rozelle Rail Yards precinct
Northern LCZs – Iron Cove Link	
LCZ 20	Victoria Road north precinct
LCZ 21	Victoria Road light industrial precinct
LCZ 22	Iron Cove residential precinct
LCZ 23	King George Park precinct
LCZ 24	Callan Park residential precinct
LCZ 25	Sydney College of the Arts precinct
LCZ 26	Darling Street precinct
Southern LCZs – St Peters interchange	
LCZ 27	Sydney Park precinct
LCZ 28	Sydney Park residential precinct
LCZ 29	Alexandra Canal industrial precinct
LCZ 30	Barwon Park precinct
LCZ 31	Princes Highway precinct
LCZ 32	St Peters triangle precinct
LCZ 33	St Peters interchange precinct

5.3.1 Central west landscape character zones (Darley Road motorway operations complex (MOC1))

This section describes the existing character of the three LCZs associated with the motorway operations complex at Darley Road (see **Figure 5-1**).

LCZ 1 – Darley Road residential precinct

This LCZ is located at the bottom of the north-western slope of the Leichhardt/Balmain ridge and the area of land falls within the boundaries of the original Helsarmel Estate. The LCZ is shown on **Figure 5-2**.The streets within the LCZ are predominantly wide and tree lined, which contributes significantly to the character and amenity of the streetscape (see **Figure 5-3**). There is dense, moderate scale landscape tree plantings located on the western edge of Darley Road providing screening to the light rail corridor. Housing along Darley Road presents fenced side boundaries to the street (see **Figure 5-4**).

The LCZ is characterised by a regular grid pattern which provides streetscape coherence and strongly defines the character of the LCZ. Residential form is generally consistent, comprising predominantly low scale buildings. Contrasting with this is the built form located within the block between Francis Street, William Street, North Street and Allen Street, which includes a converted warehouse residential development at the north-east corner of William and Francis streets (see **Figure 5-5**), and a two to four storey warehouse style storage business at the southern western edge of the block. At their frontage along William Street, the residential building and storage business are provided mid to long range views down Hubert and Francis streets to the Darley Road civil and tunnel site.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage items located within this LCZ are listed in **Table 5-2** and shown on **Figure 5-2**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-2 LCZ 1 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I658	Former general store, including interiors	Local	Leichhardt LEP 2013 (I658)
I819	Corner shop and residence, including interiors	Local	Leichhardt LEP 2013 (I819)

Figure 5-1 Central west landscape character zones

KEY

S121, Only About Children Leichhardt Elswick Street
S132, St Columba's North Leichhardt OSHC
S145, Zero Up Child Care Services
S173, St Columba's Primary School Leichhardt North

LEGEND

Existing features	Landscape character zone	Sensitive receivers	Local Environmental Plan
Light rail	Boundary	Community facility	Heritage item
Light rail stop			Heritage conservation area

Figure 5-2 LCZ 1 Darley Road residential precinct

Figure 5-3 Representative image of the low scale built form and wide, tree lined streets which are typical within the LCZ

Figure 5-4 View along Darley Road looking east from the central southern edge of the Darley Road civil and tunnel site

Figure 5-5 Converted warehouse residential building at the north-east corner of William and Francis streets

LCZ 2 – Darley Road commercial precinct

This LCZ is located between Darley Road and the light rail corridor and comprises a recently re-developed retail 'warehouse' building with ancillary parking. It is characterised by a gently sloping topography and the built form consists of a large two-storey industrial 'warehouse' style building as shown in **Figure 5-6** and **Figure 5-7.**

The LCZ is shown on **Figure 5-8**. Large scale, mature tree plantings are located at the south eastern end of the LCZ along Darley Road with more moderate scale plantings along the light rail line at the LCZs north western edge above a retaining wall. The remainder of the LCZ is sparse and concreted with a large portion serving as car parking facilities. This south eastern part of the LCZ is zoned primarily B2 Local Centre under the Leichhardt LEP 2013 with a small portion on the north eastern edge zoned SP2 Infrastructure (Railway).

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-6 View along Darley Road looking north-west towards the warehouse building

Figure 5-7 View along Darley Road looking east towards the warehouse building

Figure 5-8 LCZ 2 Darley Road commercial precinct

LCZ 3 – Leichhardt light rail corridor precinct

This LCZ is characterised by a linear light rail line raised earthen structure, a heritage listed rail bridge at Charles Street, and dense plantings along either side as shown in **Figure 5-9.** The vegetation along either side of the corridor serves to generally screen views to and from the adjacent areas.

The light rail corridor forms part of the Inner West Rail line, which runs from Central to Dulwich Hill. The Leichhardt North Station is located between City West Link and Darley Road near the junction with James Street (see **Figure 5-10**). The station platforms are staggered, with the track crossing located between the platforms and their entrances located at either end of the stop.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage items located within this LCZ are listed in **Table 5-3** and shown on **Figure 5-11.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-3 LCZ 3 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
4805738	Leichhardt (Charles St) Underbridge	Local	RailCorp S170 Register (4805738)

Figure 5-9 View looking north across Darley Road to the elevated light rail line and Charles Street heritage bridge

Figure 5-10 Leichhardt North light rail stop platform looking west

Figure 5-11 LCZ 3 Leichhardt light rail corridor precinct

5.3.2 Central east landscape character zones (Rozelle interchange)

This section describes the existing character of the 16 LCZs (see **Figure 5-12**) associated with the Rozelle interchange.

LCZ 4 – Glebe Foreshore Parklands precinct

This LCZ comprises three adjoining parks that collectively front Rozelle Bay. The LCZ is shown on **Figure 5-13**. Topography of the precinct is flat providing direct views to the adjacent commercial port area however mature tree plantings serve to partially screen views to The Crescent and City West Link beyond (see **Figure 5-14**).

The LCZ is characterised by open grasslands, sports fields, playgrounds, wetlands and barbecue facilities, picnic areas and off-leash areas. Federal Park makes up the western part of the LCZ and is characterised by a multi-use sports field, a skateboard ramp and car parking area near Chapman Road (see **Figure 5-15**). Jubilee Park is located to the south of the LCZ and is characterised by a sports field, cricket pavilion and a recently upgraded children's playground (see **Figure 5-16**). Bicentennial Park in the eastern part of the LCZ is bookended by Glebe Point Road and Chapman Road and stretches along the southern edge of Rozelle Bay (see **Figure 5-17**). It is characterised by a large fenced playground and open grassed areas.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-4.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-4 LCZ 4 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C34	Toxteth Heritage Conservation Area	Local	Sydney LEP 2012 (C34)
I647	Pope Paul VI Reserve including trees	Local	Sydney LEP 2012 (I647)
I648	Jubilee Park and Oval including cricket pavilion, oval with picket fence and landscaping	Local	Sydney LEP 2012 (I648)
I630	Johnstons Creek including canal and bridge	Local	Sydney LEP 2012 (I630)
I30	Federal Park including landscaping	Local	Sydney LEP 2012 (I30)

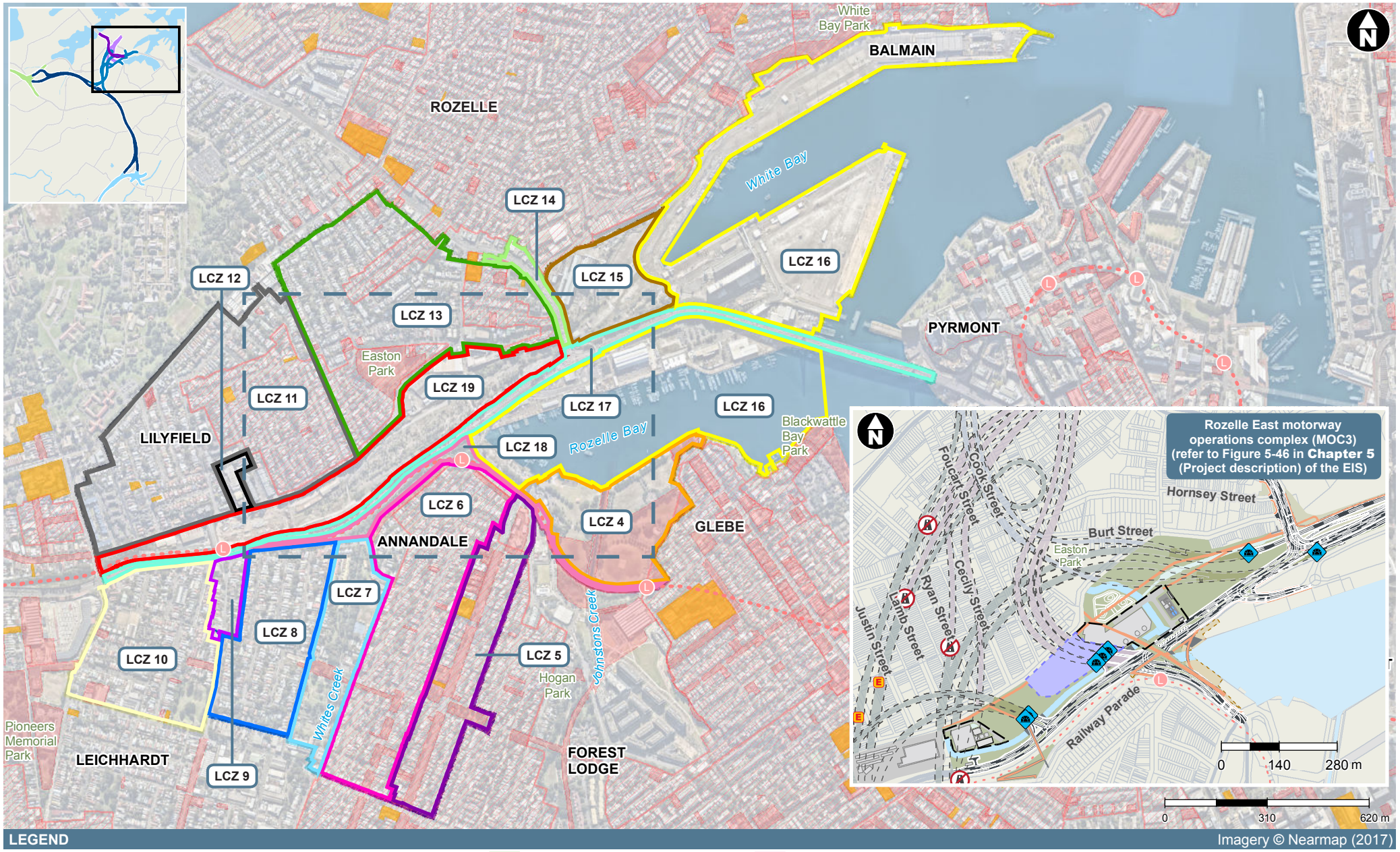


Figure 5-12 Central east landscape character zones

Figure 5-13 LCZ 4 Glebe Forehore Parklands precinct

Figure 5-14 View from the Glebe parklands looking west across Rozelle Bay towards The Crescent

Figure 5-15 View across Federal Park

Figure 5-16 View looking north east across Jubilee Park with the historic cricket pavilion in the foreground

Figure 5-17 Bicentennial Park foreshore looking east towards Anzac Bridge

LCZ 5 – Johnston Street precinct

This LCZ is located along the crest of the Annandale ridge between Booth Street and Piper Street, after which the LCZ slopes northwards, down towards Rozelle Bay. The wide, tree lined Johnston Street forms a north–south spine and is bisected by several narrower cross streets and laneways that run east–west across it. The topography of the northern section of the neighbourhood changes considerably with the western side of Johnston Street elevated, and the eastern side lower and falling away to The Crescent.

Built form within the LCZ varies from single storey Federation dwellings (see **Figure 5-18**) and grander scaled Victorian-style buildings, to post war civic and commercial buildings. There are also some examples of multi-unit development along Johnston Street. The LCZ falls within the Annandale Heritage Conservation Area which is one of a number of conservation areas that collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891. Johnston Street itself is recognised for its landscape heritage and several dwellings within the neighbourhood are recognised for their architectural heritage. This includes original buildings such as The Abbey, the 'Witches' Houses' (see **Figure 5-19**) and Annandale North Public School which enhance the character of the streetscape.

There are several areas towards the northern end of the neighbourhood which have extensive views towards the Sydney Harbour Bridge, Anzac Bridge and Sydney City. These views increase at the intersection with The Crescent.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-5** and shown on **Figure 5-21**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-5 LCZ 5 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C1	Annandale Heritage Conservation Area	Local	Leichhardt LEP 2013 (C1)
I10	Street Trees row of brush box	Local	Leichhardt LEP 2013 (I10)
I12	Annandale Post Office, including interiors	Local	Leichhardt LEP 2013 (I12)
I83	Sandstone retaining wall	Local	Leichhardt LEP 2013 (I83)
I53	House including interiors	Local	Leichhardt LEP 2013 (I53)
I54	House including interiors	Local	Leichhardt LEP 2013 (I54)
I56	House including interiors	Local	Leichhardt LEP 2013 (I56)
I57	Annandale North Public School	Local	Leichhardt LEP 2013 (I57)
I58	Sandstone retaining wall and Winkworth steps	Local	Leichhardt LEP 2013 (I58)
I59	Large sandstone wall and gateways to homes	Local	Leichhardt LEP 2013 (I59)
I60	House 'Kenilworth' including interiors	Local	Leichhardt LEP 2013 (I60)
I61	House 'Highroyd' including interiors	Local	Leichhardt LEP 2013 (I61)

Figure ID reference	Item Name	Significance	Listing
I62	House ‘Hockingdon’ including interiors	Local	Leichhardt LEP 2013 (I62)
I63	House ‘Greba’ including interiors	Local	Leichhardt LEP 2013 (I63)
I64	House ‘Oybin’ including interiors	Local	Leichhardt LEP 2013 (I64)
I65	House ‘The Abbey’ including interiors	Local	Leichhardt LEP 2013 (I65)
I66	Street trees Brush Box	Local	Leichhardt LEP 2013 (I66)
I76	Hinsby Reserve	Local	Leichhardt LEP 2013 (I76)
I77	War memorial	Local	Leichhardt LEP 2013 (I77)
00941	Substation	State Local	State Heritage Register (00941), Leichhardt LEP 2013 (I55)

Figure 5-18 Row of predominately single storey federation dwellings, view looking east along Johnston Street

Figure 5-19 Group of heritage listed houses located along the wide, tree lined Johnston Street

Figure 5-20 View from the northern eastern end of the LCZ towards the heritage Annandale (Johnston Street) underbridge and city

Figure 5-21 LCZ 5 Johnston Street precinct

LCZ 6 – Annandale Street and Young Street precinct

This LCZ is located on the western slope of the Annandale ridge and inclines down towards Whites Creek Valley to the west, and to the light rail line to the north. Young Street and Annandale Street run on a north–south axis within the LCZ and are bisected by several cross streets and laneways that run east–west across it. Part of the neighbourhood is within a Heritage Conservation Area. The LCZ is shown on **Figure 5-25**.

The LCZ has a very mixed character created by the range of architectural styles and building heights. The housing style is predominantly low scale Victorian workers' cottages, mixed with single storey Californian bungalows, weatherboard cottages and fibro cottages. The elevated nature of the northern section of the LCZ provides many larger dwellings with access to views over Rozelle Bay and the City. The steep slopes around Bayview Crescent expose attractive sandstone outcrops (see **Figure 5-22**). The slopes also allow for significant views overlooking the railway yards to the north and north-west, Rozelle Bay to the north east, and the City to east.

A significant attribute of the LCZ is the prevalence of mature street trees and established front gardens and landscaped yards. This creates vegetative corridors that contribute significantly to amenity and screening (see **Figure 5-23** and **Figure 5-24**). The whole of Annandale Street is lined with continuous rows of heritage listed, mature native street trees, which due to their height create a natural avenue which is relatively unbroken along its length. The street trees on Railway Parade are also listed as heritage items.

There are a number of commercial buildings that front Annandale Street with several large redeveloped commercial buildings including two buildings on the corner of Piper Street and a converted shop on the corner of Kentville Avenue. The Sydney Water Aqueduct which crosses Whites Creek Valley is positioned towards the northern end of the LCZ and acts as a barrier to vehicular traffic along Young Street. Cohen Park, a recreational area, is located just north of the viaduct.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-6**. There are no registered Aboriginal heritage items located within this LCZ.

Table 5-6 LCZ 6 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C1	Annandale Heritage Conservation Area	Local	Leichhardt LEP 2013 (C1)
I11	Iron/sandstone palisade fence	Local	Leichhardt LEP 2013 (I11)
I8	Shop and residence including interiors	Local	Leichhardt LEP 2013 (I8)
I4, I5	Former shop and residence, 'Craiglea' including interiors	Local	Leichhardt LEP 2013 (I4, I5)
I6	Terrace including interiors	Local	Leichhardt LEP 2013 (I6)
I7	Semi-detached house, 'Pen Dinas', including interiors	Local	Leichhardt LEP 2013 (I7)
I9	Street Trees	Local	Leichhardt LEP 2013 (I9)
I74	Whites Creek Aqueduct	State	SHR (#01354) Leichhardt LEP 2013 (I74)
I78	Street Trees – row of palms	Local	Leichhardt LEP 2013 (I78)
I79	Avenue of Phoenix canariensis	Local	Leichhardt LEP 2013 (I79)

Figure 5-22 Sandstone outcrops along Bayview Crescent

Figure 5-23 View looking north towards the project from Breillat Street showing vegetation within LCZ

Figure 5-24 Houses along Bayview Crescent showing established front gardens and mature street trees

Figure 5-25 LCZ 6 Annandale Street and Young Street precinct

LCZ 7 – Whites Creek Valley precinct

This LCZ is focussed around Whites Creek and is characterised by the creek and its banks, open grassed areas, dense mature vegetation, wetlands, sports courts, children's play equipment, light rail overpass and a small number of dwellings of varying styles. The LCZs dense vegetation provides significant screening to surrounding areas.

Dwellings at the northern end of the LCZ along White Street are characterised by contemporary town house style residential developments. South of this, towards Piper Street, there are a small number of single detached dwellings of varying styles. The creek itself consists of a concreted constructed bed with moderate height wire fencing along its edges as shown in **Figure 5-26**. A landmark element of the precinct is the State heritage Whites Creek Aquaduct which crosses the LCZ east-west.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-7** and are shown on **Figure 5-27.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-7 LCZ 7 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I26	Substation, Sydney Water (SP:5), including interiors	Local	Leichhardt LEP 2013 (I26)
SHR 01354	Whites Creek Aqueduct	State	SHR (#01354) Leichhardt LEP 2013 (I74)
4570343	Whites Creek Stormwater Channel No 95	Local	Sydney Water S170 (4570343)

Figure 5-26 The concrete bed of Whites Creek canal looking north from Piper Street bridge

Figure 5-27 LCZ 7 Whites Creek Valley precinct

LCZ 8 – Catherine Street precinct

The Catherine Street LCZ is located on the eastern side of the main Leichhardt/Balmain ridge. It predominantly slopes down in a north-easterly direction and has a gentle hill and valley landform. The gradient towards Whites Creek is much steeper and provides views over the light rail line to the Annandale ridge and the city skyline. The prevailing street pattern is a north–south orientation.

There is a prevailing low-scale built form character and consistency of residential form in the area. The general single storey cottage style in the LCZ tends to change towards the edges and at the ends of wider streets, with a visible increase in building height and form.

Buildings are elevated above a rocky outcrop along Gladstone Street (see **Figure 5-28**) which allows for some excavated garaging, with the built form above characterised by original residences which are of a small cottage scale. Some two storey contemporary development has occurred on the western side of the street which are afforded city views. The area of the LCZ along the City West Link has a clear physical departure from the character of the remainder of the LCZ reinforced by noise barriers along its edge.

There is a substantial amount of vegetation throughout the LCZ in both the private and public domain (including nature strips or verges). There are frequent open vistas available up and down the streets, especially those towards the city, which greatly contribute to amenity and character.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-8** and shown on **Figure 5-29**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-8 LCZ 8 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
SHR 01354	Whites Creek Aqueduct	State	SHR (#01354) Leichhardt LEP 2013 (I74)

Figure 5-28 Typical sloping, wide, tree lined street within the LCZ, view looking south along Gladstone Street

Figure 5-29 LCZ 8 Catherine Street precinct

LCZ 9 – Catherine Street neighbourhood centre precinct

This LCZ serves a role as a small neighbourhood centre. It is characterised by an existing strip of shops on the western side of Catherine Street, around Piper Street, and at the corner of City West Link. These shops have multi-storey residential housing that sits above it, setback from the lower levels. These residences (shown in **Figure 5-30**) are afforded significant, direct views to the east across Rozelle Rail Yards and the Sydney CBD.

There are also several properties on the eastern side of Catherine Street that were originally constructed as shops, although are not currently used for that purpose. The LCZ is well defined by topography, with Piper Street situated on the rise of the hill, and the Lilyfield light rail stop situated at the base of the incline.

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-30 View looking south along Catherine Street towards the IGA and multi storey housing above at the intersection with City West Link

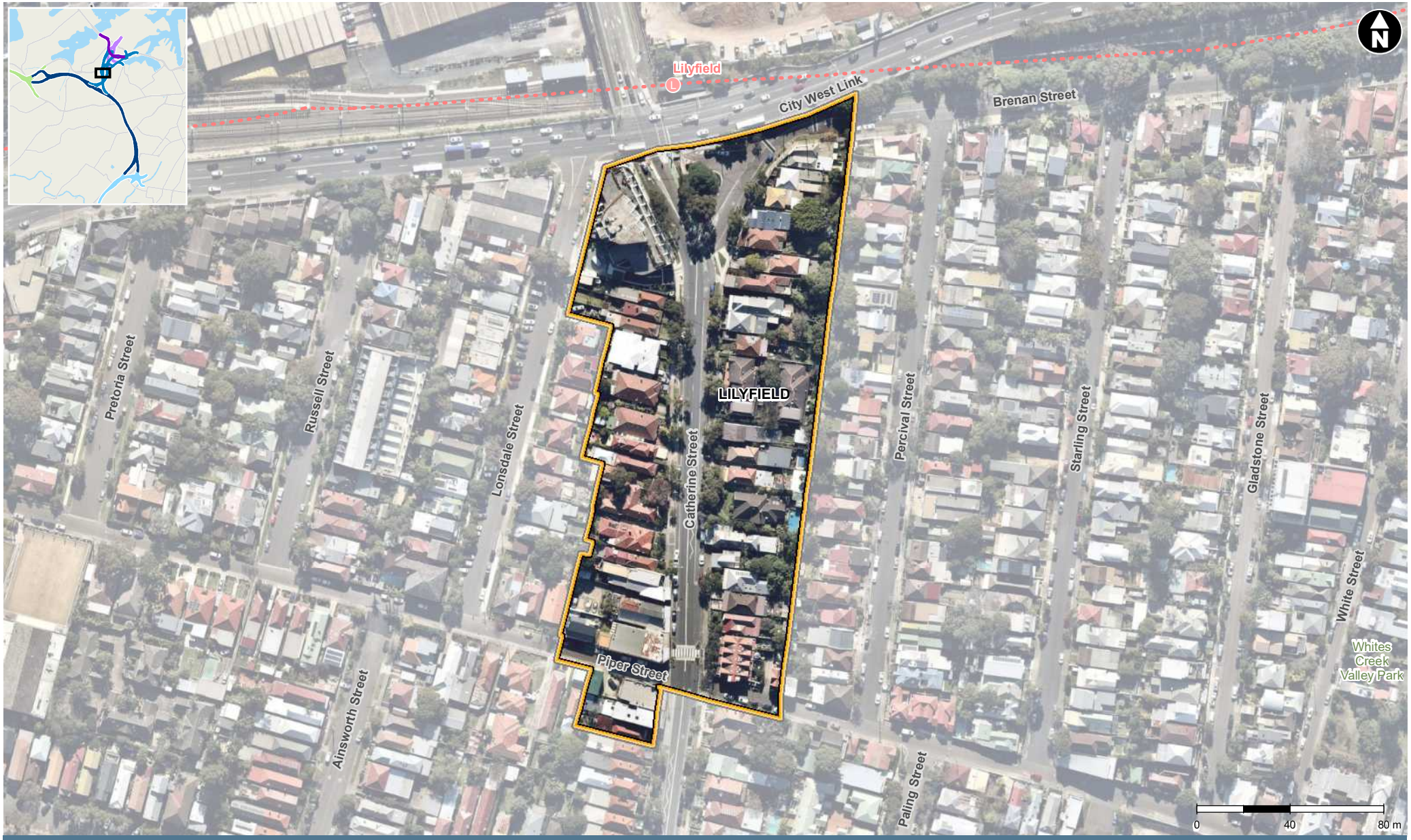


Figure 5-31 LCZ 9 Catherine Street neighbourhood centre precinct

LCZ 10 – Balmain Road precinct

The character of the LCZ is significantly influenced by the regular road pattern and subdivision layout. The streets are predominantly wide tree-lined residential streets, with nature strips or verges often planted with native trees and shrubs (see **Figure 5-32**).

There is a prevailing low scale built form in the LCZ with dwellings primarily detached, single storey cottages. Architectural styles vary reflecting different periods of residential development these include Victorian, some Federation and examples of post-war dwellings.

The parts of the LCZ fronting the City West Link and Balmain Road depart from the character of the core of the LCZ with much more varied development. The change in character in Balmain Road is more transitional, whereas the City West Link has a clear physical departure from the homogenous character of the remainder of the neighbourhood. This is reinforced by noise barriers and a change of level at the end of Pretoria, Russell and Lonsdale Streets. There are however still pockets of detached, single storey cottages evident in these parts of the LCZ. Further changes in built form character include the light industrial area with frontages to Moore and MacKenzie Streets and the Leichhardt bowling club which fronts Piper Street near Balmain Road.

There are open vistas available up and down the streets, especially those towards the city, which greatly contribute to amenity and character. War Memorial Park is a significant open space and landscape feature within the LCZ.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-9**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-9 LCZ 10 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I660	Street trees, Brush Box plantation	Local	Leichhardt LEP 2013 (I660)
I675	Former factory, including interiors	Local	Leichhardt LEP 2013 (I675)
I705	House, 'Rutherford', including interiors	Local	Leichhardt LEP 2013 (I705)
I704	'Grenfell Cottage', including interiors	Local	Leichhardt LEP 2013 (I704)
I674	Former corner shop and residence, including interiors	Local	Leichhardt LEP 2013 (I674)

Figure 5-32 View looking east along Alfred Street showing a mix of housing styles typical of the precinct

Figure 5-33 LCZ 10 Balmain Road precinct

LCZ 11 – Nanny Goat Hill residential precinct

The Nanny Goat Hill residential precinct is located on the southern side of the main Lilyfield/Rozelle ridge. The LCZ is shown on **Figure 5-37**.The LCZ is strongly defined by its topography which slopes away from Balmain Road to the southeast becoming much steeper closer to Lilyfield Road. There is also a small area around Halloran Street that lies in a basin surrounded by steeply rising land. The general elevation of the land, and the views available from it, greatly add to amenity.

The majority of roads within the LCZ are orientated north to south down the slope, which provides for views out to Whites Creek Valley and the ridge of Annandale as shown in **Figure 5-34** and **Figure 5-35**. The rising elevation in the eastern part of the LCZ allows views to the Sydney CBD. The prevailing built form in the neighbourhood is single storey detached cottages on reasonably uniform sized allotments. There are some multi-unit developments from various eras scattered throughout the neighbourhood (see **Figure 5-36**).

There is an abundance of street planting throughout the LCZ, including mainly native species such as brush boxes, bottlebrushes and some eucalyptus. Informal planting in private backyards, including high canopy trees, further add to the amenity and character of the LCZ. The residences that front Lilyfield Road to the east of Justin Street have views to the Rozelle Rail Yards, which are currently partially screened by some mature and some moderate intermittent tree plantings.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-10** and shown on **Figure 5-37.** Registered Aboriginal heritage sites within this LCZ are listed in **Table 5-11** and shown on **Figure 5-37**.

Table 5-10 LCZ 11 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C16	Brennan's Estate Heritage Conservation Area	Local	Leichhardt LEP 2013 (C16)
I714	Timber Cottage, including interiors	Local	Leichhardt LEP 2013 (I714)
I722	Former shop and residence, including interiors	Local	Leichhardt LEP 2013 (I722)
I723	Former shop and residence, including interiors	Local	Leichhardt LEP 2013 (I723)
I706 – I712	Terrace, including interiors	Local	Leichhardt LEP 2013 (I706 –I712)

Table 5-11 LCZ 11 Aboriginal heritage

Figure ID reference	Name	Site type
45-6-2278	Lilyfield Cave	Rock shelter with midden

Figure 5-34 View from Lilyfield Road near Cecily Street across the project site to City West Link and the Annandale Ridge

Figure 5-35 Houses along Lilyfield Road opposite the Rozelle Rail Yards, view looking east towards the city

Figure 5-36 Typical sloping street, view looking north along Foucart Street

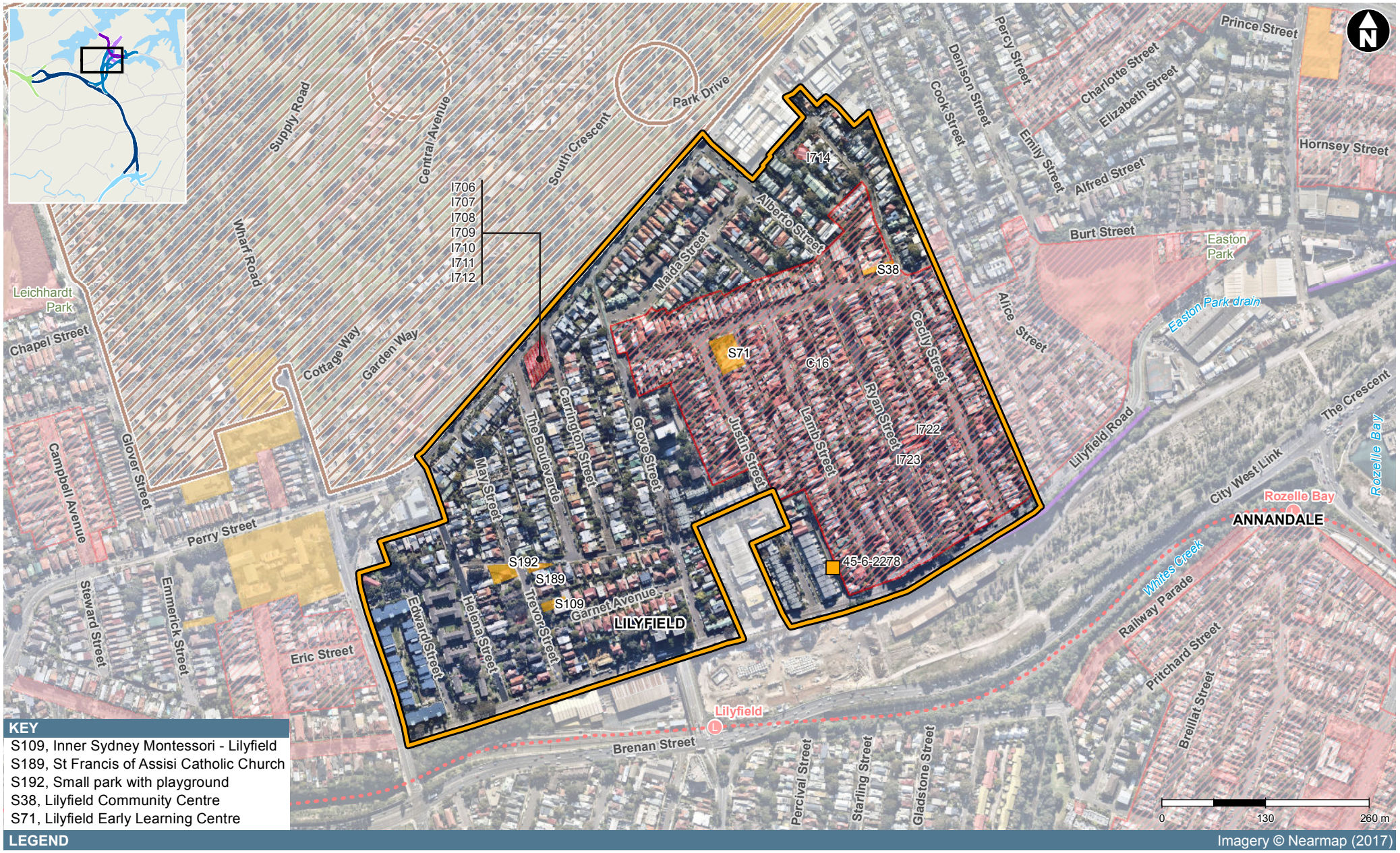


Figure 5-37 LCZ 11 Nanny Goat Hill residential precinct

LCZ 12 – Halloran Street commercial precinct

This LCZ is located within the block bordered by Halloran Street, Lilyfield Road, Justin Street and Joseph Street and is characterised by commercial buildings. The developments are generally two storeys in height with no setbacks and are 70s/80s industrial in style (see **Figure 5-38**). This represents a significant departure to the adjacent and adjoining residential area which is largely historic in character. The industrial building that fronts Lilyfield Road has views to the Rozelle Rail Yards.

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-38 Commercial buildings looking north along Halloran Street

Figure 5-39 LCZ 12 Halloran Street commercial precinct

LCZ 13 – Easton Park residential precinct

This LCZ is located at the south-eastern corner of the Balmain Peninsula. It is strongly defined by its topography, which looks across a valley to Annandale and Glebe towards the south and east. The LCZ contains some significant vegetation. Mature trees are located on both public and private land with larger trees located around Easton Park (see **Figure 5-40**).

The LCZ contains three parks – Easton Park, O'Connor Reserve and Rozelle Common. Easton Park is the largest of these and is located at the southern end of the precinct along Lilyfield Road. It is characterised by a playground, a sports field, cricket nets and dense mature figs that border its northern, eastern and western edges (see **Figure 5-41**).

The LCZ is primarily residential in character and the current and original scale of development is predominately single storey, freestanding cottages. A number of two storey houses however are located along the higher elevations and adjacent to Easton Park at the foot of the hill with some recent developments such as townhouses, located along Alfred Street. There are also numerous smaller infill developments located throughout the LCZ which consist of single houses and semi-detached dwellings (see example at **Figure 5-42**). The dwellings east of Gordon Street tend to be more substantial masonry houses and terraces (see **Figure 5-43**).

The height and scale of housing is also partially affected by sandstone outcrops in the lower half of the neighbourhood. The corner of Denison and Alfred Streets, at the top of Easton Park serves as a small neighbourhood hub and includes a corner shop, heritage listed Smiths Hall building as well as Easton Park.

There are three distinct character areas within the neighbourhood that are located within heritage conservation areas:

- Evans Street
- Most of the area east of Gordon Street
- 'Knoll' west of Easton Park.

Aboriginal and non-Aboriginal heritage

Heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-12** and shown on **Figure 5-44**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-12 LCZ 13 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
4571704	Sewage Pumping Station No. 6	Local	Sydney Water S170 Register (4571704)
C7	The Valley Heritage Conservation Area	Local	Leichhardt LEP 2013 (C7)
C18	Easton Park Heritage Conservation Area	Local	Leichhardt LEP 2013 (C18)
C19	Hornsey Street Heritage Conservation Area	Local	Leichhardt LEP 2013 (C19)
#2	Former Hotel, 78 Lilyfield Road.	Local	SREP 26 (#2)
#3	'Cadden Le Messurier', 84 Lilyfield Road	Local	SREP 26 (#3)
I765	Cottage and former broom factory, including interiors	Local	Leichhardt LEP 2013 (I765)
I752	Easton Park	Local	Leichhardt LEP 2013 (I752)

Figure ID reference	Item Name	Significance	Listing
I755	House, 'Rotherhithe Cottage', including interiors	Local	Leichhardt LEP 2013 (I755)
I753, I754	Corner shop and residence including interiors	Local	Leichhardt LEP 2013 (I753, I754)
I724-I728	Terrace, including interiors	Local	Leichhardt LEP 2013 (I724-I728)
I729	Corner building, including interiors	Local	Leichhardt LEP 2013 (I729)
I730, I731	Semi-detached house, including interiors	Local	Leichhardt LEP 2013 (I730, I731)
I732	Smith's Hall including interiors	Local	Leichhardt LEP 2013 (I732)
I764	House including interiors	Local	Leichhardt LEP 2013 (I764)
I766, I767	Semi-detached house including interiors	Local	Leichhardt LEP 2013 (I766, I767)
I769, I770	Former tramway substation and stables, including interiors	Local	Leichhardt LEP 2013 (I769, I770)
I771	House, 'Hornsey', including interiors	Local	Leichhardt LEP 2013 (I771)
I768	St Joseph's Catholic Church, Rozelle	Local	Leichhardt LEP 2013 (I768)
I788	St Joseph's presbytery, including interiors	Local	Leichhardt LEP 2013 (I788)
I789-I793	Mary Terrace, including interiors	Local	Leichhardt LEP 2013 (I789-I793)

Figure 5-40 View looking south across Easton Park towards the Rozelle Rail Yards showing picnic table, mature trees and large playing field

Figure 5-41 Play area located in the south eastern corner of Easton Park

Figure 5-42 Houses located on the corner of Lilyfield Road and Denison Street

Figure 5-43 View looking north east along Lilyfield Road toward Victoria Road

KEY

S05, Rosebud Cottage Child Care Centre
S31, NSW Catholic Renewal Centre

LEGEND

Existing features
- Light rail
- Light rail stop

Landscape character zone
- Boundary

Sensitive receivers
- Community facility

Potential heritage
- Potential heritage item

Local Environmental Plan
- Heritage item
- Heritage conservation area

State Heritage Register
- Item

SREP Heritage Register
- Item

S170 Agency Register Heritage
- S170 Sydney Water

Figure 5-44 LCZ 13 Easton Park residential precinct

LCZ 14 – Victoria Road south precinct

The precinct is characterised by high volumes of traffic with vehicles travelling to and from the city via Victoria Road, which serves as a main arterial for the Inner West of Sydney. Victoria Road incorporates a pedestrian bridge near Lilyfield Road.

This LCZ includes a number of commercial businesses that have frontages to Victoria Road as well as some small areas of open space along the LCZs north-western edge. Parts of these open space areas are densely vegetated with mature trees that provide screening for the adjacent residences in Quirk Street (see **Figure 5-45**).

It also includes a pedestrian bridge which spans Victoria Road near its junction with Lilyfield Road. The built form fronting Victoria road is generally degraded and when combined with the utilitarian road infrastructure and high levels of traffic create an area of generally low visual amenity.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-13** and are shown on **Figure 5-47.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-13 LCZ 14 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C19	Hornsey Street Heritage Conservation Area	Local	Leichhardt LEP 2013 (C19)
C7	The Valley Heritage Conservation Area	Local	Leichhardt LEP 2013 (C7)
PL1	Victoria Road bridge	Potential Local[1]	NA

Figure 5-45 View looking north towards a row of dense mature trees that provides screening to Quirk Street

Figure 5-46 View looking west across Victoria Road to Lilyfield Road, the pedestrian bridge and a commercial premises

[1] Item identified as a potential heritage item by GML (2017), refer **Appendix U** (Technical working paper: Non-Aboriginal heritage) of the EIS.

Figure 5-47 LCZ 14 Victoria Road south precinct

LCZ 15 – White Bay Power Station precinct

This LCZ is located immediately east of Victoria Road and is bounded by Robert Street to its north. It is characterised by the decommissioned White Bay Power Station, which is a heritage listed, former coal fired power station.

The remains of the power station can be clearly seen at the western end of Anzac Bridge on the junction of Victoria Road and Roberts Street. The station came on line in 1917 and was decommissioned in 1984. The site is now inaccessible to the general public. The power station boiler houses have a dramatic vertical façade and serves as a landmark with its remaining chimneys easily identified from many vantage points (see **Figure 5-48**). The southern boundary of the LCZ comprises a row of uniform tree plantings which provides moderate levels of screening from Victoria Road/Western Distributor.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-14** and shown on **Figure 5-49.** There are no identified Aboriginal heritage sites located within this LCZ.

Table 5-14 LCZ 15 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
SHR 01015	White Bay Power Station	State	State Heritage Register (#01015) SREP 26 (#11) Pacific Power/Ausgrid S170 Register (#74) Sydney Harbour Foreshore Authority S170
PL11	Former White Bay Hotel site (plinth and archaeology)	Potential Local[1]	NA
PL12	Southern penstock	Potential State[2]	NA

Notes:

[1] The former White Bay Hotel site (plinth and archaeology) is excluded from the SHR curtilage for the White Bay Power Station, however, it is identified in the 2013 White Bay Power Station Conservation Management Plan as being of Moderate significance. The site has been assessed as a potential heritage item of local significance by GML (2017), refer to **Appendix U** (Technical working paper: Non-Aboriginal heritage) of the EIS

[2] The southern penstock is excluded from the SHR curtilage for White Bay Power Station, however, it is identified in 2013 White Bay Power Station Conservation Management Plan as being of High significance. The site has been assessed as a potential heritage item of State significance by GML (2017), refer to **Appendix U** (Technical working paper: Non-Aboriginal heritage) of the EIS

Figure 5-48 View looking east across Victoria Road towards Robert Street and the White Bay Power Station

Figure 5-49 LCZ 15 White Bay Power Station precinct

LCZ 16 – Rozelle Bay wharves precinct

This LCZ is characterised by a flat topography and working harbour activities. It comprises a waterfront harbour area within Rozelle Bay, including harbour walls, wharves, jetties and a number of commercial businesses including:

- Boat repair and maintenance facilities
- Superyacht marina
- Large dry stack boat storage facility
- Marine contracting facilities
- Catamaran facility
- Maritime NSW buildings (not yet occupied at time of writing)
- White Bay Cruise Ship Terminal
- Grain silos.

The built form within the LCZ is primarily industrial-style buildings up to a height of about 20 metres (see **Figure 5-50**). It has minimal tree planting with extensive hardstand areas, primarily comprising concrete deck (see **Figure 5-51**).

The northern boundary of the Rozelle Bay component of this LCZ comprises a row of uniform tree plantings which provide a moderate level of screening to from Victoria Road/approaches to Anzac Bridge and City West Link.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-15** and shown on **Figure 5-52.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-15 LCZ 16 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
01914	Glebe Island Bridge	State (SHR)	State Heritage Register (01914)
No. 1	Glebe Island Silos	Local	SREP 26 (#1)
No. 5	Monument, Glebe Island	Local	SREP 26 (#5)
C7	The Valley Heritage Conservation Area	Local	Leichhardt LEP 2013 (C7)

Figure 5-50 Large dry boat storage marina shed located near City West Link

Figure 5-51 View form the wharves looking south towards Glebe parklands across Rozelle Bay

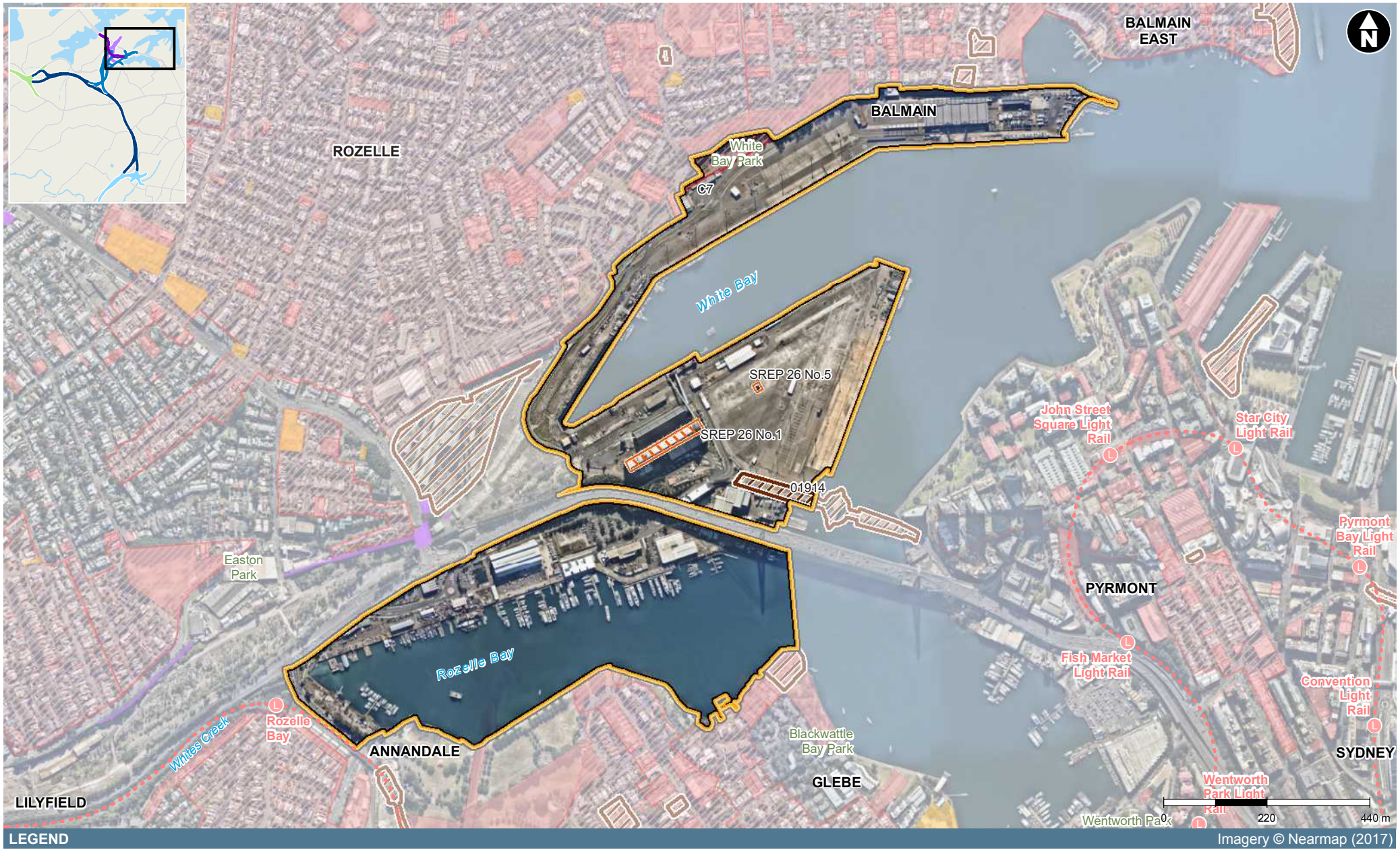


Figure 5-52 LCZ 16 Rozelle Bay wharves precinct

LCZ 17 – City West Link precinct

This LCZ comprises City West Link, a major arterial motorway which connects the Inner West of Sydney to the city centre (see **Figure 5-53**).

It is characterised by high volumes of traffic travelling from the western end of Anzac Bridge to Balmain Road, Leichhardt. The western end of the roadway has noise walls and intermittent screen vegetation, providing a sense of visual enclosure, with the exception of a brief view across the Rozelle Rail Yards when travelling eastbound (see **Figure 5-54**).

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-53 City West Link looking west towards Rozelle Rail Yards from the edge of the Anzac Bridge

Figure 5-54 City West Link east of The Crescent, looking west

Figure 5-55 LCZ 17 City West Link precinct

LCZ 18 – Rozelle light rail corridor and Whites Creek canal precinct

This LCZ is located primarily in parallel to and to the south of City West Link, veering to the south-east at The Crescent. It is characterised by a linear light rail line structure with dense vegetation along either side of the corridor, which serves to generally screen views to and from the adjacent residential areas.

The light rail corridor forms part of the Inner West rail line, which runs from Central to Dulwich Hill. It includes the Lilyfield stop, located near to the junction of Catherine Street and City West Link. The stop is built as an island platform and is accessed by stairs and a lift from Catherine Street. It also includes the Rozelle Bay stop, located adjacent to Railway Parade and Bayview Crescent (see **Figure 5-57**).

There are two local heritage listed railway bridges within the LCZ, the Annandale Railway Bridge (see **Figure 5-58**) and the Johnston Street Underbridge. The Glebe Railway viaduct is a State heritage listed item which consists of a number of stone arches that curve around the southern edge of Jubilee Park (see **Figure 5-56**).

The Whites Creek canal runs parallel to the light rail line within this LCZ and is characterised by a concrete channel with high wire fencing and vegetation along its edges. It crosses beneath the light rail line at the northern end of Bayview Crescent and continues east underneath The Crescent out to Rozelle Bay.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-16** and shown on **Figure 5-59.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-16 LCZ 18 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
4570343	Whites Creek Stormwater Channel No 95	Local	Sydney Water S170 (4570343)
SREP #7	Annandale Railway Bridge - Railway Parade	Local	SREP 26 (#7) Railcorp S170 (4803231)
SREP #8	Arched Bridge (at Whites Creek)	State	SREP 26 #8 Railcorp S170 (4803229)
SHR 01034	Glebe and Wentworth Park Railway Viaduct	State	SHR #01034 Sydney LEP 2012 (I32) Railcorp S170 (4801104)
I30	Federal Park including landscaping	Local	Sydney LEP 2012 (I30)
I630	Johnstons Creek	Local	Sydney LEP 2012 (I630)

Figure 5-56 The State heritage listed Glebe Railway Viaduct, view looking south across Jubilee Park

Figure 5-57 Rozelle Bay light rail stop looking west along the platform

Figure 5-58 Heritage listed Annandale (Railway Parade) Railway bridge

LEGEND

Imagery © Nearmap (2017)

Existing features
- Light rail
- Light rail stop

Landscape character zone
- Boundary

Sensitive receivers
- Community facility

Potential heritage
- Potential heritage item

Local Environmental Plan
- Heritage item
- Heritage conservation area

State Heritage Register
- Item

SREP Heritage Register
- Item

S170 Agency heritage register
- S170 Sydney Water
- S170 RailCorp Item

Figure 5-59 LCZ 18 Rozelle light rail corridor and Whites Creek precinct

LCZ 19 – Rozelle Rail Yards precinct

This LCZ is primarily located on the site of the former Metropolitan Goods railway line in a wide cutting. The overall landscape character of the Rozelle Rail Yards precinct is associated with its former use that is, a mainly flat landform with some gentle gradients. It is currently a disused and degraded brownfield site with associated redundant rail infrastructure, stockpiles and native and exotic vegetation regrowth that has established itself over recent years. Exceptions to this include a number of industrial buildings located on the LCZs central northern edge near Gordon Street which vary in height from one to two storeys and are largely of a warehouse style character (see **Figure 5-63**) and the Rozelle maintenance depot adjacent to Lilyfield Road and Catherine Street (under construction). The facility, which adjoins the western boundary of the project, forms part of the CBD and South East Light Rail project. The construction site is visually characterised by a number of temporary site offices, building materials, an access road and fences/hoarding (see **Figure 5-62**).

The Rozelle Rail Yards site management works is a separate project approved to manage the existing environmental and safety issues within part of the Rozelle Rail Yards precinct (commenced and anticipated to be around 12 months in duration). The works would result in the removal of vegetation, waste, stockpiles of materials, existing rail infrastructure, buildings and redundant services. These works significantly alter the character of the majority of this LCZ.

The south-eastern corner of the LCZ is currently characterised by dense mature vegetation which provides some screening to City West Link. This vegetation will be removed as part of the planned Rozelle Rail Yards site management works. The vegetation above the cutting adjoining the terraces at the eastern end of Lilyfield Road will be retained. Victoria Road borders the eastern side of the LCZ via a road bridge over the former rail line that previously connected the rail yards and White Bay. Along its southern boundary the LCZ is mostly screened by vegetation along the City West Link road corridor. The area surrounding the site can be broadly characterised as having an inner city urban landscape character.

Although mature vegetation currently encloses the site to views from adjacent roads, much of this vegetation will be removed as part of the site management works. Some elevated residential areas to the north are currently afforded filtered views across the site and these views would change once the site management works have been carried out.

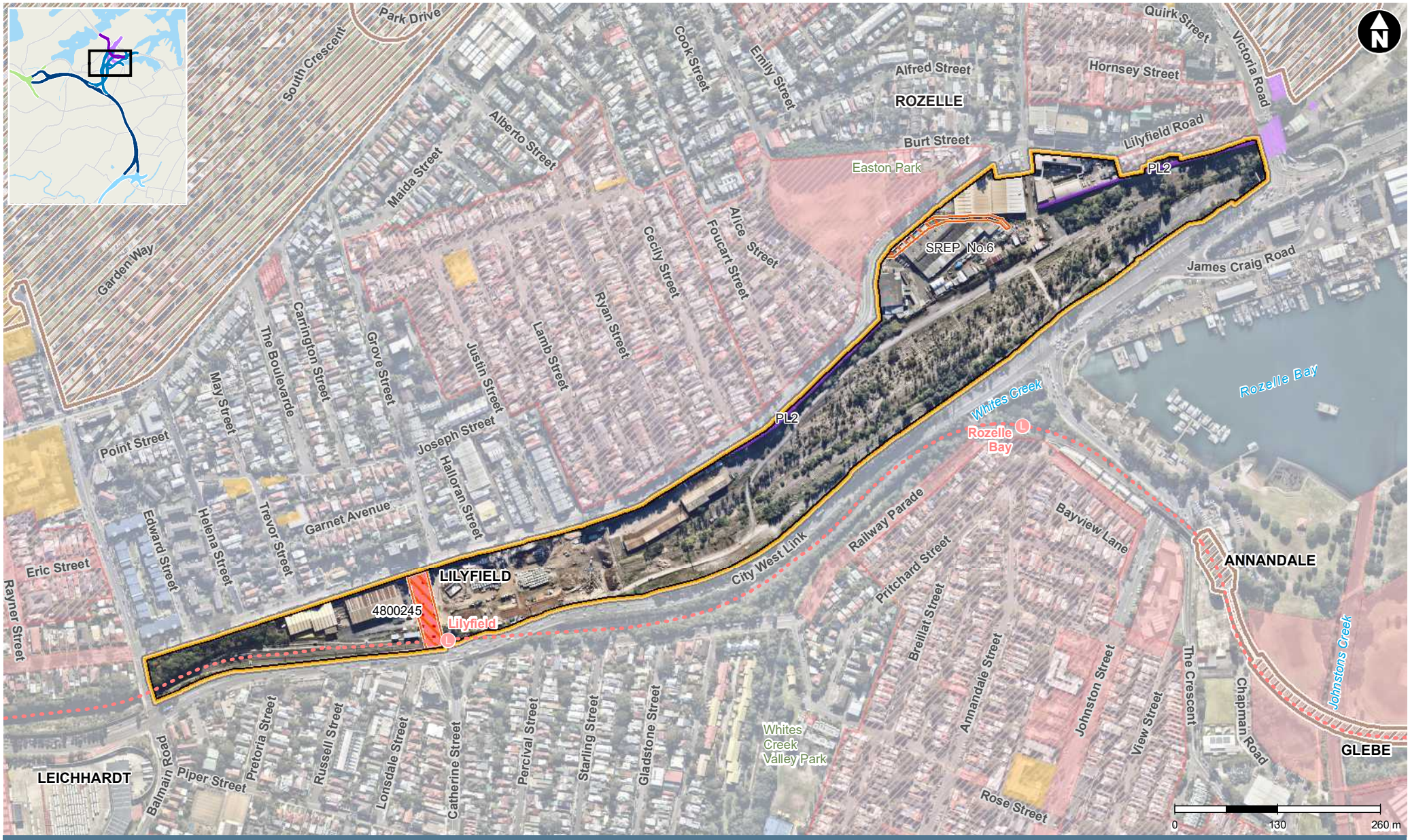
The LCZ includes a section of Catherine Street, which forms a bridge connecting Lilyfield Road with City West Link. From parts of Catherine Street and from the entry to the light rail stop, broad views across the site are available. In these views, the CBD skyline is prominent, in conjunction with the Sydney Harbour Bridge, Glebe Island grain silos and Anzac Bridge (see **Figure 5-62**).

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-17** and shown on **Figure 5-60.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-17 LCZ 19 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
No. 6	Lilyfield stormwater canal	Local	SREP 26 (#6)
PL2	Sandstone cutting, Rozelle	Potential Local	NA
4800245	Lilyfield (Catherine St) Overbridge	Local	Railcorp S170 (4800245) SREP 26 (#12)



LEGEND

Existing features
- Light rail
- Light rail stop

Landscape character zone
- Boundary

Sensitive receivers
- Community facility

Potential heritage
- Potential heritage item

Local Environmental Plan
- Heritage item
- Heritage conservation area

State Heritage Register
- Item

SREP Heritage Register
- Item

S170 Agency heritage register
- S170 RailCorp Item

Figure 5-60 LCZ 19 Rozelle Rail Yards precinct

Figure 5-61 Rozelle Rail Yards looking south-west from Victoria Road pedestrian bridge towards City West Link

Figure 5-62 Rozelle Rail Yards looking east towards the city from Catherine Street, showing the Rozelle maintenance depot under construction in the foreground

Figure 5-63 Commercial buildings located on Lilyfield Road, view looking east from Denison Street

5.3.3 Northern landscape character zones (Iron Cove Link)

This section describes the existing character of the seven LCZs (see **Figure 5-64**) associated with the Iron Cove Link.

LCZ 20 – Victoria Road north precinct

This LCZ is shown on **Figure 5-65** and is characterised by high volumes of traffic, with vehicles travelling to and from the city via Victoria Road, which serves as a main arterial for the inner west of Sydney.

North of Darling Street, the LCZ slopes down towards Iron Cove (see **Figure 5-66**). The slope and low lying nature of this section of Victoria Road allows reasonably unimpeded views to the north-west along the corridor until Callan Street, where the curve in the road prevents complete views from higher on the ridge to Iron Cove. From Callan Street there are direct views to Iron Cove.

Development to either side of Victoria Road within the LCZ ranges in scale from single storey to three storeys. The north-eastern side of the road is characterised by shallow lots with wide street frontages onto Victoria Road. The south-western side of the road is primarily characterised by a mix of later 1900s industrial style buildings and Victorian style two storey shops and residences (see **Figure 5-67**). Other building forms include housing from the inter-war years, traditional pubs and a church building currently used as a Community College.

A number of buildings that front Victoria Road incorporate original shop front detailing and weather protection through the incorporation of cantilevered awnings. A number also have nil setbacks and restricted vehicle access resulting from there being no formal lane structure. The former Balmain Leagues Club site is located near the ridgeline to the north-west of Darling Street and comprises a vacant and derelict building.

There is minimal vegetation within the LCZ which combined with the utilitarian road infrastructure, at times degraded built form and high levels of traffic, create an area of low visual amenity.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-18** and shown on **Figure 5-65.** There are no identified Aboriginal heritage sites located within this LCZ.

Table 5-18 LCZ 20 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C7	The Valley Heritage Conservation Area	Local	Leichhardt LEP 2013 (C7)
17	Iron Cove Bridge Abutment	State	RTA S170 (17) SREP 26 (#17)
I746, I807-I809	York Buildings including interiors	Local	Leichhardt LEP 2013 (I746, I807-I809)
PL3	House (260 Victoria Road, Rozelle)	Potential local[1]	NA
PL4	House (262 Victoria Road, Rozelle)	Potential local[1]	NA
PL5	House (264 Victoria Road, Rozelle)	Potential local[1]	NA
PL6	House (266 Victoria Road, Rozelle)	Potential local[1]	NA
PL7	House (248 Victoria Road, Rozelle)	Potential local[1]	NA
PL8	House (250 Victoria Road, Rozelle)	Potential local[1]	NA

Note:
[1] Item identified as a potential heritage item by GML (2017), refer **Appendix U** (Technical working paper: Non-Aboriginal heritage) of the EIS

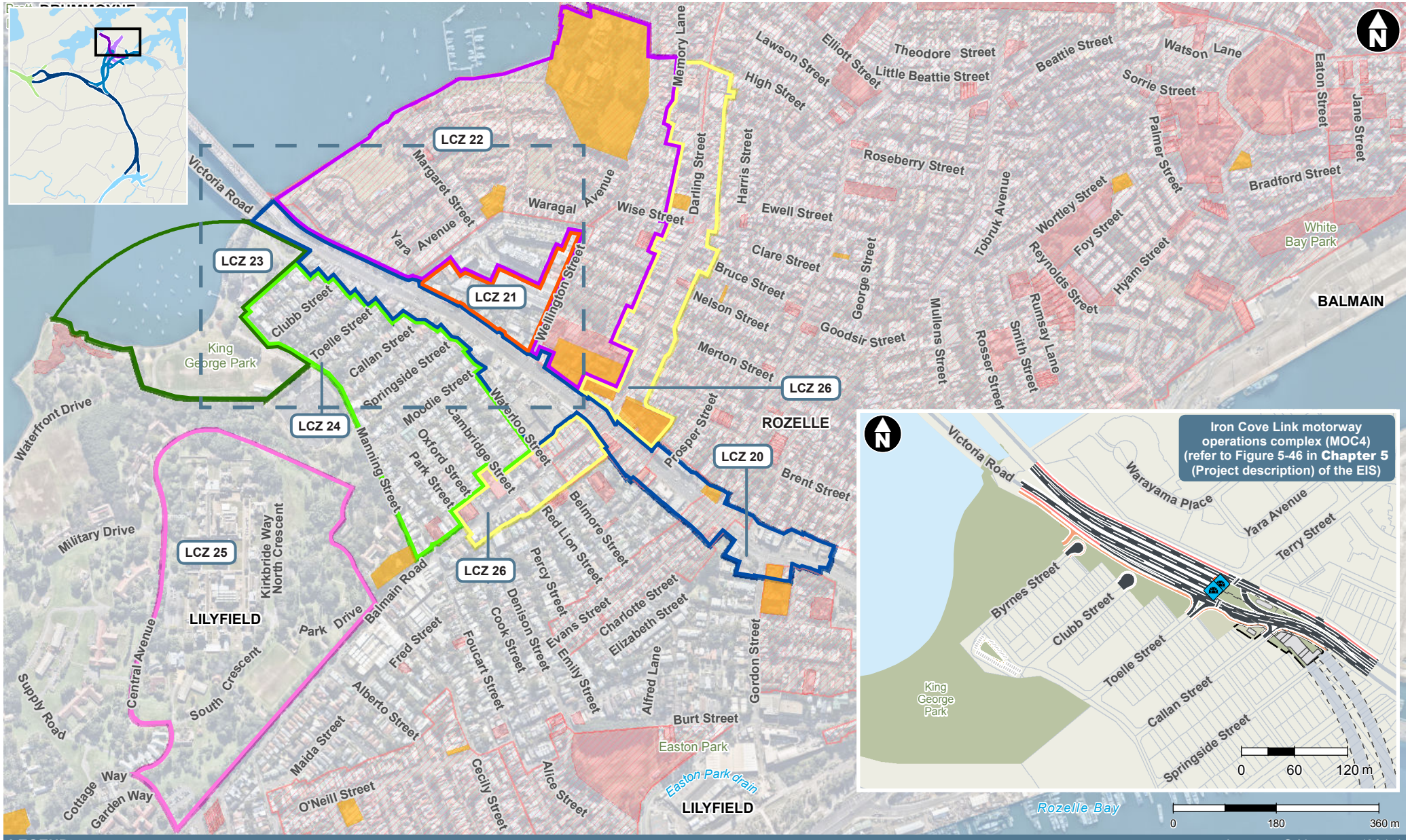


Figure 5-64 Northern landscape character zones

LEGEND

Landscape character zone
- Boundary

Sensitive receivers
- Community facility

Potential heritage
- Potential heritage item

Local Environmental Plan
- Heritage item
- Heritage conservation area

State Heritage Register
- Item

SREP Heritage Register
- Item

S170 Agency heritage register
- S170 RTA item

Figure 5-65 LCZ 20 Victoria Road north precinct

Figure 5-66 View looking north-west along Victoria Road toward Iron Cove with the derelict Balmain Leagues club pictured on the far left

Figure 5-67 View looking north along Victoria Road from its intersection with Terry Street of a mix shops and residences.

LCZ 21 – Victoria Road light industrial precinct

The Victoria Road light industrial precinct is located along the north-eastern side of Victoria Road between Terry and Wellington Streets and comprises a variety of commercial premises. The LCZ forms a distinct employment area with a variety of uses ranging from light manufacturing, warehousing, ancillary commercial and retail uses and car related uses (see **Figure 5-68**).

The precinct is characterised by a diverse range of subdivision patterns and the built form varies due to changes in land uses and topography. Building heights, setbacks, and access arrangements differ depending on the age and function of the building and the size and location of the lots. The premises that front Victoria Road within this LCZ have partial views to Iron Cove. The LCZ is shown on **Figure 5-69**.

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-68 Victoria Road light industrial precinct, view from Victoria Road to Crystal Street

Figure 5-69 LCZ 21 Victoria Road industrial precinct

LCZ 22 – Iron Cove residential precinct

This LCZ is located to the north of Victoria Road as shown on **Figure 5-70**, and is characterised by a topography that steeply slopes downwards from the ridgeline at Darling Street to Iron Cove.

The road pattern in the LCZ is based around three main roads: Victoria Road, Terry Street and Darling Street. Minor roads within the LCZ connect between Darling and Terry streets and provide for views over Iron Cove and further west.

The south-western area of the LCZ is characterised by two major multi-unit residential developments (Balmain Shores and Balmain Cove). The developments each consist of a series of buildings up to eight storeys high (see **Figure 5-71**). To the north of Balmain Shores and Balmain Cove is Sydney Secondary College Balmain Campus.

The LCZ is characterised by intermittent, mature vegetation at its border with Victoria Road. This becomes significantly denser closer to Iron Cove Bridge. A range of public open space has been established along the foreshore of these sites and includes Bridgewater Park and an active transport link between King George Park in the south west and Sydney Secondary College Balmain Campus in the north east.

Terry Street comprises a mix of single and double storey residences, with residences primarily Victorian era in character. The south-eastern side of Terry Street includes two blocks of recently–developed multi-storey apartments ('Union Balmain') (see **Figure 5-72**). The southernmost upper level apartments have direct views to Victoria Road and beyond.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-19** and shown on **Figure 5-70.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-19 LCZ 22 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C6	Iron Cove Heritage Conservation Area	Local	Leichhardt LEP 2013 (C6)
I742	Former bank building, including interiors	Local	Leichhardt LEP 2013 (I742)
I743	Rozelle Public School, including interiors	Local	Leichhardt LEP 2013 (I743)
I786	Former Balmain Power Station administration building, including interiors	Local	Leichhardt LEP 2013 (I786)
I787	Former Balmain Power Station pumping station, including interiors	Local	Leichhardt LEP 2013 (I787)
I810–I817	Terraces, including interiors	Local	Leichhardt LEP 2013 (I810-I817)

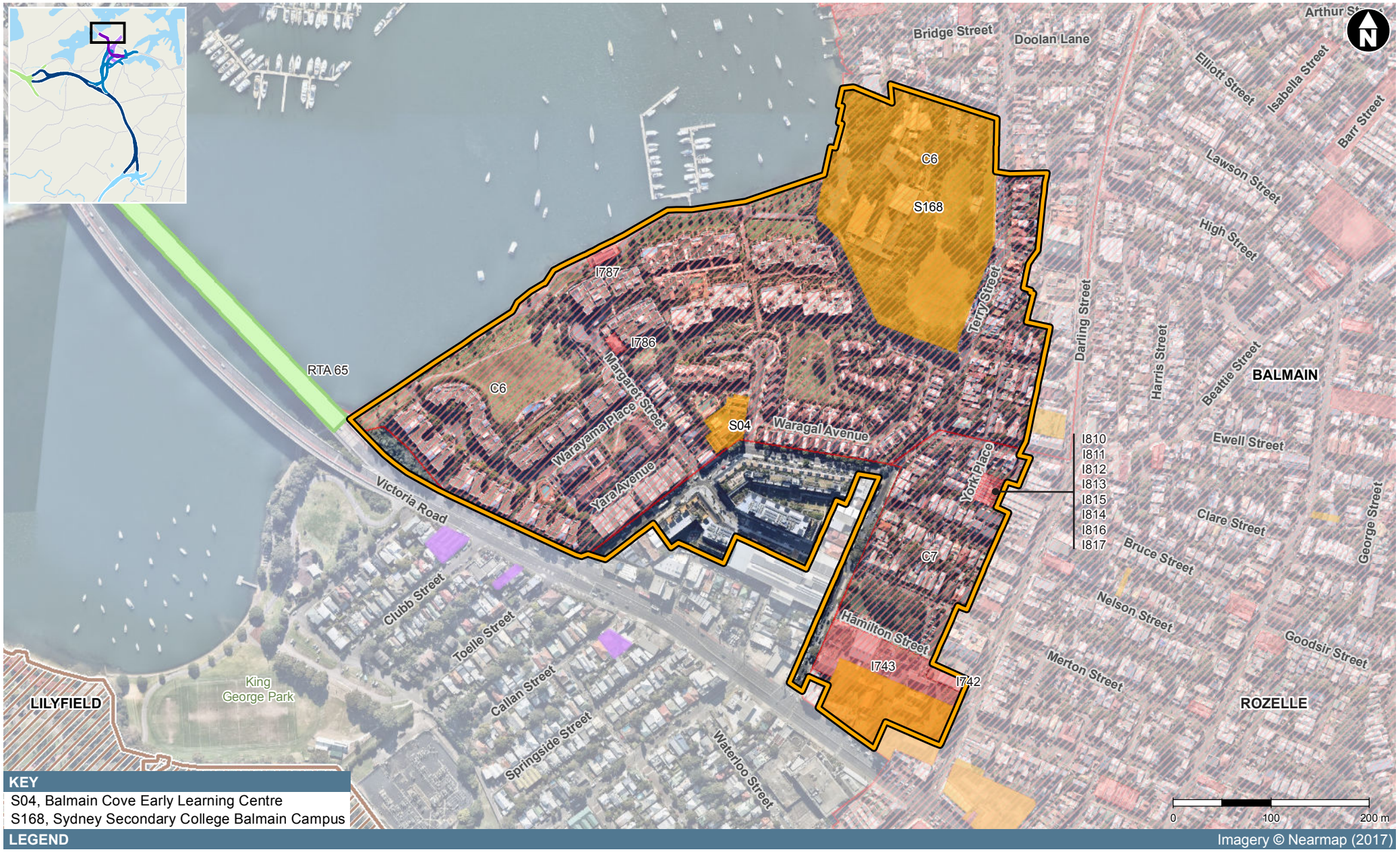


Figure 5-70 LCZ 22 Iron Cove residential precinct

Figure 5-71 View towards Iron Cove with the Balmain Shores residential development in the foreground

Figure 5-72 The Union Balmain mixed use development, view looking east from Terry Street towards Nagurra Place

LCZ 23 – King George Park precinct

The King George Park LCZ forms a small part of the broader network of Iron Cove Parklands, and includes an adjoining harbour area known as Iron Cove. The LCZ is generally flat and allows for views across the water towards Drummoyne.

King George Park includes both active and passive recreation facilities. This encompasses an oval used by local sporting groups as well as local schools for sports carnivals, a fitness station, a children's playground and a section of the Iron Cove Bay Run along the foreshore (see **Figure 5-73** and **Figure 5-74)**.

The LCZ features a row of mature trees towards the eastern edge at the point where the topography begins to slope upwards. It also features dense mature trees along its western and southern edges with intermittent landscape plantings along its Iron Cove frontage.

There is a small jetty that extends from King George Park over the bay and a harbour wall runs most of the way along the edge of the park. The small bay is a mooring area for a number of private boating vessels (see **Figure 5-75)**. A former amenities block in the car park area adjacent to Manning Street has recently been demolished and replaced with a new upgraded facility which is located in the south western part of the LCZ.

The LCZ provides high levels of amenity to the users of the park and Bay Run, as well as the residences located adjacent to it. The interface between the LCZ and the adjacent dwellings contributes significantly to the character of the residential streets and provides important streetscape values to the locality.

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items and no registered Aboriginal heritage sites located within this LCZ. The King George Park Draft Plan of Management referred to incomplete land claims lodged by the Metropolitan Local Aboriginal Land Council. These were not complete and may not necessarily denote Aboriginal cultural or scientific archaeological values (refer **Appendix V** (Technical working paper: Aboriginal heritage) of the EIS).

Figure 5-73 Children's playground area near Iron Cove Bridge, view looking south west

Figure 5-74 View looking north towards the Iron Cove Bridge with the Iron Cove Bay Run in the foreground

Figure 5-75 View towards Iron Cove across King George Park showing the mature trees that line the car park area adjacent to Manning Street

Figure 5-76 LCZ 23 King George Park precinct

LCZ 24 – Callan Park residential precinct

This LCZ is shown on **Figure 5-77**, and is bounded by King George Park to the west, the Callan Park grounds to the west and south, Victoria Road and Darling Street, in the north and east. The topography slopes steeply from Victoria Road and Darling Street down to King George Park, creating a west facing valley (see **Figure 5-78**). Sandstone outcrops remain at the lower end of the slopes, along some of the street frontages.

The road layout provides extensive views over the adjoining parklands and Iron Cove. In the middle of the neighbourhood, there are views over the Kirkbride building within Callan Park (including from Victoria Road), currently used by the Sydney College of the Arts.

The LCZ has a distinct, often uniform scale and character and comprises primarily single storey detached dwellings dating from the late 1800s and early 1900s (see **Figure 5-79**). Adjacent to King George Park, there are a number of two storey dwellings (see **Figure 5-80**).

At the bottom of the valley along Manning, Toelle, Callan and Clubb streets, there are a number of two storey townhouses and infill development that have been developed post the 1970s. The streets are characterised primarily by modest development, consisting of mainly cottages with a tight development pattern and limited building setbacks.

Tree cover across the LCZ is varied. Most mature trees are located in the lower valley with a canopy of trees evident when viewed from higher slopes. Mature trees located within Callan Park form a distinct back drop to the lower areas within the precinct and along parts of Manning Street. Wider streets such as Clubb and Moodie, feature street trees and most front yards throughout the neighbourhood have vegetation, which adds to streetscape amenity.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-20** and shown on **Figure 5-77.** There are no registered Aboriginal heritage items located within this LCZ.

Table 5-20 LCZ 24 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I751	Maxwell House, including interiors	Local	Leichhardt LEP 2013 (I751)
PL9	House, 8 Callan Street, Rozelle	Potential Local[1]	NA

Note:

1 Item identified as a potential heritage item by GML (2017), refer Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS

Figure 5-77 LCZ 24 Callan Park residential precinct

Figure 5-78 Callan Street looking north-east towards Victoria Road

Figure 5-79 Springside Street looking south west towards Callan Park showing typical single storey detached dwellings

Figure 5-80 Houses adjacent to King George Park along Manning Street, view looking north towards Iron Cove

LCZ 25 – Sydney College of the Arts precinct

This primary land use within this LCZ is the Sydney College of the Arts (SCA) which is housed within the heritage listed Kirkbride complex; a cluster of sandstone buildings established in the late 19th century (see **Figure 5-81**). Gary Owen House, built in the 1840s and the current location of the NSW Writers Centre, is also located within the LCZ towards its southern end and is surrounded by a number of more recent (1970s/1980s) buildings which are largely unused.

The LCZ topography generally rises from the northern and western boundary, up to Balmain Road on the south-eastern boundary. Parts of the site are relatively steep, particularly the eastern edge; however, there is an extensive network of paths and that enable access to all areas. There are also parts of the site that are level, particularly in the areas near to existing buildings and the land near Balmain Road which is used as a sports field.

The topography of the site allows for views towards Drummoyne and the areas around Victoria Road to the north of Darling Street (see **Figure 5-82**). There are also allows views from surrounding areas to the site with particular features such as the tower at the Kirkbride complex (see **Figure 5-81**), highly visible above the tree canopy from surrounding areas to the north and north east.

The LCZ provides a significant level of amenity to the surrounding residential properties. The interface between the LCZ and the dwellings located adjacent to it and those which have views to it, contributes significantly to the character of the residential streets and provides important streetscape values to the locality.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-21** and shown on **Figure 5-83.** Registered aboriginal heritage sites located within this LCZ are listed in **Table 5-22** and shown on **Figure 5-83**.

Table 5-21 LCZ 25 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
SHR 00818	Callan Park Conservation Area and Buildings	State	State Heritage Register (00818)
SHR 01341	Sewage Pumping Station 27	State	State Heritage Register (01341)

Table 5-22 LCZ 25 Aboriginal heritage

Figure ID reference	Name	Site Type
45-6-1481	Midden	Midden

Figure 5-81 Kirkbride complex including tower, located within the Sydney College of the Arts

Figure 5-82 View towards the vegetated eastern border of the LCZ, looking out towards 'Balmain Union' apartments in Rozelle

Figure 5-83 LCZ 25 Sydney College of the Arts precinct

LCZ 26 – Darling Street precinct

This LCZ is characterised by a vibrant mix of restaurants, retail shops, community facilities and commercial enterprises (see **Figure 5-84**). The character of buildings located south-west of Victoria Road has remained largely unchanged and has an established two storey scale (with the inclusion of the occasional larger building). The predominant style of buildings is traditional shop–top housing. The architectural style is mostly late Victorian with some early 1900s Federation styled buildings.

On the north-eastern side of Victoria Road, the scale of the buildings increases to three and four storeys with tall parapets. The church buildings which include Chapel Hill Rozelle Presbyterian and Darling Street Anglican Church St Thomas' are dominant features within the streetscape.

The setbacks for commercial sites in the neighbourhood are generally nil, while houses, public buildings and churches have varied setbacks. Most shops have full width suspended awnings, and several buildings have restored or reconstructed the traditional posted verandas over the footpath. Restoration work within the neighbourhood has added a traditional element to the streetscape and is generally encouraged as part of the renewal of commercial activity along Darling Street.

The area is characterised by the emergence of numerous restaurants/cafes and takeaway shops as well as 'lifestyle' boutiques. This character is most notable in the leisure retail strip to the north east of Victoria Road.

There are several street trees within the area and mature trees are located within the Rozelle Public School on the north-eastern side of Victoria Road. The area around the school currently hosts the weekend Rozelle Markets, which has broader community patronage.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-23** and shown on **Figure 5-85.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-23 LCZ 26 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C6	Iron Cove Heritage Conservation Area	Local	Leichhardt LEP 2013 (C6)
C7	The Valley Heritage Conservation Area	Local	Leichhardt LEP 2013 (C7)
I741	Hannaford Senior Citizen Centre, including interiors	Local	Leichhardt LEP 2013 (I741)
I747	Former police station, including interiors	Local	Leichhardt LEP 2013 (I747)
I748	Single story shops including interiors	Local	Leichhardt LEP 2013 (I748)
I749	Single storey commercial building, including interiors	Local	Leichhardt LEP 2013 (I749)
I750	Former Fire Brigade and Ambulance Training Centre, including interiors	Local	Leichhardt LEP 2013 (I750)
I744	St Paul's Church and neighbourhood centre, including interiors ('aka' Chapel Hill Rozelle Presbyterian church)	Local	Leichhardt LEP 2013 (I744)
I745	St Thomas' Church group, including interiors	Local	Leichhardt LEP 2013 (I745)

Figure 5-84 View looking north-east along Darling Street near the intersection with Victoria Road

Figure 5-85 LCZ 26 Darling Street precinct

5.3.4 Southern landscape character zones (St Peters interchange)

This section describes the existing character of the seven LCZs (see **Figure 5-87**) associated with the St Peters interchange.

LCZ 27 – Sydney Park precinct

This LCZ comprises a regionally significant park (Sydney Park) located north of Campbell Road. The park topographically comprises a series of constructed landforms and wetlands, which are part of the remediation of the site from a former landfill (see **Figure 5-86**).

The park is characterised by a series of visually prominent hills with panoramic views of the city skyline and Sydney Airport. There are also large open turfed areas and stormwater detention ponds, which have been transformed into wetland habitat. The park is fringed with mature trees and screening vegetation.

Facilities within the park include a sports oval, walking paths, BBQs, picnic facilities, seating, public toilets, a playground, and educational elements such as the water sensitive urban design initiatives. Due to the density of the surrounding residential area, this recreational space is highly used and valued by the local community.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-24** and shown on **Figure 5-88**.There are no registered Aboriginal heritage sites located within the LCZ.

Table 5-24 LCZ 27 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I27	Former Bedford Brickworks Group including chimneys, kilns and grounds.	Local	Sydney LEP 2012 (I27)

Figure 5-86 Sydney Park, showing wetlands and bioretention system nestled between man-made landforms

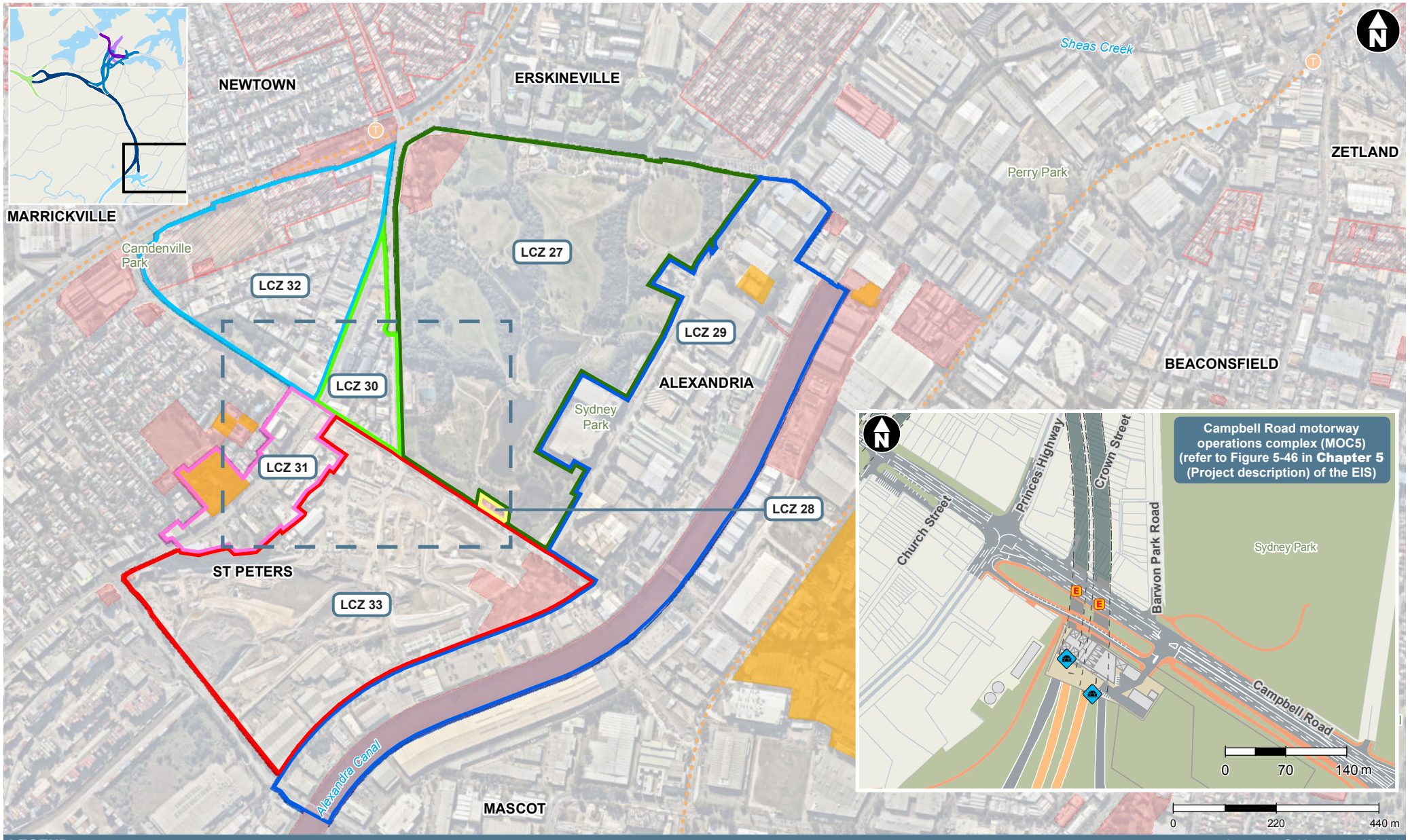


Figure 5-87 Southern landscape character zones

Figure 5-88 LCZ 27 Sydney Park precinct

LCZ 28 – Sydney Park residential precinct

This LCZ comprises a row of heritage listed double storey 'Victorian' terrace houses (see **Figure 5-89**). The terraces have rear lane access that back onto Sydney Park. The terraces have direct views across Campbell Road to the St Peters interchange (currently under construction as part of the New M5 project).

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-25** and shown on **Figure 5-90**. There are no registered Aboriginal heritage sites located within the LCZ.

Table 5-25 LCZ 28 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I12	Terrace group including interiors, 2–34 Campbell Road	Local	Marrickville LEP 2011 (I12)

Figure 5-89 Heritage-listed row of terraces on Campbell Road, opposite the St Peters interchange site

Figure 5-90 LCZ 28 Sydney Park residential precinct

LCZ 29 – Alexandra Canal industrial precinct

This LCZ is an active industrial corridor on the eastern side of Burrows Road, which backs onto the Alexandra Canal (see **Figure 5-91**). Alexandra Canal was originally a natural tributary of the Cooks River (Shea's Creek) but was realigned and channelised in 1880s-1890s. It has a strong historic link to early industrial development in the St Peters and Alexandria area.

The LCZ is characterised by large, low lying industrial buildings and sheds with open areas between them for private car parking and truck loading facilities. The buildings front the main roads (namely Burrows Road and Euston Road), and intermittent views can be seen between these large, long buildings to the canal. There are mature trees along both Euston Road and Burrows Road. Some lots are used as storage areas for large shipping containers, which visually tie these industrial lots to the canal and its history as an active shipping corridor.

Three isolated sites with commercial and industrial uses are located on the western side of Euston Road adjoining Sydney Park.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-26** and shown on **Figure 5-92**. Registered Aboriginal heritage items are listed in **Table 5-27** and shown on **Figure 5-92.**

Table 5-26 LCZ 29 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
01621	Alexandra Canal	State	State Heritage Register (01621) Sydney Water S170 (4571712) Sydney LEP 2012 (I3)

Table 5-27 LCZ 29 Aboriginal heritage

Figure ID reference	Name	Site type
45-6-0751	Aboriginal site Shea's Creek	Artefact scatter, midden, deposit

Figure 5-91 Typical view of industrial complexes located adjacent to Alexandra Canal, as viewed from Rickettys Bridge looking north

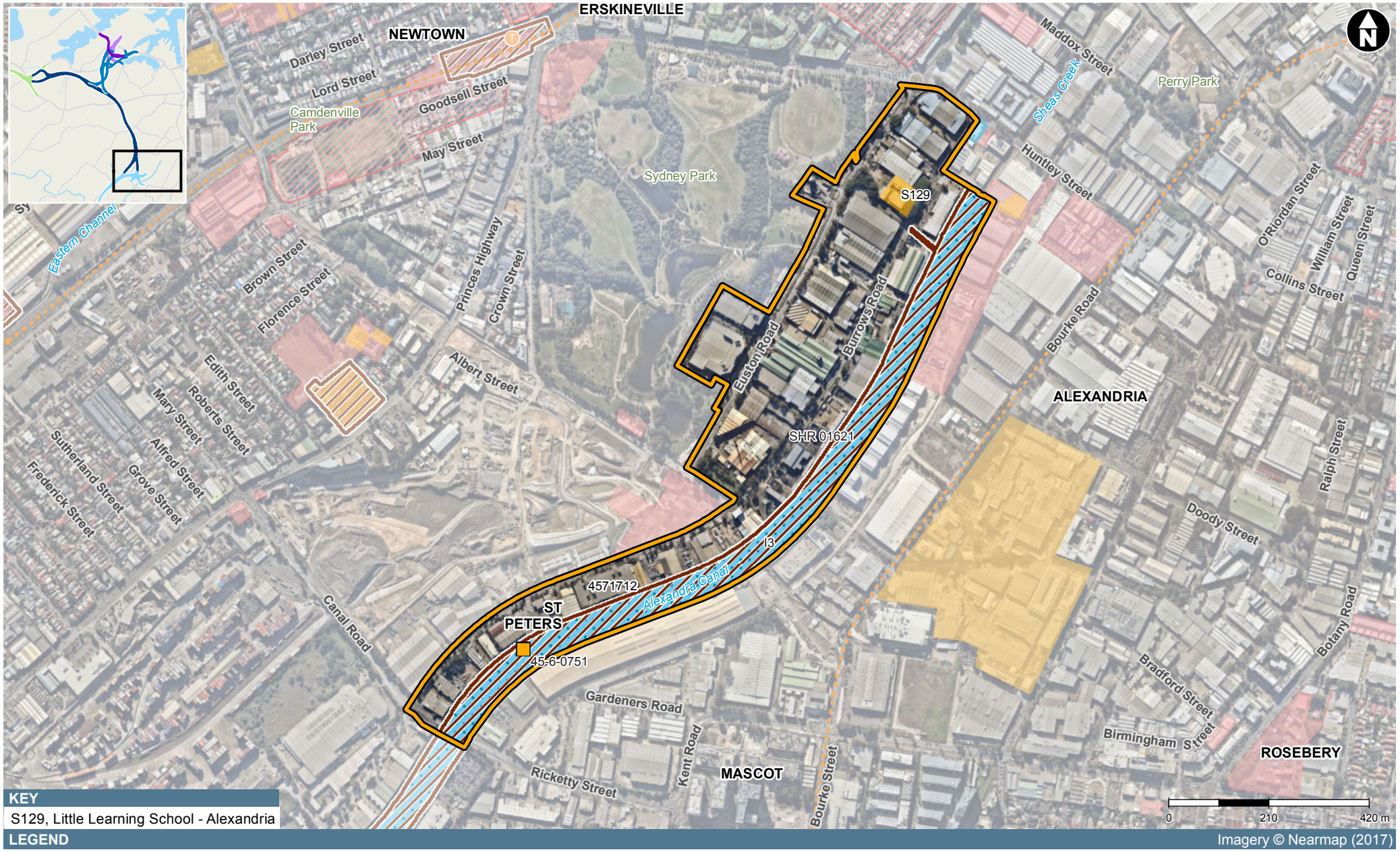


Figure 5-92 LCZ 29 Alexandra Canal industrial precinct

LCZ 30 – Barwon Park precinct

This LCZ is characterised by remnants of earlier residential use in the area, and light industrial and commercial uses that have evolved over time. This has resulted in a mix of building types and forms.

The land subdivision pattern along Barwon Park Road varies from medium size allotments at the northern end that are industrial or commercial in use, to smaller blocks south of the intersection with Crown Street, some of which are residential and others commercial. At the juncture of Barwon Park Road with Campbell Road (adjacent to the project site) is a block of part three and four storey apartments which would afford angled views toward to project (see **Figure 5-93**). The apartments are south east oriented and overlook Sydney Park with some oblique views to the project site. The outlook to Sydney Park along Barwon Park Road offers pleasant vistas, although this is interrupted in part by the City of Sydney Council works depot.

Campbell Street is a busy thoroughfare with frequent truck movements. It is fronted by a mix of residential terraces and villas, and the blank sidewalls of commercial/industrial uses fronting Princes Highway and Crown Street. Campbell Street will be widened along its southern side as part of surface road upgrades delivered by the New M5 project.

The Crown Street streetscape is the most intact of the precinct, consisting of older housing stock on relatively small allotments (albeit with some mixed commercial intrusion), as shown in **Figure 5-94.**

Mature street trees and gardens add to the established character of this area.

Aboriginal and non-Aboriginal heritage

There are no non-Aboriginal heritage conservation areas or heritage items or registered Aboriginal heritage sites located within this LCZ.

Figure 5-93 View look north-west along Barwon Park Road from Campbell Road

Figure 5-94 View look north along Crown Street

Figure 5-95 LCZ 30 Barwon Park residential precinct

LCZ 31 – Princes Highway precinct

The Princes Highway precinct comprises a strong linear transport corridor broadly following a low ridgeline, and characterised by active retail, light industrial and commercial development. It is of utilitarian character with limited scenic amenity (see **Figure 5-96**). Commercial complexes comprise fast food chains, a hotel and small factory complexes with internal courtyards and limited mature street trees.

Views are visually confined within the road corridor, predominantly due to built form on either side of the road. Intermittent views can be seen to the landscape beyond the fringing development along perpendicular roads and through gaps between buildings and commercial complexes.

Adjoining the Princes Highway road corridor is an active business and commercial corridor. The heritage listed St Peters Anglican Church sits on a natural high point and is the only area that contains substantial tree cover along this part of the corridor.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-28** and shown on **Figure 5-97.** There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-28 LCZ 31 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I283	Remaining brick road and footpath paving and stone guttering, Victoria Street (near 2 Bishop Street)	Local	Marrickville LEP 2011 (I283)
00032	St Peters Anglican Church, 187–209 Princes Highway, St Peters	State	State Heritage Register (#00032) Marrickville LEP 2011 (I275)

Figure 5-96 View south along Princes Highway towards the intersection with Canal Road, showing industrial and commercial buildings located adjacent to the road

Figure 5-97 LCZ 31 Princes Highway commercial precinct

LCZ 32 – St Peters Triangle precinct

This LCZ is between Princes Highway, Campbell Street and the Bankstown Rail Line. It has been and still is undergoing a transition from its industrial past and is the subject of a Master Plan (released in 2009) which has a focus on developing the LCZ into a diverse, mixed use precinct.

The LCZ comprises a mix of residential and industrial buildings with land uses that include light industry and urban support services, retail, residential, freight and logistics, office, artist studios and creative industries (see **Figure 5-98**). May Lane is a focus for street art and the May Lane Art Project is an outdoor gallery space.

The predominant building height in the precinct is one to two storeys. Building heights across the precinct range from single storey residential and industrial buildings, to three to four storey commercial/industrial buildings and a six storey residential flat building on the southern corner of May Street and Princes Highway. The upper levels of these buildings have views across the wider area, particularly towards the south as the land gently slopes away in this direction.

This precinct contains the Goodsell Estate Heritage Conservation Area. A variety of local open space and sports fields are available at Simpson Park and Camdenville Park.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-29** and are shown on **Figure 5-99**. There are no registered Aboriginal heritage sites located within this LCZ.

Table 5-29 LCZ 32 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
C16	Goodsell Estate Heritage Conservation Area	Local	Marrickville LEP 2011 (C16)
I273	Terrace housing, including interiors	Local	Marrickville LEP 2011 (I273)

Figure 5-98 A typical street within the LCZ showing a combination of dwellings, commercial and artistic spaces, view looking north along Hutchison Street

Figure 5-99 LCZ 32 St Peters Triangle precinct

LCZ 33 – St Peters interchange precinct

This LCZ currently comprises an active construction site for the St Peters interchange project currently under development as part of the New M5 project.

Once completed, the area will consist of motorway control complexes, ventilation facilities, distribution substation, fire pump rooms and deluge tanks and the interchange road network (see **Figure 5-100**). The approved design for the interchange (as delivered by the New M5 project), along with the proposed Campbell Road motorway operations complex (MOC 5) to be delivered by the M4-M5 Link project, would result in new open space, created by remediating the former landfill site and creation of an 'urban forest', capable of competing with the scale of the proposed interchange.

Large areas of new tree planting will be incorporated on both sides of the New M5 ramps and above the portals to present a continuous canopy and create a sense of green immersion for the motorist upon entry or exit from the tunnel. Landscape treatments surrounding the Campbell Road motorway operations complex will also focus on creating a defined street edge with street tree planting, and feature fig tree plantings to offer increased 'green volume' and help define a sense of landscape character for the site.

Roads and Maritime, as the proponent for the New M5 project, has responsibility for the urban design of the St Peters interchange. This includes a land bridge connecting Sydney Park to the St Peters interchange to be delivered upon completion of the M4-M5 Link. Roads and Maritime have developed an active recreation strategy for the new open space area which would include a full size multi-purpose field, four multi-purpose courts, space for more passive recreation and a walking circuit.

A small part of the north-west corner of this LCZ will be utilised as a construction site for the M4-M5 Link project.

Aboriginal and non-Aboriginal heritage

Non-Aboriginal heritage conservation areas and heritage items located within this LCZ are listed in **Table 5-30** and shown on **Figure 5-101**. There are no registered Aboriginal heritage sites in this LCZ.

Table 5-30 LCZ 33 non-Aboriginal heritage

Figure ID reference	Item Name	Significance	Listing
I312	Service garage	Local	Marrickville LEP 2011 (I276)

Figure 5-100 Artists impression of part of the New M5 St Peters interchange, birds eye view looking north (source: McGregor Coxall, New M5 Draft Urban Design and Landscape Plan)

Figure 5-101 LCZ 33 St Peters interchange precinct

5.4 Other areas of project land

The following sites would be used during construction only and would be subject to the Residual Land Management Plan (RLMP). Following construction, these sites would be rehabilitated and retained for a separate future development and/or use.

Parramatta Road West and East

The Parramatta Road West civil and tunnel site (C1b) is located west of Parramatta Road between around Alt Street and Bland Street at Ashfield. The site is currently occupied by several commercial properties that would be demolished to facilitate construction. A construction site for the M4 East project is located to the south on the opposite side of Bland Street. Some residential properties including single storey detached dwellings and two, three-storey apartment blocks are located to the immediate west and south, and contain mature, tall trees at their boundary.

The Parramatta Road East civil site (C3b) is located on the east side of Parramatta Road at Haberfield, between north of Alt Street and Bland Street. The site is occupied by several commercial premises that would be demolished to facilitate construction. A construction site for the M4 East project is located to the south. Single storey detached residential properties are located to the immediate east and north.

Both sites comprise large areas of open hardstand at ground level, associated with the current use. The buildings are single storey show rooms and offices. They are located along Parramatta Road, which is defined by the heavily trafficked corridor and commercial properties, interspersed with residential properties. The Parramatta Road corridor exhibits a number of road and advertising signage, limited street tree planting and is generally of low amenity.

Pyrmont Bridge Road

The Pyrmont Bridge Road tunnel site (C9) is located between Parramatta Road and Pyrmont Bridge Road at Annandale on land that currently comprises commercial and industrial businesses.

The site and its immediate surrounds represent one of the few well defined and intact pockets of industrial land within the Leichhardt Municipality. Pyrmont Bridge Road contains a mix of contemporary industrial development interspersed with original factory buildings. The industrial buildings are generally two to three storeys with their consistent height and location on the street alignment providing a “hard building edge.”

Interspersed within the industrial development adjoining and adjacent to the site are small pockets of remnant residential development. Along the eastern section of Pyrmont Bridge Road, a row of two storey Victorian terraces sit alongside a corner store and Federation period warehouse.

A number of moderate to high scale residential apartments and offices are located adjacent to the site on Parramatta Road and Mallett Street. Two multi-storey apartment buildings are located on the northern and southern sides of the intersection of Booth Street/Mallett Street and Pyrmont Bridge Road. Two additional multi-storey apartment buildings are located near the construction site on the southern side of Parramatta Road. Bridge Road School is also located adjacent to the site across Parramatta Road.

6 Assessment of construction visual impacts

This section assesses potential visual impacts on various receptors during construction. The methodology for assessing visual impacts is identified in **section 3.3.2**. Site layouts and dimensions of structures and buildings mentioned in this section are approximate at this stage and would be confirmed during detailed design and construction planning. The construction assessment has been based on the description provided in **Chapter 6** (Construction work) of the EIS.

Visual impacts during the construction stage would result from the introduction of construction activities and construction ancillary facilities into the existing landscape. This would include night lighting for sites that contain tunnelling activities or that support tunnelling activities. The methodology used for the assessment is outlined in **section 3.3.2**.

Proposed construction hours would be managed in six broad categories:

- Tunnelling and tunnelling support activities, including spoil handling and haulage, deliveries and underground construction and fitout works. These activities would be carried out up to 24 hours a day and seven days a week
- Out-of-hours construction activities that cannot be conducted during standard construction hours for safety or traffic operational reasons. These activities would include integration works (with the M4 East and New M5 projects, and the surface road network at Rozelle), and some utility works and upgrade works to the surface road network
- Most other surface construction activities, which would be carried out within standard construction hours
- Blasting and rock breaking, which would be carried out within reduced construction hours and subject to provision of respite periods
- Minor or ancillary activities that would not generate a noise impact above acceptable levels, or are otherwise authorised by an environmental protection licence under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act)
- Activities that are required to be conducted under direction from a relevant authority (such as Police) or are required to prevent an imminent loss of life or environmental damage.

The majority of above ground construction works, with the exception of those mentioned above, would occur during the standard working hours of between:

- 7.00 am and 6.00 pm Monday to Friday
- 8.00 am and 1.00 pm on Saturdays.

Receptors with views to construction ancillary facilities and activities could include:

- Industrial neighbours
- Residential neighbours – low, medium or high density
- Commercial neighbours/users of commercial areas
- Recreational (active and passive) users
- Motorway users (motorists and cyclists).

The duration of the construction works would be around five years. In some areas such as Haberfield and St Peters this would result in an extended construction period in addition to the construction period for the M4 East and New M5 projects that could have cumulative landscape character and visual impacts for some receptors (see **Chapter 8**).

Further details about the land uses at these sites following the construction period are provided in **Chapter 5** (Project description) and **Chapter 12** (Land use and planning) of the EIS. The visual impact assessment for each construction ancillary facility (including night time lighting) is provided in **Table 6-1** to **Table 6-21** and is summarised at **section 6.14**.

6.1 Wattle Street civil and tunnel site (C1a)

The Wattle Street civil and tunnel site would be located above and below ground within Wattle Street at Haberfield between Parramatta Road and Ramsay Street. This construction ancillary facility would use land above ground that is currently being used as a construction zone for the M4 East project.

Structures, equipment and construction activities likely to be visible from surrounding receptor locations include site offices and amenities, laydown and storage of materials, construction vehicle access driveways, temporary fences and/or hoarding and light vehicle parking. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of this EIS. An indicative construction site layout for the Wattle Street civil and tunnel site is shown in **Figure 6-1.**

The Wattle Street interchange entry and exit ramps that will be constructed as part of the M4 East project would be used for spoil removal. Spoil handling on the site would occur 24 hours-a-day, seven days-a-week. While spoil removal would be favoured during standard daytime construction hours, spoil removal may occur outside these hours to minimise the length of the construction period.

These uses represent a significant downgrade from the use of the site for the M4 East project which utilised a much larger footprint and higher levels of above ground activity such as demolition works and other activities associated with the construction the new Wattle Street road alignment. The visual impact assessment undertaken for the construction ancillary facilities for M4 East project found that:

- For residents at Wattle Street, Walker Avenue, Ramsay Street, Martin Street and Dobroyd Parade, the overall visual impact rating during construction would be High
- For pedestrians at Reg Coady Reserve, Wattle Street, Walker Avenue, Ramsay Street, Martin Street, Dobroyd Parade and Parramatta Road, the overall visual impact rating during construction would be Moderate
- For motorists at Wattle Street, Walker Avenue, Ramsay Street, Martin Street, Dobroyd Parade and Parramatta Road, the overall visual impact rating during construction would be Moderate.

Appendix L of the M4 East EIS provides further details regarding the assessment.

Given the existing environment (including land uses), construction activities and construction footprint has changed since this initial assessment; a new assessment based on the current environment and new construction ancillary facility specifications has been carried out and is detailed in **Table 6-1.**

For an assessment of the cumulative impacts of the two consecutive construction projects see **section 8.1**. Representative receptor locations have been identified as described in **Table 6-1** and shown in **Figure 6-1.** Night lighting impacts are assessed in **Table 6-2**.

6.1.1 Visual impacts

Table 6-1 Wattle Street civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C1a-1 Religious congregation – Wattle Street. Provides a representative view for the Jehovah's Witnesses Kingdom Hall adjacent to the construction ancillary facility.	The Kingdom Hall is a place of worship located on a busy road (Wattle Street), with most of the grounds required for parking. The quality of the existing view from the site is low, with the duration of viewing likely generally to be limited to walking to and from the car. A front verandah with adjoining small landscaped area could be used as a location for informal gathering before entering and after leaving the building. On balance, the sensitivity of this receptor to the proposed change is considered to be Low.	The area where the construction activities would be taking place is currently a construction site for the purposes of the M4 East project. The visibility of construction work would be reduced given that much of the work would take place underground within the cut and cover tunnel sections. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate-Low**
C1a-2 Residents – Wattle Street, Walker Avenue and Ramsay Street. Provides a representative view for residential receptors adjoining and adjacent to the construction ancillary facility.	Most of the residential development facing the project is on busy Wattle Street, in addition to a small number of residences on Ramsay Street. Residents on Walker Avenue would have views from rear areas of homes and backyards. This comprises a high number of typically sensitive residential receptors. The quality of these views is typically low within the busy road context, but would be seen on a daily basis. A number of houses on Walker Street also back onto the civil site. Within this context the sensitivity of residents is therefore considered to be High.	The area where the construction activities would be taking place is currently a construction site for the purposes of the M4 East project. The visibility of construction work would be reduced over that for the M4 East project given that much of the work would take place underground. A number of residents on Wattle Street and Ramsay Street would have direct views to the construction ancillary facility from front rooms and gardens, with a number on Walker Street potentially having partial views to construction activity from back gardens. Construction activity would take place over a period of around 3.5 years. Therefore, on balance the magnitude of the visual impact to the proposed change is considered to be Moderate.	**High–Moderate**

Receptor	Sensitivity	Magnitude	Rating
C1a-3 Motorists on Wattle Street, Ramsay Street and Parramatta Road. Provides a representative view for motorists using Parramatta Road, Wattle Street and Ramsay Street.	There is likely to be a moderate number of receptors on Ramsay Street and high levels of receptors, particularly during peak periods, on Parramatta Road and Wattle Street. Motorists using Wattle Street will be exposed for slightly longer periods of time than motorist using Parramatta Road of Ramsay Street, however, the sensitivity of motorists to change is considered to be Low due to the generally short viewing time within the context of a longer journey, the focus of the driver on the road, the current low level of amenity provided by the M4 East construction works and the context of the view within a busy road environment.	Motorists would have views to hoarding at close range and limited views above to construction activities. The area is currently a construction site for the M4 East project. The construction works for the project would be significantly downgraded from the M4 East works however, construction activity would take place over a period of around 3.5 years. Therefore, on balance the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C1a-4 Pedestrians –, Wattle Street, Walker Avenue, Ramsay Street and Parramatta Road. Provides a representative view for pedestrians walking past and near to the construction ancillary facility.	Pedestrians walking for passive recreational purposes are likely to use alternative routes away from main roads and therefore relatively low receptor numbers are anticipated. Within this context, and given the current low level of amenity provided by the M4 East construction works, the sensitivity of this receptor group is considered to be Low.	The area is currently a construction site for the M4 East project. However, the visibility of construction work would be reduced given that much of the work would take place underground. The work would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

6.1.2 Night lighting impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road, local streets and associated vehicular traffic, and illuminated windows of the residential properties. The project lighting during construction would occur when necessary to support tunnelling work and be associated with site offices and amenities, laydown and storage of materials, construction vehicle access driveways and car parking. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6-2 Wattle Street civil and tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C1a-1 Religious congregation – Wattle Street Provides a representative view for the congregation at the Jehovah's Witnesses place of worship adjacent to the construction ancillary facility.	Low. Refer to **Table 6-1**.	The magnitude of lighting change relative to the existing construction ancillary facility activities as part of the M4 East project would be low. The congregation members would have existing views from a limited number of front windows across a car parking area to a busy road. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C1a-2 Residents – Wattle Street, Walker Avenue and Ramsay Street Provides a representative view for residential receptors adjoining and adjacent to the construction ancillary facility.	Most of the residential development facing the project is on busy Wattle Street, in addition to a small number of residences on Ramsay Street. Residents on Walker Avenue would have views from rear areas of homes and backyards. Residential receptors would typically be focussed on activities within the house at night. Within this context and given the current low level of amenity provided by the M4 East construction works, the sensitivity of residents is therefore considered to be Low.	The area is currently a construction site for the M4 East project, and the visibility of construction work would be reduced given that much of the work would take place underground. Lighting would be designed to reduce spill, and the predominantly single storey dwellings would have limited views over hoarding. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
C1a-3 Motorists on Wattle Street, Ramsay Street and Parramatta Road Provides a representative view for motorists using Parramatta Road, Wattle Street and Ramsay Street.	There is likely to be a moderate number of receptors on Ramsay Street and high levels of receptors, particularly during peak periods, on Parramatta Road and Wattle Street. Motorists using Wattle Street will be exposed for slightly longer periods of time than motorist using Parramatta Road of Ramsay Street, however, the sensitivity of motorists to change is Low due to the generally short period of viewing time as part of a longer journey, the focus of the driver on the activity of driving, the current low level of amenity provided by the M4 East construction works and the context of the view within a busy road environment.	Motorists would be afforded views to hoarding at close range and due to being seated in vehicles would have limited views above to construction activities. The area where the construction activities would take place is currently a construction site for the purposes of the M4 East project. The visibility of construction work would be reduced given that much of the work would take place underground. Lighting would be designed to reduce spill. However, construction activity would take place over a period of some 4.5 years. Therefore, on balance the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C1a-4 Pedestrians –Wattle Street, Walker Avenue, Ramsay Street and Parramatta Road Provides a representative view for pedestrians walking past and near to the construction ancillary facility.	Pedestrians walking for passive recreational purposes are likely to use alternative routes away from main roads and therefore relatively low receptor numbers are anticipated. Within this context, and given the current low level of amenity provided by the M4 East construction works the sensitivity of this receptor group is considered to be Low.	The area is currently a construction site for the purposes of the M4 East project, and the visibility of construction work would be reduced given that much of it would take place underground and views would be of limited duration from this receptor. However, the work would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

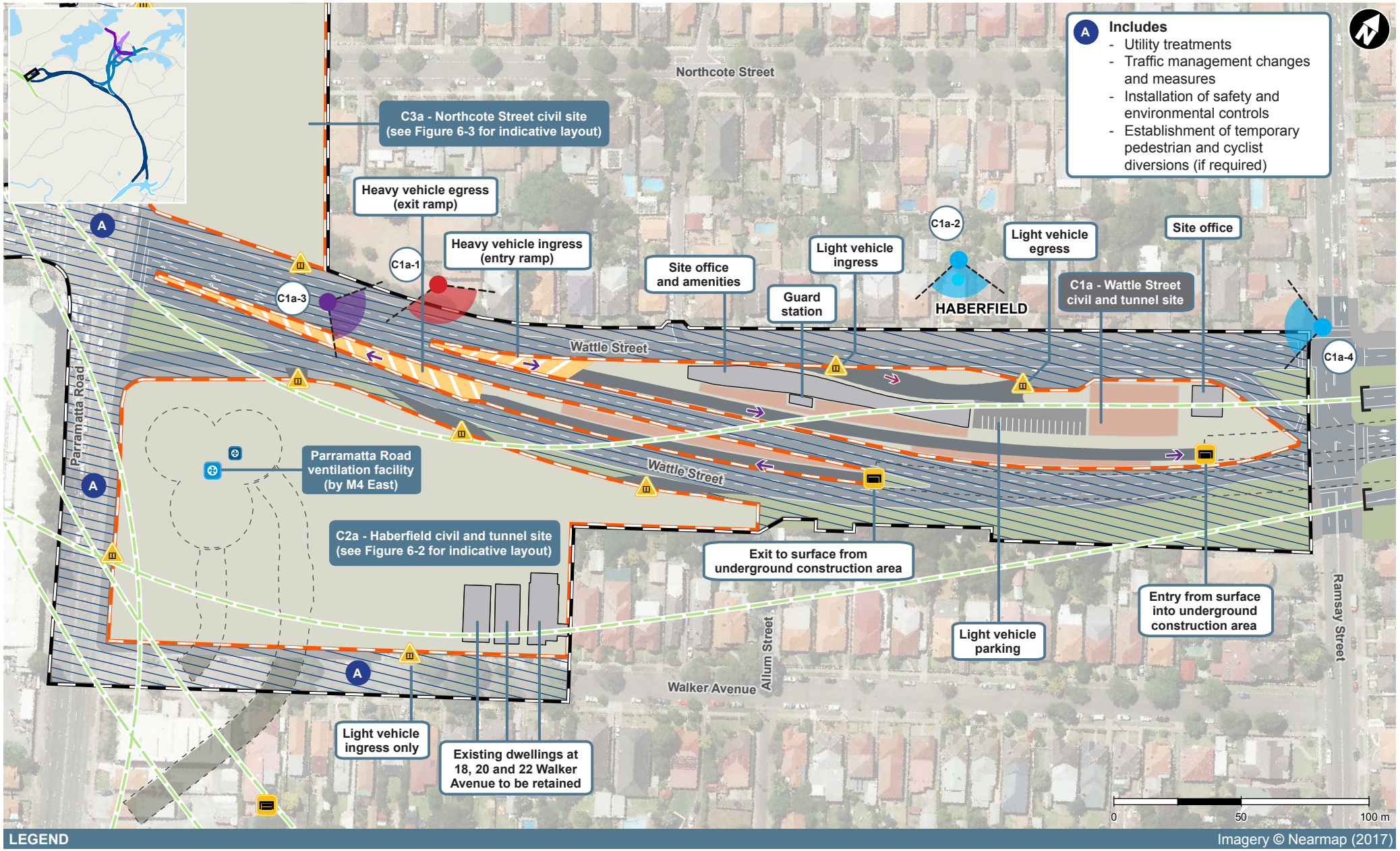


Figure 6-1 Wattle Street civil and tunnel site (C1a) visual visual receptor locations

6.2 Haberfield civil and tunnel site (including the Haberfield ventilation facility) (C2a)

The Haberfield civil and tunnel site would be located above and below ground around the south-eastern corner of the Parramatta Road and Wattle Street intersection, extending along Parramatta Road between Wattle Street and Walker Avenue. This construction ancillary facility would use land above ground that is currently being used as a construction ancillary facility for the M4 East project.

Structures, equipment and construction activities that would be likely to be visible from surrounding receptor locations include site offices and amenities, laydown and storage of materials, construction vehicle access driveways, temporary fences and/or hoarding and light vehicle parking.

A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Haberfield civil and tunnel site is shown in **Figure 6-2**.

Heavy vehicles delivering materials and equipment would enter and exit the Haberfield civil and tunnel site via the westbound Wattle Street carriageways. Light vehicles would access and egress the site via Wattle Street and Walker Avenue. Workforce car parking for this area would also be located at the Northcote Street civil site (C3a).

These proposed construction activities represent a significant downgrade from the use of the site for the M4 East project. Where previously the construction site had a larger footprint with greater levels of above ground work, activities as part of the M4-M5 project will primarily consist of below ground works. In addition, the Parramatta Road ventilation facility will be constructed at this location as part of the M4 East project and will be present on a portion of this site when construction of the M4-M5 Link commences. The landscape and visual impact assessment undertaken for the M4 East project found that:

- For residents at Wattle Street and Walker Avenue, the overall visual impact rating during construction would be High
- For pedestrians at Wattle Street and Walker Avenue, the overall visual impact rating during construction would be Moderate
- For motorists at Wattle Street and Walker Avenue, the overall visual impact rating during construction would be Moderate.

Appendix L of the M4 East EIS provides further details regarding the assessment.

Given the existing environment (including land uses), construction activities and construction footprint have changed since this initial assessment; a new assessment based on the current environment and new construction ancillary facility layout has been carried out and is detailed in **Table 6-3**.

For an assessment of the cumulative impacts of the two consecutive construction projects, please refer to **section 8.1**. Representative receptor locations have been identified as described in **Table 6-3** and shown in **Figure 6-2**. Night lighting impacts are detailed in **Table 6-4**.

6.2.1 Visual impacts

Table 6-3 Haberfield civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C2a-1 Motorists on Wattle Street, Walker Avenue and Parramatta Road Provides a representative view for motorists using Parramatta Road, Wattle Street and Walker Avenue.	There is likely to be a moderate number of receptors on Walker Avenue and high levels of receptors, particularly during peak periods, on Parramatta Road and Wattle Street. However, the sensitivity of motorists to change is considered to be Low due to the short viewing time within the context of a longer journey, the focus of the driver on the activity of driving, the current low level of amenity provided by the M4 East construction works and the context of the view within a busy road environment.	Motorists would be afforded views to hoarding at close range and due to being seated in vehicles would have limited views above to construction activities. The area is currently a construction site for the purposes of the M4 East project. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C2a-2 Religious congregation – Wattle Street Provides a representative view for the congregation at the Jehovah's Witnesses place of worship adjacent to the construction ancillary facility.	The Kingdom Hall is a place of worship located on a busy road (Wattle Street), with most of the grounds required for parking. The quality of the existing view from the site is low, with the duration of viewing likely generally to be limited to walking to and from the car. A front verandah with adjoining small landscaped area would be expected at times to provide a location for informal gathering before entering and after leaving the building. Most of the religious activity associated with this site would be expected to occur in a private setting within the building. On balance, the sensitivity of this receptor to the proposed change is considered to be Low.	The area where the construction activities would be taking place is currently a construction site for the purposes of the M4 East project. The congregation would have views from a limited number of front windows across a car parking area. The visibility of construction work would be reduced given that much of the work would take place underground. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed work is considered to be Moderate.	**Moderate-Low**

Receptor	Sensitivity	Magnitude	Rating
C2a-3 Residents – Wattle Street and Walker Avenue Provides a representative view for residences around the construction ancillary facility site.	Most of the residential development facing the project is on busy Wattle Street, in addition to a small number of residences on Walker Avenue. This comprises a high number of typically sensitive residential receptors. The quality of these views is typically low within the busy road context, but would be seen on a daily basis. A number of houses on Walker Avenue also back onto the site. Within this context the sensitivity of residents is therefore considered to be High.	The area is currently a construction site for the purposes of the M4 East project. The visibility of construction work would be reduced over that for the M4 East project given that much of the work would take place underground. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**High–Moderate**
C2a-4 Pedestrians – Wattle Street, Walker Avenue and Parramatta Road Provides a representative view for pedestrians walking past the construction ancillary facility.	Pedestrians walking for passive recreational purposes are likely to use alternative routes away from main roads and therefore a relatively low receptor numbers are anticipated. Within this context, and given the current low level of amenity provided by the M4 East construction works the sensitivity of this receptor group is considered to be Low.	The area is currently a construction site for the M4 East project. However, the visibility of construction work would be reduced given that much of the work would take place underground. The work would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate–Low**

6.2.2 Night lighting impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road, local streets and associated vehicular traffic, and illuminated windows of the residential properties and also the commercial buildings along Parramatta Road.

Lighting during construction would occur when necessary to support tunnelling work and be associated with temporary site offices and amenities, laydown and storage of materials, construction vehicle access driveways and parking. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6-4 Haberfield civil and tunnel site night lighting visual impact assessment

Receptor	Night lighting visual impact assessment Sensitivity	Magnitude	Rating
C2a-1 Motorists on Wattle Street, Walker Avenue and Parramatta Road Provides a representative view for motorists using Parramatta Road, Wattle Street and Walker Avenue.	Low. See **Table 6-3.**	The area is currently a construction site for the purposes of the M4 East project. The visibility of construction work would be reduced over that for the M4 East project given that much of the work would take place underground. Lighting would be designed to reduce spill. However, construction activity would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C2a-2 Religious congregation – Wattle Street Provides a representative view for the congregation at the Jehovah's Witnesses place of worship adjacent to the construction ancillary facility.	Low. See **Table 6-3**.	The magnitude of lighting change relative to the existing construction ancillary facility activities as part of the M4 East project would be low. However, construction activity would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate–Low**

Receptor	Night lighting visual impact assessment Sensitivity	Magnitude	Rating
C2a-3 Residents – Wattle Street and Walker Avenue Provides a representative view for residences around the construction ancillary facility site.	Most of the residential development facing the project is on busy Wattle Street, in addition to a small number of residences on Walker Avenue. Residential receptors would typically be focused on activities within the house at night. Within this context the sensitivity of residents is considered to be Low.	The area is currently a construction site for the purposes of the M4 East project, and the visibility of construction work would be reduced over that for the M4 East project given that much of the work would take place underground. Lighting would be designed to reduce spill, and the predominantly single storey dwellings would have limited views over hoarding. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact is considered to be Moderate.	**Moderate-Low**
C2a-4 Pedestrians – Wattle Street, Walker Avenue and Parramatta Road Provides a representative view for pedestrians walking past the construction ancillary facility.	Low. See **Table 6-3**.	The area is currently a construction site for the M4 East project. The visibility of construction work would be reduced over that for the M4 East project given that much of it would take place underground. However, the work would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

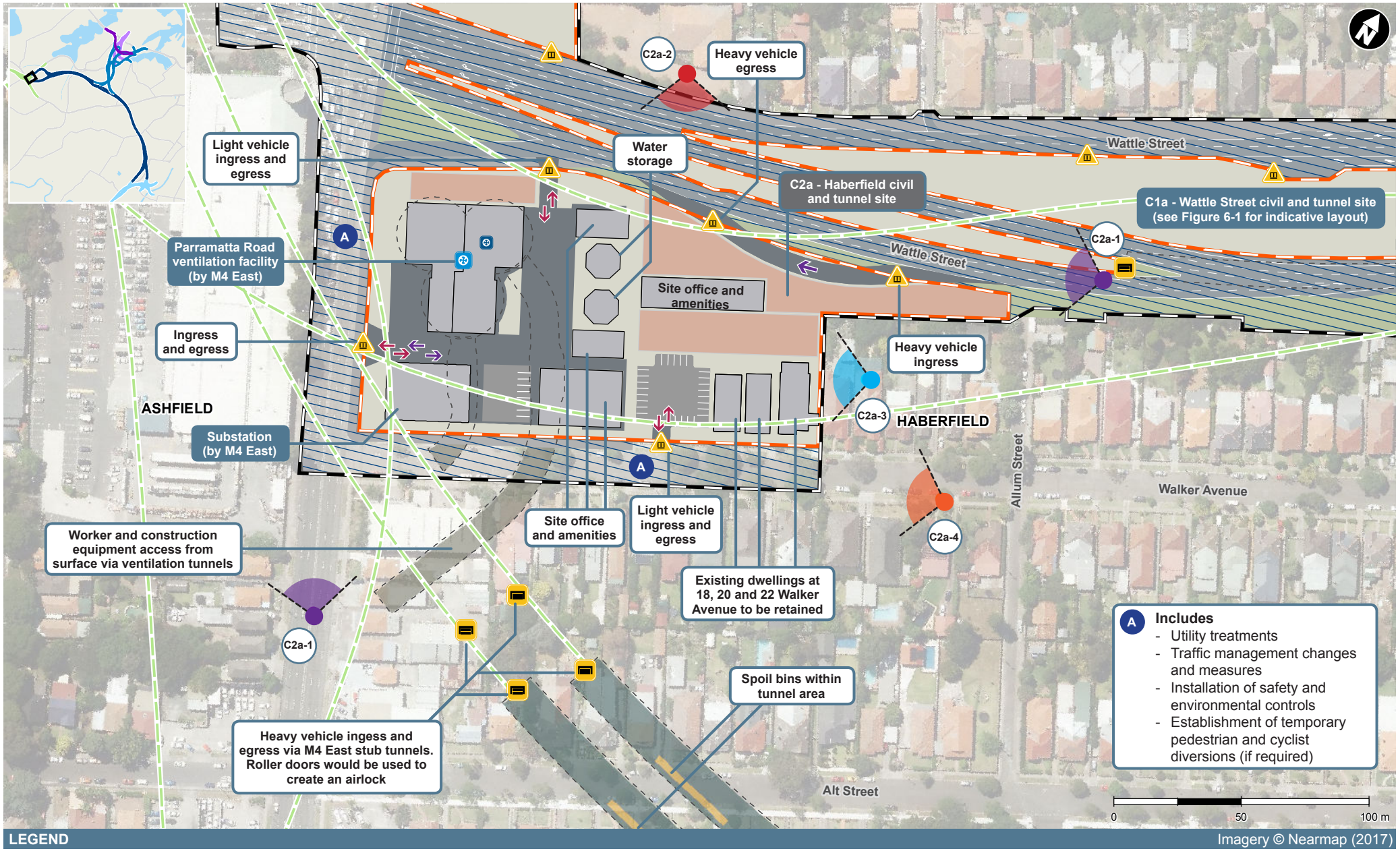


Figure 6-2 Haberfield civil and tunnel site (C2a) visual receptor locations

6.3 Northcote Street civil site (C3a)

The Northcote Street civil site at Haberfield would be located between Wattle Street and Wolseley Street at Haberfield. This construction ancillary facility would use land that is currently being used as a construction ancillary facility for the M4 East project. The site would be used for construction workforce parking and to support construction activities at the nearby civil and tunnel sites, including laydown and storage of materials. A tall hoarding in the order of 3.6 metres high would be located along the residential edge of the civil site. A detailed description of this construction ancillary facility is provided in **Chapter 6** (construction work) of the EIS. An indicative construction site layout for the Northcote Street civil site is shown in **Figure 6-3.**

The use of the laydown area and light vehicle parking would occur 24 hours-a-day, seven days-a-week. Feasible and reasonable management strategies would be investigated to minimise the volume of heavy vehicles using the laydown area at night. This could include the provision of temporary barriers along the boundary with adjoining residential properties.

These uses represent a significant downgrade from the use of the site for the M4 East project. The large scale acoustic shed established for use by the M4 East project would be dismantled before construction of the M4-M5 Link project commences as would storage, workshop and double stacked office buildings and a water treatment plant. The landscape character and visual impact assessment undertaken for the M4 East project found that:

- For residents at Wattle Street, Northcote Street, Wolseley Street, Parramatta Road, the overall visual impact rating would be Moderate
- For pedestrians at Wattle Street, Northcote Street, Wolseley Street, Parramatta Road, Page Avenue, Earle Avenue, Frederick Street, the overall visual impact rating would be Moderate–Low
- For motorists at Wattle Street, Parramatta Road, the overall visual impact rating would be Low.

Appendix L of the M4 East EIS provides further details regarding the assessment for this project.

Given the existing environment (including land uses), construction activities and construction footprint has changed since this initial assessment; a new assessment based on the current environment and new construction ancillary facility layout has been carried out and is detailed in **Table 6-5**.

For an assessment of the cumulative impacts of the two consecutive construction projects, please refer to **section 8.1**. Representative receptor locations have been identified as described in **Table 6-5** and shown in **Figure 6-3**. Night lighting impacts are detailed in **Table 6.6.**

6.3.1 Visual impacts

Table 6-5 Northcote Street civil site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C3a-1 Religious congregation – Wattle Street Provides a representative view for the congregation at the Jehovah's Witnesses place of worship adjoining the south-western corner of the construction ancillary facility.	The Kingdom Hall is a place of worship located on busy road, with most of the grounds required for parking. The quality of the existing view from the site is low, with the duration of viewing likely generally to be limited to walking to and from the car. A front verandah with adjoining small landscaped area would be expected at times to provide a location informal gathering. However, views to the construction ancillary facility from these locations would be primarily be at an angle past a row of mature trees and over an adjoining fence. Most of the religious activity associated with this site would be expected to occur in a private setting within the building. On balance, the sensitivity of this receptor to the proposed change is considered to be Low.	The area is currently a construction site for the M4 East project. The view of the project would be limited to that of a tall hoarding in the order of 3.6 metres high. However, construction activity would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C3a-2 Motorists – Wattle Street, Parramatta Road Provides a representative view for motorists using Parramatta Road and Wattle Street.	There is likely to be a high number of receptors, particularly during peak periods, on Parramatta Road and Wattle Street. The sensitivity of motorists to change is considered to be Low due to the short viewing time within the context of a longer journey, the focus of the driver on the activity of driving, the current low level of amenity provided by the M4 East construction works and the context of the view within a busy road environment.	Motorists would be afforded views to hoarding at close range and due to being seated in vehicles would have limited views above to construction activities. The area where the construction activities would be taking place is currently a construction site for the purposes of the M4 East project. However, the existing acoustic shed would be removed, reducing the scale of infrastructure visible. Nonetheless construction activity would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

Receptor	Sensitivity	Magnitude	Rating
C3a-3 Residents – Wattle Street, Northcote Street, Wolseley Street, Parramatta Road Provides a representative view for residences around the construction ancillary facility.	The civil site adjoins or is in close proximity to a limited number of residential properties with back and front gardens, and rooms facing towards the site. However, the number of affected receptors is relatively low, as is the quality of the existing view, given that the area is currently a construction site for the M4 East project. The view from the closed off end of Northcote Street would be seen daily by a number of residents. Within this context, the sensitivity of residents to the construction ancillary facility is considered to be Moderate.	Views for nearby residents to the hoarding would predominantly be from side windows, and front/back gardens. However, the existing acoustic shed would be removed, reducing the scale of infrastructure visible. Little of the activity taking place within the civil site would be expected to be visible from these receptors. However, the hoarding would be in place for a period of up to 3.5 years. On balance, the magnitude of the visual impact is considered to be Low.	**Moderate-Low**
C3a-4 Pedestrians – Wattle Street, Northcote Street, Wolseley Street, Parramatta Road, Page Avenue, Earle Avenue, Frederick Street Provides a representative view for pedestrians walking past the construction ancillary facility.	Pedestrians walking for passive recreational purposes are likely to use alternative routes away from main roads and therefore a relatively low receptor numbers are anticipated. Within this context, the sensitivity of this receptor group to the construction works is considered to be Low.	The area is currently a construction site for the M4 East project. However, the existing acoustic shed would be removed, reducing the scale of infrastructure visible. Nonetheless, the work would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

6.3.2 Night lighting visual impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road, Wattle Street, local streets and associated vehicular traffic, and illuminated windows of the residential properties and also the commercial buildings along Parramatta Road. The civil site would be bounded by tall hoarding.

Lighting during construction would occur when necessary to support tunnelling work and would be associated with construction workforce parking and laydown and storage of materials. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6.6 Northcote Street civil site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C3a-1 Religious congregation – Wattle Street Provides a representative view for the congregation at the Jehovah's Witnesses place of worship.	Low. Refer **Table 6-5.**	The magnitude of lighting change relative to the existing construction ancillary facility activities as part of the M4 East project would be low. A tall hoarding in the order of 3.6 metres high would be located along the residential edge of the civil site and lighting within the adjoining car park would be expected to be low level. However, construction activity would take place over a period of around 3.5 years. On balance, the magnitude of change in night lighting impact is considered to be Low.	**Low**
C3a-2 Motorists – Wattle Street, Parramatta Road Provides a representative view for motorists using Parramatta Road and Wattle Street.	Low. Refer **Table 6-5**.	Motorists would be afforded views to hoarding at close range and would have limited views above to construction activities. The area is currently a construction site for the M4 East project. Lighting would be designed to reduce spill. However, construction activity would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

Receptor	Sensitivity	Magnitude	Rating
C3a-3 Residents – Northcote Street, Wolseley Street Provides a representative view for residences adjoining and opposite the construction ancillary facility.	The civil site adjoins or is in close proximity to a limited number of private residential properties with back and front gardens, and rooms facing towards the project. However, the number of affected receptors is relatively low, as is the quality of the existing view to a construction site for the M4 East project. Residents would typically be focussed on activities within the house at night. Within this context the sensitivity of residents is considered to be Low.	The area is currently a construction site for the M4 East project. A tall hoarding in the order of 3.6 metres high would be located along the residential edge of the civil site. Lighting would be designed to reduce spill, and the predominantly single storey dwellings would have limited views over hoarding. However, construction activity would take place over a period of around 3.5 years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate–Low**
C3a-4 Pedestrians – Wattle Street, Northcote Street, Wolseley Street, Parramatta Road Provides a representative view for pedestrians walking past the construction ancillary facility.	Low. Refer **Table 6-5**.	The area is currently a construction site for the M4 East project. However, the work would take place over a period of around 3.5 years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

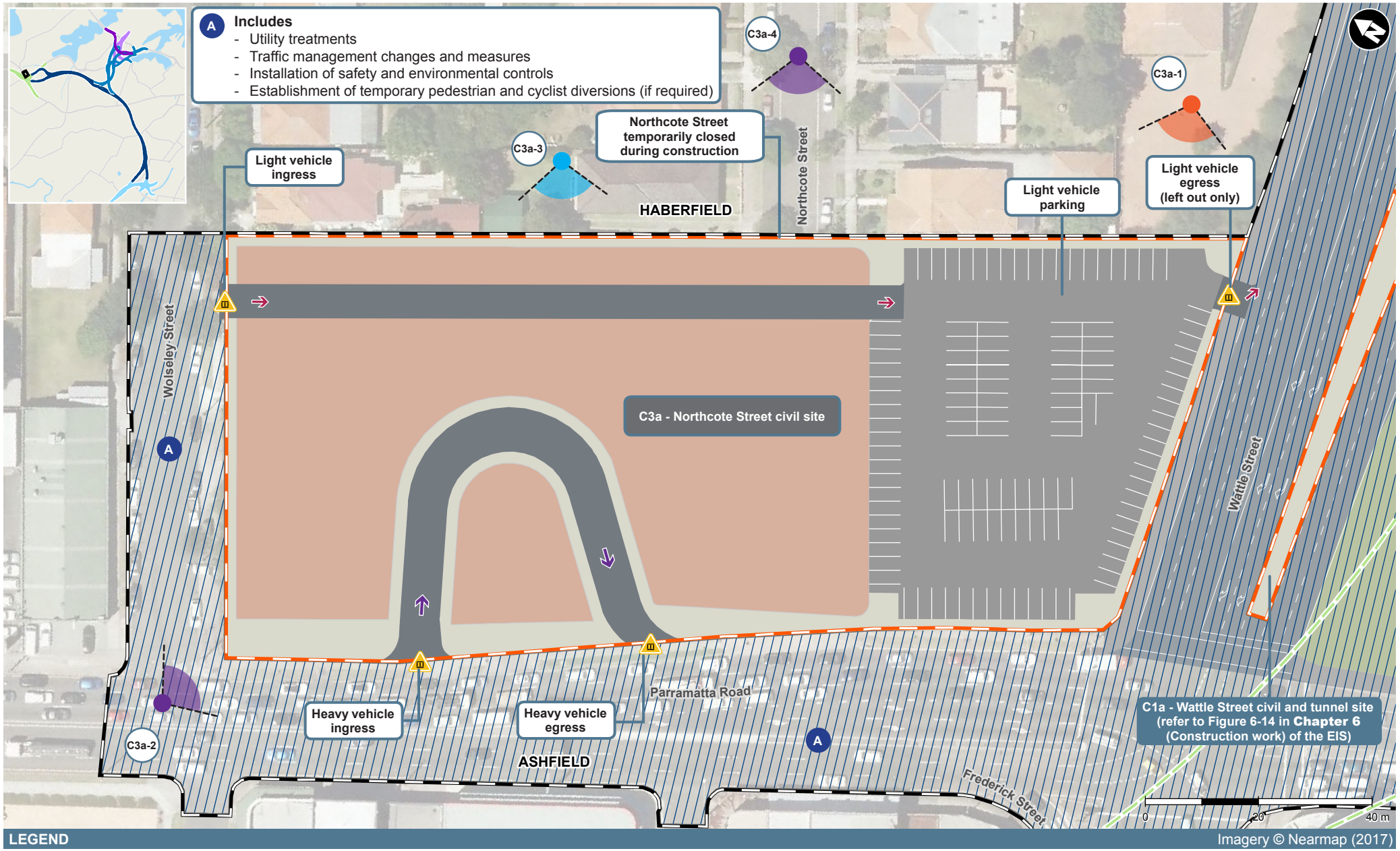


Figure 6-3 Northcote Street civil site (C3a) visual receptor locations

6.4 Parramatta Road West civil and tunnel site (C1b)

The Parramatta Road West civil and tunnel site (C1b) would be located west of Parramatta Road, between north of Alt Street and Bland Street at Ashfield. The site is currently occupied by several commercial properties that would be demolished to facilitate construction. Residential properties including single dwellings and apartment blocks are located to the immediate west and north. A construction site for the M4 East project is located to the south on the opposite side of Bland Street.

A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Parramatta Road West civil site is shown in **Figure 6-4.**

Structures, equipment and construction activities that would be likely to be visible from surrounding receptor locations include demolition of existing buildings and structures, removal and installation of utilities, site offices, amenities, temporary infrastructure, delivery of materials, laydown and storage of materials, plant and equipment, an acoustic shed and, spoil haulage.

Construction traffic would enter and exit the site to and from the western (northbound) carriageway of Parramatta Road via new driveways. Spoil handling on the site would occur 24 hours a day, seven days a week, within an acoustic shed. Heavy vehicle movements associated with the removal of spoil from tunnelling would only occur via Parramatta Road.

Representative receptor locations have been identified as described in **Table 6-7** and shown in **Figure 6-4**. Night lighting impacts are detailed in **Table 6-8**.

6.4.1 Visual impacts

Table 6-7 Parramatta Road West civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C1b-1 Motorists on Alt Street, Bland Street and Parramatta Road Provides a representative view for motorists using Parramatta Road, Alt Street and Bland Street.	There is likely to be a moderate number of receptors on Bland Street and Alt Street and a high number of receptors, particularly during peak periods, on Parramatta Road. However, the sensitivity of motorists to change is considered to be Low due to the busy Parramatta Road context, short periods of viewing as part of a longer journey, and the focus of the driver on the road.	The magnitude of change is considered to be Moderate due to the removal of existing structures, the scale of the acoustic shed compared to existing built form at the site and its proximity to the road, the visual prominence of the site, and the about a four -year timeframe over which the works would take place.	**Moderate–Low**
C1b-2 Residents – Alt Street, Bland Street and Parramatta Road This receptor is located on Alt Street north of Parramatta Road and provides a representative view for residential receptors around the construction ancillary facility.	The northern edge of the civil and tunnel site adjoins a mix of residential and commercial development fronting onto Parramatta Road. The western edge of the site is adjoined by two, three storey apartment complexes that would have views over the site, and rows of single storey freestanding residential development fronting onto Alt Street. This results in a high number of receptors. Residents would have varying views to the construction ancillary facility from front yards, back yards and the sides of properties, as well as from within residences. Many of these residents would have regular views of the project. The quality of the existing view is moderate to high in that it looks into vegetation canopies, or through vegetation/deciduous trees, or potentially in some cases over the top of adjacent buildings. Within the context of the above, the sensitivity of these residential receptors to the civil and tunnel site is considered to be High.	The proposed acoustic shed would be in the order of 10 metres high, with its back wall at the western site boundary, causing the removal of substantial trees. This would result in a loss of solar access to a number of adjoining residential properties, noting that solar access is already reduced to varying degrees by the trees. The acoustic shed would result in impacts to views from the adjoining residential properties over a period of about four years. The magnitude of change would therefore be considered High.	**High**

Receptor	Sensitivity	Magnitude	Rating
C1b-3 Pedestrians – Alt Street, Bland Street and Parramatta Road Provides a representative view for pedestrians walking near the construction ancillary facility.	Pedestrians walking for passive recreational purposes (sensitive receptors) are likely to use alternative routes away from main roads. This type of receptor is considered generally to have low levels of sensitivity to their surroundings given their familiarity with the travel route and the busy Parramatta Road context. Pedestrians are also likely to comprise low to moderate numbers. Within this context, the sensitivity of this receptor group to the construction works is considered to be Low.	The magnitude of change is considered to be Moderate due to: the scale of the acoustic shed, its proximity to the receptors; the visual prominence of the acoustic shed visible above hoardings including from height for pedestrians using the bridge across Parramatta Road near Bland Street and the up to about a four-year timeframe over which the works would take place.	**Moderate–Low**

6.4.2 Night lighting impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road, local streets and associated vehicular traffic, and illuminated windows of the residential properties. The project lighting during construction would occur when necessary to support tunnelling work and be associated with the acoustic shed, site offices, amenities, temporary infrastructure, delivery of materials, laydown and storage, plant and equipment and spoil haulage. Lighting would largely be contained within the acoustic shed and would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6-8 Parramatta Road West civil and tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C1b-1 Residents – Alt Street, Bland Street and Parramatta Road Provides a representative view for residential receptors around the construction ancillary facility.	This view is seen from living areas, including balconies. However, residential receptors would typically be focussed on activities within the house at night. Within this context the sensitivity of residents is considered to be Low.	The multi storey apartment buildings to the west of the site would largely be shielded from lighting within the construction ancillary facility as it would be contained within the acoustic shed. Lighting of outdoor areas would be designed to reduce spill, with adjacent single storey residences unlikely to view much activity above the boundary hoarding. However, upper storey residences along this boundary would be expected to have views at a distance of the laydown area on the north-west corner	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
		of Alt Street and Parramatta Road. Further, construction activity (and therefore the duration of the view) would take place over a period of some four years. Within this context the sensitivity of residents is considered to be Moderate.	
C1b-2 Motorists on Alt Street, Bland Street and Parramatta Road Provides a representative view for motorists using Parramatta Road, Alt Street and Bland Street.	The sensitivity of motorists to change is Low due to the short period of viewing time as part of a longer journey, and the focus of the driver on the activity of driving, within a busy road environment.	Lighting would be designed to reduce spill, and likely set back from and below the level of the perimeter hoarding. This lighting would be seen within the context of the well-lit Parramatta Road corridor. Lighting within the acoustic shed would only be visible when the truck entry/exit doors were open. However, construction activity would take place over a period of about four years. On balance, the magnitude of the visual impact to the proposed change is considered to be Low.	**Low**
C1b-3 Pedestrians – Alt Street, Bland Street and Parramatta Road Provides a representative view for pedestrians walking near the construction ancillary facility.	Low. Refer **Table 6-7**.	The magnitude of change is considered to be Low due to its location along a busy road corridor, and as views to the construction activities would predominately be shielded via a hoarding structure and located within the acoustic shed. Pedestrians using the bridge across Parramatta Road near Bland Street would be substantially shielded from construction lighting by the acoustic shed.	**Low**

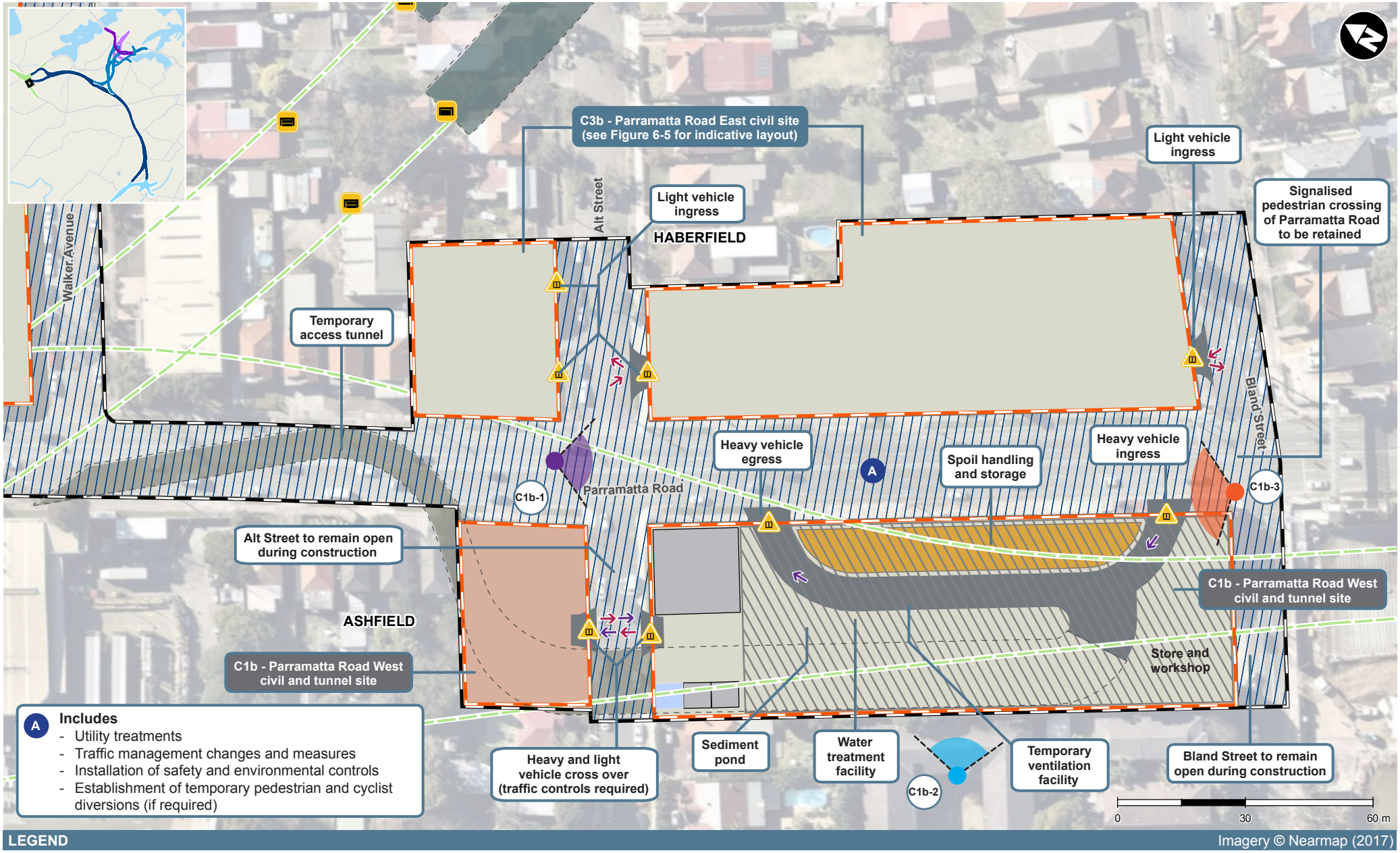


Figure 6-4 Parramatta Road West civil and tunnel site (C1b) visual receptor locations

6.5 Haberfield civil site (C2b)

The Haberfield civil site (C2b) would be used to support civil construction of a substation and fitout of permanent operational infrastructure including the Parramatta Road ventilation facility (being constructed as part of the M4 East project). The site would include temporary site offices, workshop and storage facilities, laydown areas, ingress and egress for heavy and light vehicles, workforce amenities and car parking.

The surface construction activities proposed for the Haberfield civil site (C2b) scenario would result in less infrastructure located on the site compared to Option A. As such, the assessment undertaken in **section 6.2** is considered a representative worst case scenario for receptors in the vicinity of the Haberfield civil site (C2b arrangement). As such, no specific additional assessment has been undertaken for Option B. Please refer to **section 6.2** for the assessment of Option A.

6.6 Parramatta Road East civil site (C3b)

The Parramatta Road East civil site (C3b) would be located east of Parramatta Road at Haberfield, between north of Alt Street and Bland Street. The site is occupied by several commercial premises that would be demolished to facilitate construction. Residential properties are located to the immediate east and north. A construction site for the M4 East project is located to the south.

The Parramatta Road East civil site (C3b) would be used to support tunnelling construction activities that would occur at the Parramatta Road West civil and tunnel site (C1b) and to provide construction workforce parking. The site would include temporary site offices, ingress and egress for light vehicles, workforce amenities and car parking.

Structures, equipment and construction activities that would be likely to be visible from surrounding receptor locations include site offices, amenities, temporary infrastructure including temporary noise barriers, demolition of existing structures, removal and installation of utilities, construction vehicle access driveways, temporary fences and/or hoarding and light vehicle parking.

A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Parramatta Road East civil site (C3b) is shown **Figure 6-5** representative receptor locations have been identified as described in **Table 6-7** and shown in **Figure 6-5**. Night lighting impacts are detailed in **Table 6-8**.

6.6.1 Visual impacts

Table 6-9 Parramatta Road east civil site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C3b-1 Motorists – Alt Street, Bland Street and Parramatta Road Provides a representative view for motorists using Parramatta Road, Alt Street and Bland Street.	There is likely to be a moderate number of receptors on Alt Street and Bland Street and a high number of receptors, particularly during peak periods, on Parramatta Road. However, the sensitivity of motorists to change is considered to be Low due to the busy Parramatta Road context, short periods of viewing as part of a longer journey, and the focus of the driver on the road.	The magnitude of change is considered to be Moderate due to the scale of the perimeter hoarding and its proximity to the road, the visual prominence of the site, and the timeframe of four years over which the works would take place.	**Moderate–Low**
C3b-2 Residents – Alt Street, Bland Street and Parramatta Road Provides a representative view for residences around the construction ancillary facility.	The civil site adjoins or is in close proximity to a limited number of residential properties with back and front gardens, and rooms facing towards the project, in addition to several houses at the end of Bland Street near Parramatta Road which face toward the civil site. Within this context, views towards the civil site would regular and for extended durations. The quality of the existing view of the car yard and display building is low. Within this context, the sensitivity of residents to the construction ancillary facility is considered to be Moderate.	The visual prominence of the hoarding is moderate given its proximity and it may impact on existing views. None of the activity taking place within the civil site would be expected to be visible from this receptor, other than at access and exit points to the site. However, the hoarding would be in place for a period of up to four years. On balance, the magnitude of the visual impact is considered to be Moderate.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
C3b-3 Pedestrians – Alt Street, Bland Street and Parramatta Road Provides a representative view for pedestrians walking near the construction ancillary facility.	Pedestrians walking for recreational purposes (sensitive receptors) are likely to use alternative routes away from main roads. Travel may be non-recreational focussed including commuters walking to and from the nearby bus stops as part of a longer work commute and pedestrians walking to and from the local school on Bland Street. This type of receptor is considered generally to have low levels of sensitivity to their surroundings given their familiarity with the travel route, and the work related context of the journey. Within this context, the sensitivity of this receptor group to the civil construction site is considered to be Low.	The magnitude of change is considered to be Low due to its location along a busy road corridor, and as views to the construction activities would predominately be set back from and shielded by a hoarding structure. Pedestrians using the bridge across Parramatta Road near Bland Street would have short but extensive views into the site as they crossed the bridge.	**Low**

6.6.2 Night lighting visual impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road, Alt Street and Bland Street with associated vehicular traffic, and illuminated windows of the residential properties. The civil site would be bounded by hoarding to screen the site.

Lighting during construction would occur when necessary to support tunnelling work and would be associated with site offices, amenities, temporary infrastructure, construction vehicle access driveways and parking. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6-10 Parramatta Road East civil site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C3b- 1 Motorists – Parramatta Road Provides a representative view for motorists using Parramatta Road.	The sensitivity of motorists to change is Low due to the short period of viewing time as part of a longer journey, and the focus of the driver on the activity of driving, within a busy road environment.	Lighting would be designed to reduce spill. However, construction activity would take place over a period of some four years. The magnitude of the visual impact to the proposed change is considered to be Low.	**Low**

Receptor	Sensitivity	Magnitude	Rating
C3b-2 Residents – Alt Street, Bland Street Provides a representative view for residences adjoining and opposite the construction ancillary facility.	Residents would typically be focused on activities within the house at night. Within this context the sensitivity of residents is considered to be Low.	Hoarding would be located along the residential edge of the civil site. Lighting would be designed to reduce spill, and the predominantly single storey dwellings would have limited views over the hoarding. However, construction activity would take place over a period of some four years. Therefore, on balance, the magnitude of the visual impact to the proposed change is considered to be Moderate.	**Moderate–Low**
C3b-3 Pedestrians – Alt Street, Bland Street, Parramatta Road Provides a representative view for pedestrians walking past the construction ancillary facility.	Pedestrians walking for recreational purposes (sensitive receptors) are likely to use alternative routes away from main roads. Travel would therefore be expected to be more origin-destination focused, with the project comprising part of a longer journey. The pedestrian overbridge provides views to the construction site, however with relatively low receptor numbers. Within this context, the sensitivity of this receptor group to the construction works is considered to be Low.	The magnitude of change is considered to be Low due to its location along a busy road corridor. Pedestrians using the bridge across Parramatta Road near Bland Street would experience lighting impacts within the context of this busy road.	**Low**

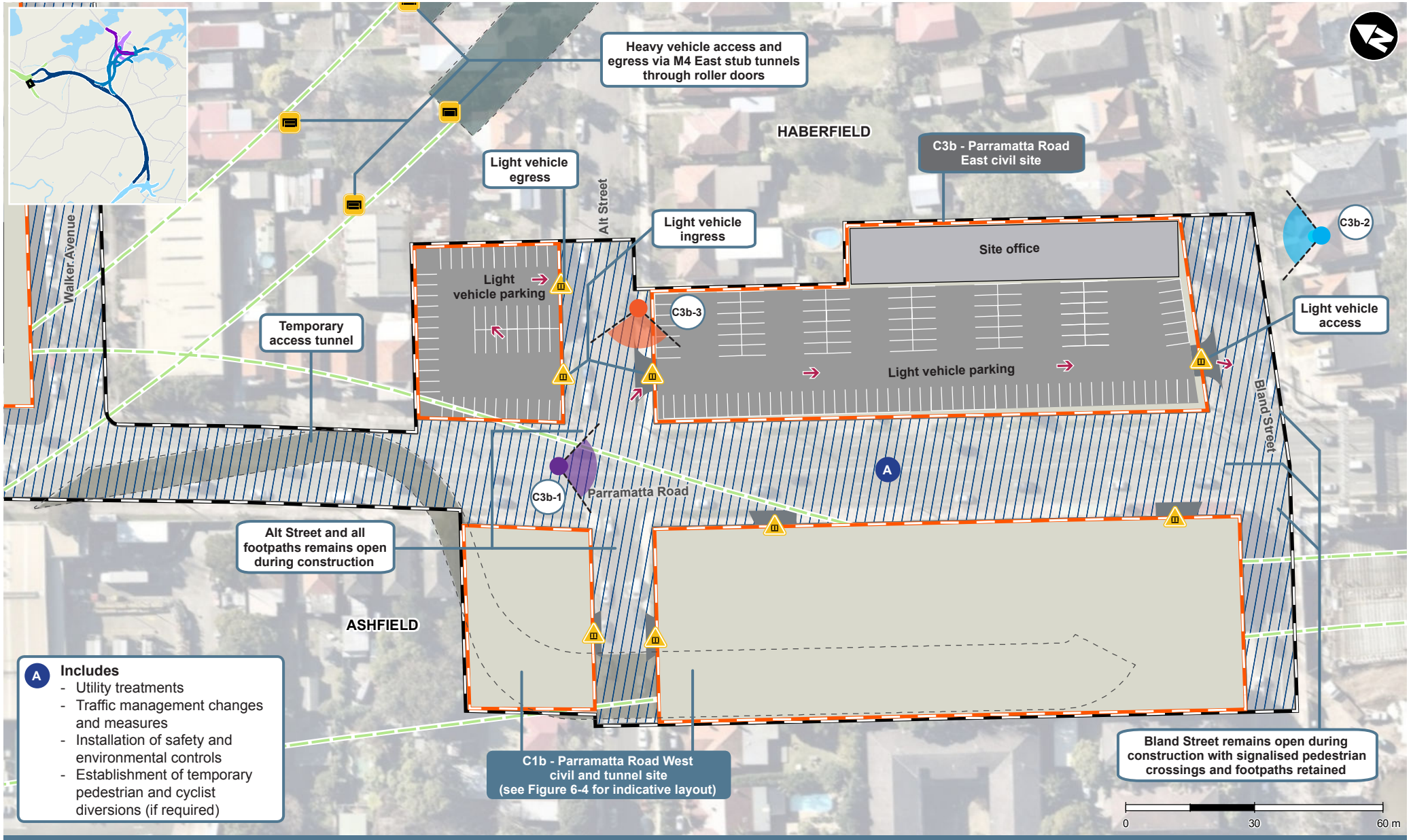


Figure 6-5 Parramatta Road East civil site (C3b) visual receptor locations

6.7 Darley Road civil and tunnel site (C4)

The Darley Road civil and tunnel site would be located between the Inner West Light Rail to the north and Darley Road to the south. The site is currently occupied by a commercial premise and associated car parking facilities. Immediately adjacent in the north-east corner of the site is the Leichhardt North light rail stop.

The site would be used for tunnelling support during construction, and would also involve the construction of the Darley Road motorway operations complex (MOC1). During construction the site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, an acoustic shed, a temporary water treatment plant and sediment pond, workforce amenities and car parking. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Darley Road civil site is shown in **Figure 6-6**.

Spoil haulage associated with the tunnelling works, supported by the site would occur during standard construction hours only.

Representative receptor locations have been identified as described in **Table 6-11** and shown in **Figure 6-6**. Night lighting impacts are detailed in **Table 6-12**.

6.7.1 Visual impacts

Table 6-11 Darley Road civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C4-1 Pedestrians – Darley Road, City West Link pedestrian bridge Provides representative views for pedestrians walking past the site along Darley Road and using the pedestrian bridge across City West Link near Charles Street.	Local residents would likely view the site as they walk to and from the light rail stop, to and from the recreational areas near Hawthorne Canal and Blackmore Oval and as they cross the pedestrian bridge across City West Link. This would amount to a high number of receptors however; these views would only be experienced in passing as part of a longer journey. As a result, it is considered that the sensitivity of these receptors is Low.	The site and associated activities would be viewed within the context of the busy City West Link and moderately busy Darley Road. This along with the existing sites use as a commercial premise which is of a similar scale and built form to the proposed acoustic shed would result in a Low magnitude of impact.	**Low**
C4-2 Motorists – Darley Road Provides a representative view for motorists using Darley Road.	The site would generally only be visible for a short period of time as motorists pass through the area and the driver's attention would be focused on the road; however, increased traffic resulting from construction may lead to increased short delays in the peak periods. The sensitivity of motorists is therefore considered to be Moderate.	Temporary hoarding, an acoustic shed and site offices and amenities would be visible. Given the acoustic shed would have similar scale and built form to the existing commercial premise, the magnitude of change is considered to be Low.	**Moderate-Low**
C4-3 Residents – Darley Road, Charles Street, Hubert Street (south of Darley Road), Francis Street (south of Darley Road) and James Street Provides a representative view for residences adjacent to the construction site.	The sensitivity of nearby residents to the civil and tunnel site is considered to be High due to the potentially long duration of the view from the receptor, the proximity of the residences (particularly along Darley Road) and potential for views toward the site from the upper floors of residences in adjacent streets.	Construction infrastructure including temporary hoarding, site offices and amenities and an acoustic shed would replace the existing landscape of a commercial building and associated car parking. The residents would potentially have views of these construction elements from front yards, back yards and the sides of properties. There would also be an increase in the numbers of vehicles (construction traffic) using Darley Road to access the site. The magnitude of change is considered to be High as a result of these factors.	**High**.

Receptor	Sensitivity	Magnitude	Rating
C4-4 Light rail users – Leichhardt North light rail stop Provides a representative view for light rail users (at the station and on the light rail) of the Leichhardt North light rail stop.	The sensitivity of the receptor at this location would be Low given these receptors would primarily be commuting, resulting in the construction ancillary facility only being visible for a short period of time (whilst users are waiting for or alighting from light rail services).	The magnitude of change is considered to be High as the receptors would be in immediate proximity to the site providing high visibility (particularly from the entrance stairwell which is elevated above the site) for these periods. Temporary hoarding would constitute a change from the existing fencing at the site which provides open views to the commercial building and associated car parking and vegetation near Darley Road.	**Moderate**

6.7.2 Night lighting impacts

The existing visual setting of this construction ancillary facility includes lighting associated with the Leichhardt North light rail stop, City West Link, Darley Road, local streets, traffic, illuminated windows of surrounding residential properties and a commercial premises. City West Link runs to the north elevated above and separated from the residential area to the south. Lighting along City West is predominantly screened by a vegetated buffer, a high noise wall and the commercial premises. This premise is open to 8.30 pm three nights a week, 8pm three nights a week and 7pm one night a week. The light rail operates from 6am to 11pm Sunday to Thursday and until midnight Friday to Saturday.

Lighting during construction would occur when necessary to support tunnelling work and be associated with temporary site offices, workshop and storage facilities, a laydown area, entry and exit points for construction traffic, an acoustic shed, workforce amenities and car parking.

Table 6-12 Darley Road civil and tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C4-1 Pedestrians – Darley Road, City West Link pedestrian bridge Provides representative views for pedestrians walking past the site along Darley Road and using the pedestrian bridge across City West Link near Charles	Local residents would likely view the site at night as they walk to and from the light rail stop, to and from the recreational areas near Hawthorne Canal and as they cross the pedestrian bridge across City West Link. As these views would only be experienced in passing, it is considered that the sensitivity of these receptors is Low.	Lighting at the site would be viewed within the context of the busy City West Link and moderately busy Darley Road. Due to this and having regard to the site's existing use as a commercial premise which operates into the night, the magnitude of impact is considered to be Low.	**Low**

Receptor	Sensitivity	Magnitude	Rating
Street.			
C4-2 Motorists – Darley Road Provides a representative view for motorists using Darley Road.	The sensitivity of motorists is anticipated to be Low given the limited time they would be viewing the lighting from the construction ancillary facility site compared to the length of their journey and as the driver's attention would be focused on the road.	As a result of existing road lighting associated with traffic as well as the lighting currently associated with the commercial premise which operates into the night, the magnitude of change is considered to be Low	**Low**
C4-3 Residents – Darley Road, Charles Street, Hubert Street (south of Darley Road), Francis Street (south of Darley Road) and James Street Provides a representative view for residences adjacent to the construction site.	The sensitivity of nearby residents to the civil and tunnel site is considered to be High due to the potentially long viewing period of receptors at close proximity, particularly along Darley Road. Residents would potentially have views from front yards, back yards and the sides of properties. While there are a number of residents in close proximity, residents would be predominately indoors at night and are unlikely to view the construction ancillary facility.	Lighting associated with the construction ancillary facility would replace the existing lighting associated with the commercial premise which operates into the night. The 24/ operation of the commercial premise would result in night lighting impacts but would be designed to minimise light spill to residences. Although the existing lighting environment includes street lighting and operation of the commercial site, the construction site and activities would be of different type and scale. The magnitude of change is considered to be Moderate.	**High-Moderate**
C4-4 Light rail users – Leichhardt North light rail stop Provides a representative view for light rail users of the Leichhardt North light rail stop.	Low. Refer **Table 6-11**.	The magnitude of change is considered to be Moderate as the receptors would be in immediate proximity to the site providing high visibility (particularly from the entrance stairwell which is elevated above the site) for these periods. Temporary hoarding would constitute a change from the existing fencing at the site which provides open views to the commercial premise and associated car parking and vegetation near Darley Road. However, this location would be subject to existing lighting within the context of the light rail stop and City West Link corridor.	**Moderate-Low**

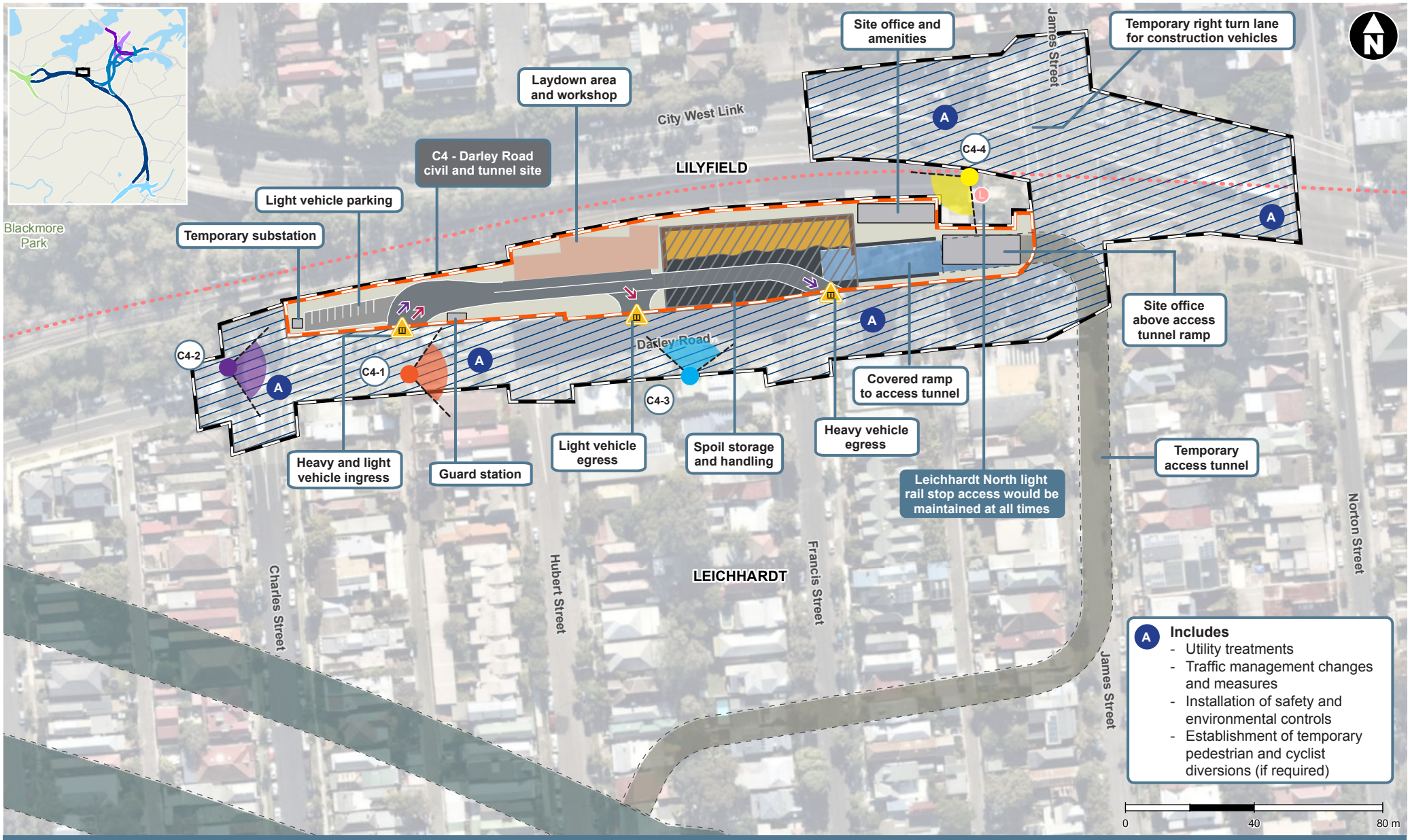


Figure 6-6 Darley Road civil and tunnel site (C4) visual receptor locations

6.8 Rozelle civil and tunnel site (C5)

The Rozelle civil and tunnel site would be located between Lilyfield Road to the north, City West Link to the south, Victoria Road to the east and the Sydney CBD and South East Light Rail Rozelle maintenance depot to the west. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Rozelle civil and tunnel site is shown in **Figure 6-7**.

The site would be predominantly located on disused land that forms part of the Rozelle Rail Yards. The site would also use land adjacent to Lilyfield Road and Gordon Street at Rozelle that is currently occupied by commercial and industrial properties. These properties would be acquired for the project and demolished to facilitate construction of the Rozelle interchange.

Structures, equipment and construction activities likely visible from surrounding receptor locations include:

- Utility, drainage and road treatments
- Site offices, amenities and temporary construction hoarding (including acoustic hoarding if required)
- Acoustic sheds
- Construction of the cut-and-cover structures including piling, concrete works, excavation of dive structures and installation of a precast concrete roof
- Tunnel excavation of the Rozelle interchange, Iron Cove Link and proposed future Western Harbour Tunnel and Beaches Link tunnel stubs using roadheaders, as well as stockpiling of excavated material and spoil haulage.

Representative receptor locations have been identified as described in **Table 6-13** and shown in **Figure 6-7.** Night lighting impacts are detailed in **Table 6-14**.

6.8.1 Visual impacts

Table 6-13 Rozelle civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C5-1 Motorists – City West Link Provides representative views for motorists using City West Link.	The sensitivity of motorists to change is considered to be Moderate. The view may be less readily noticed over time, and when in free-flowing traffic the driver's attention would be focused on the road.	A separate project (the Rozelle Rail Yards site management works as outlined in **section 8.2**) will have cleared vegetation within the Rozelle Rail Yards boundary alongside City West Link that provides intermittent screening to the site. This combined with the removal of the vegetation outside this boundary as part of the project would result in direct views to temporary hoarding as well as parts of the acoustic sheds and permanent infrastructure being constructed (including ventilation facilities). The magnitude of change is therefore considered to be Moderate.	**Moderate**.
C5-2 Residents – Foucart Street and Cecily Street Provides a representative view for residents on Foucart Street and Cecily Street.	The topography slopes steeply down towards the site along these two streets providing a moderate number of residents with diagonal views across parts of the construction site. Residents would potentially have views from living areas, front yards, back yards and verandahs, particularly at upper levels further up the slope. The sensitivity of these nearby receptors is therefore considered to be High.	There are street trees on both sides of Lilyfield Road that provide intermittent screening. Some of these trees would be removed during construction which would provide direct views to fencing and hoarding and larger elements within the construction site such as the acoustic shed and the ventilation facility. The magnitude of the visual impact would therefore be High.	**High**
C5-3 Residents – Lilyfield Road near Denison Street Provides a representative view for residences on Lilyfield Road near Denison Street.	A number of two and three storey houses are located at the corner of Lilyfield Road near Denison Street. They are situated on a rising slope and are oriented towards Lilyfield Road with views across the site and to the city skyline. The residences have windows and balconies facing the site. Other residences both upslope and along Denison Street also have similar views. The sensitivity of nearby residents is therefore considered to be High.	There are mature street trees on Lilyfield Road adjoining the northern boundary of the site which currently provide intermittent screening. The majority of these trees are anticipated to be removed during construction which would provide direct views to fencing and hoarding, an acoustic shed and a ventilation facility as well as other construction elements which would impact on their current views over a prolonged period. The magnitude of change is considered therefore to be High.	**High**

Receptor	Sensitivity	Magnitude	Rating
C5-4 Residents – Breillat Street, Annandale Provides a representative view for residences on Breillat Street.	Breillat Street slopes steeply down towards the site and would provide some residents with partially obscured views from their front or back rooms across the construction site. There is dense vegetation along Railway Parade and mature street trees along Pritchard Street and Breillat Street that would provide screening to some residences. The sensitivity of nearby receptors is considered to be Moderate.	Some buildings, such as the acoustic shed and ventilation facilities would likely be visible for a number of residents above/through tree cover. There is some separation from the site provided by City West Link, the light rail line, Whites Creek and Railway Parade. The magnitude of the visual impact would therefore be Low.	**Moderate–Low**
C5-5 Recreational users – Easton Park Provides a representative view for recreational users of Easton Park.	The sensitivity of the receptor at this location would be Moderate given the proximity to the site and its flat topography, which provides large areas with unimpeded views out towards the construction site. Currently the edge of the proposed site along Lilyfield Road comprises a number of industrial buildings, providing poor amenity.	The magnitude of change is considered to be High given the proximity and extent of the construction site, and the number of construction elements that would likely be visible above the hoarding.	**High–Moderate**
C5-6 Recreational users – Glebe Foreshore Parklands Provides a representative view for recreational users of Glebe Foreshore Parklands.	Users of this space are engaged in both active and passive recreation activities, and are likely to be there for prolonged periods of time, and be present in high numbers, particularly on weekends. The moderate to long range view of the site provides a sweeping panorama across Rozelle Bay comprising an extensive water element of the view. The wider view includes a diverse range of features including Anzac Bridge, the Glebe Island grain silos and the White Bay Power Station in the foreground, and the residential tower blocks at Pyrmont, and highly modulated backdrop of areas of Rozelle and Balmain. Within this context, the sensitivity of visual receptors to the project is considered to be High.	The magnitude of change is considered to be Moderate given: the works would extend from beyond the existing corner of The Crescent to the approaches of Anzac Bridge; the works can be expected to be moderately visually prominent with the exception of taller elements such as the ventilation facility which would be highly visually prominent from this receptor location; and would take place over a period of up to five years.	**High-Moderate**

6.8.2 Night lighting impacts

The visual setting of the construction ancillary facility includes lighting associated with City West Link, Lilyfield Road, Victoria Road and Catherine Street as large arterial roads, local streets, associated traffic and illuminated windows of the residential properties. The Glebe parklands are also associated with harbour lighting (boats, marina), city lighting (commercial and residential buildings), park and street lighting and sports field lighting.

Lighting during construction would occur when necessary to support tunnelling and would be associated with site offices, amenities, acoustic sheds, tunnel excavation stockpiling of excavated material and spoil haulage. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass to adjoining residential properties.

Table 6-14 Rozelle civil and tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C5-1 Motorists – City West Link Provides representative views for motorists using City West Link.	Low. Refer **Table 6-13.**	A separate project (the Rozelle Rail Yards site management works as outlined in **section 8.2**) will clear the vegetation within the Rozelle Rail Yards boundary alongside City West Link that provides intermittent screening to the site. This combined with the removal of the vegetation outside this boundary as part of the M4-M5 Link project would mean some views into the site and additional lighting. The magnitude of change is therefore considered to be Moderate.	**Moderate–Low**.
C5-2 Residents – Foucart Street and Cecily Street Provides a representative view for residents on Foucart Street and Cecily Street.	The sensitivity of the residents is considered to be Moderate given many of the homes are elevated and look over the site, which would be in operation 24 hours a day. However, in most instances residents would be predominately indoors at night and are unlikely to view the construction ancillary facility..	A number of residences directly adjacent to the construction ancillary facility are elevated and can look into the construction site over the boundary hoarding. Although elevated, many of these residences look into the street and would be expected to have little or no night-time visibility of the C5 construction site. Within this context, the magnitude of lighting impacts is considered to be Moderate.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
C5-3 Residents – Lilyfield Road near Denison Street Provides a representative view for residences on Lilyfield Road near Denison Street.	High. Refer **Table 6-13**	There are mature street trees on Lilyfield Road adjoining the northern boundary of the site which currently provide intermittent screening. The majority of these trees are anticipated to be removed during construction which would potentially provide direct views into the site to construction lighting elements. The magnitude of change is considered to be High.	**High**
C5-4 Residents – Breillat Street, Annandale Provides a representative view for residences on Breillat Street.	Low. Refer **Table 6-13**	Some lighting would potentially be visible for a number of residents above/through tree cover. There is some separation from the site provided by City West Link, the light rail line, Whites Creek and Railway Parade. The magnitude of the visual impact would be Low.	**Low**
C5-5 Recreational users – Easton Park Provides a representative view for recreational users of Easton Park.	The sensitivity for this receptor is Low given the likely low number of recreational users of the park at night, and likely short duration of stay.	The magnitude of change is considered to be High within the context of the proximity and extent of the construction site, and the number of construction lighting elements that would be visible above the boundary hoarding.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
C5-6 Recreational users – Glebe Foreshore Parklands Provides a representative view for recreational users of Glebe Foreshore Parklands	Users of this space are engaged in both active and passive recreation activities. Active recreation at night would primarily consist of use of the sporting facilities which have lighting. Passive recreation would be set within the context of street, park, harbour and city lighting. There would also likely be minimal views to lighting of the construction ancillary facility from this receptor location as they would primarily be contained within acoustic sheds and behind hoarding, and would comprise moderate to long range views from the site. It is therefore considered that the sensitivity of this receptor is Low.	The magnitude of change is considered to be Low given the lighting context of the receptor location and the likelihood that lighting of the construction ancillary facility would be obscured by hoarding and within acoustic sheds.	**Low**

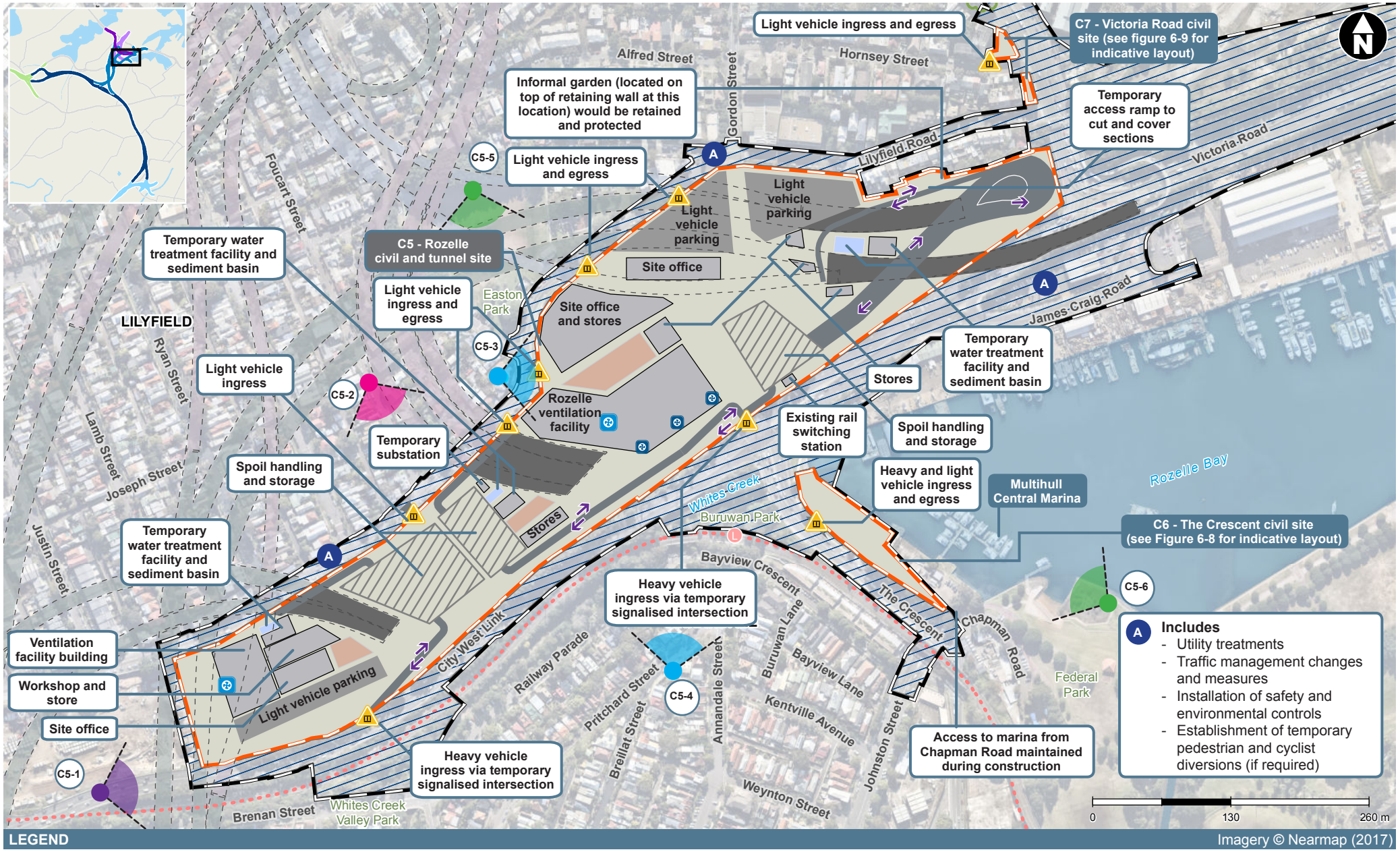


Figure 6-7 Rozelle civil and tunnel site (C5) visual receptor locations

6.9 The Crescent civil site (C6)

The Crescent civil site (C6) would be located between The Crescent and Rozelle Bay on land owned by Roads and Maritime. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Crescent civil site is shown in **Figure 6-8**.

The site would be cleared and include the establishment of temporary site offices, workshops and storage facilities, laydown areas, entry and exit driveways for construction traffic, internal access roads, temporary water treatment sediment ponds, workforce amenities and car parking.

The Crescent civil site would be established on land immediately adjacent to Rozelle Bay and Whites Creek and would support construction activities in and adjacent to these waterways. Representative receptor locations have been identified as described in **Table 6-15** and shown in **Figure 6-8**. A night time lighting impact assessment has not been undertaken for this site as it will operate during standard daytime construction hours only.

Table 6-15 The Crescent civil site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C6-1 Residents – Bayview Crescent and Johnston Street Provides a representative view for residences on Bayview Crescent and within the apartments at 300 Johnston Street.	A number of single and two storey houses are located along Bayview Crescent. They are situated on an escarpment which drops down significantly to The Crescent. The residences have windows, porches and balconies facing the site. The apartments on Johnston Street at the southern end of Bayview Crescent are separated from the construction site by the light rail line. Despite this, upper levels of the apartments have clear views toward the construction site and a number of residents would be affected. The quality of the existing view in this location is high. The sensitivity of nearby residents is therefore High.	A row of mature street trees on Bayview Crescent between Buruwan Lane and Johnston Street provide a moderate level of screening to the construction site. Views of the civil site would be available between the trees. There are also some mature trees located within the construction footprint which would be removed. The residences at the southern end of Bayview Crescent and Johnston Street would have clear views across the light rail line and The Crescent to the construction site. The construction of the new pedestrian/cycle bridge would also be seen from this location. The magnitude of change is considered therefore to be High.	**High**
C6-2 Motorists – The Crescent Provides representative views for motorists using The Crescent.	The sensitivity of motorists to change is considered to be Low due to the relatively short period of time elements of the civil site would be visible within the context of their overall trip, and also as the driver's attention would be focused on the road.	Mature trees currently provide intermittent screening to the site however these would be removed as part of the construction work. There would be unobstructed views to temporary hoarding as well as the construction of the pedestrian/cycle bridge. The magnitude of change is therefore considered to be Moderate.	**Moderate–Low**
C6-3 Recreational users – Rozelle Bay Provides a representative view for recreational users of Rozelle Bay.	This would predominantly consist of boat users. The bay would most likely used by people leaving or returning their boats to the moorings. In some cases, they may also be stationary in the bay for periods of time for maintenance or recreation. Recreational users are likely to be focused on the open areas of the Bay and Glebe Foreshore Parklands. The sensitivity of visual receptors to the project is therefore considered to be Moderate.	The magnitude of change is considered to be Moderate as although the tree removal, hoarding and pedestrian/cyclist bridge would alter the existing character, there is currently a lack of visual amenity both in terms of the derelict condition of the site and the busy transport corridors which are adjacent to it.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
C6-4 Recreational users – Glebe Foreshore Parklands Provides a representative view for recreational users of the Glebe Foreshore Parklands.	Users of this space are engaged in both active and passive recreation activities, and are likely to be there for prolonged periods of time, and be present in high numbers, particularly on weekends. The moderate to long range view of the site provides a sweeping panorama across Rozelle Bay comprising an extensive water element of the view. The wider view includes a diverse range of features including Anzac Bridge, the Glebe Island grain silos, and the White Bay Power Station in the foreground, and the residential tower blocks at Pyrmont, and highly modulated backdrops of parts of Rozelle and Balmain seen through the middle to background of the view. Within the context of existing tall infrastructure in the view, the sensitivity of visual receptors to the project is considered to be High.	The magnitude of change is considered to be Moderate given the works would take place on what is currently a derelict site that provides poor visual amenity both in terms of the derelict condition of the site and the busy transport corridors which are adjacent to it. The works would take place in close proximity to the park, and notwithstanding upkeep of hoardings the site would comprise an obvious construction compound within which loading and unloading of materials would be likely to be visible, and the duration of viewing would potentially be High. However, the compound would not obstruct key features, and comprise a relatively small element within the broader view.	**High–Moderate**

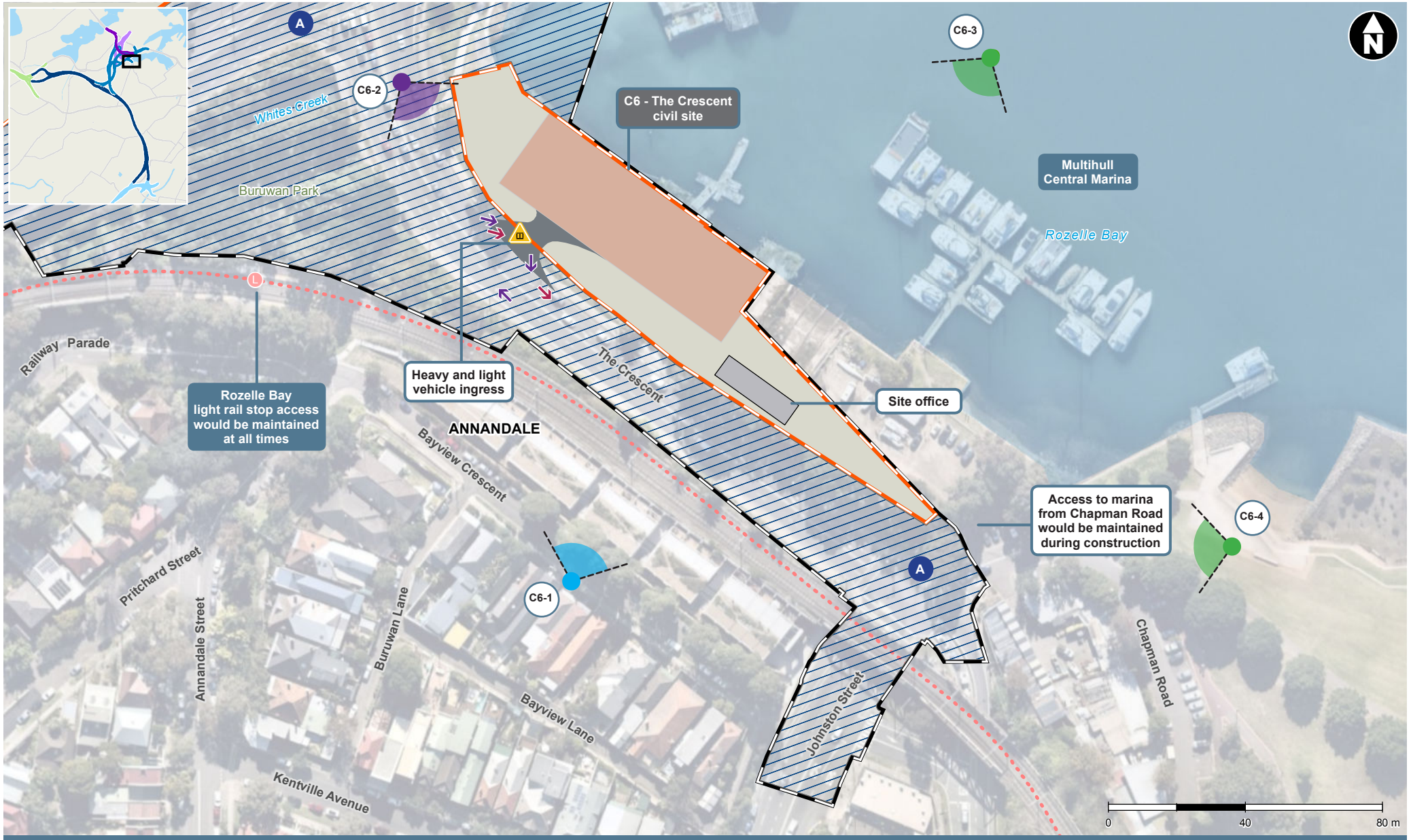


Figure 6-8 The Crescent civil site (C6) visual receptor locations

6.10 Victoria Road civil site (C7)

The Victoria Road civil site (C7) would be located on the western side of Victoria Road between Quirk Street and Lilyfield Road on land occupied by commercial properties. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Victoria Road civil site is shown in **Figure 6-9.**

The existing buildings and other structures on the site would be demolished to facilitate establishment of temporary site offices, a laydown area, workforce amenities and car parking. Representative receptor locations have been identified as described in **Table 6-16** and shown in **Figure 6-9**. A night time lighting impact assessment has not been undertaken for this site as it will operate during standard daytime construction hours only.

Table 6-16 Victoria Road civil site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C7-1 Residents – Lilyfield Road Provides a representative view for residents on Lilyfield Road.	Lilyfield Road curves towards the construction ancillary facility which limits some views of the construction site from residences that front this street. Some houses may have direct views from verandahs such as those around Denison Street which are oriented to the south towards the site whereas other homes, particularly those oriented to the east and west, would likely have oblique views. However, views towards this location currently focus on Victoria Road and the existing commercial building, comprising an immediate environs view of low quality. The sensitivity of these nearby receptors is therefore considered to be Moderate.	There is currently an existing two-storey, warehouse style commercial building located at the construction site on the corner of Lilyfield Road which has no setbacks. This would be demolished and replaced with temporary site offices, a laydown area, workforce amenities and car parking, fencing and hoarding. However, the extent of visibility of the change would be relatively low given the long frontage to Victoria Road, and the project would not be expected to further obstruct views from residences. Within this context the magnitude of the visual impact would be Moderate.	**Moderate**
C7-2 Residents – Hornsey Street and Quirk Street Provides a representative view for residents on Hornsey Street and Quirk Street.	The topography slopes down towards the site along these two streets. This would mean a number of residents would have views across the construction site, albeit an oblique view. The exception to this would be the seven storey apartment building immediately adjoining the construction site at the corner of Hornsey Street. The mid and upper levels of this building that face east and south would all have views down to and across the construction site from front living areas and verandahs. The sensitivity of these nearby receptors is therefore considered to be High.	There is currently a commercial building with shop top housing and rooftop parking located at the construction site on the corner of Hornsey Street, which has no setbacks. This would be demolished and replaced with temporary site offices, a laydown area, workforce amenities and car parking, fencing and hoarding. The site would be subject to extensive overlooking from residences. Within this context the magnitude of the visual impact would be High.	**High**
C7-3 Motorists – Victoria Road	Provides representative views for motorists using Victoria Road and the local roads for Lilyfield, Hornsey and Quirk Streets. The sensitivity of motorists to change is considered to be Low due to the relatively short period of time elements of the civil site would be visible within the context of their overall trip and the focus of the driver on the activity of driving.	Temporary site offices, workforce amenities and car parking would potentially be seen above fencing and hoarding. These would replace the existing landscape of two storey commercial premises. The magnitude of change is therefore considered to be Low.	**Low**

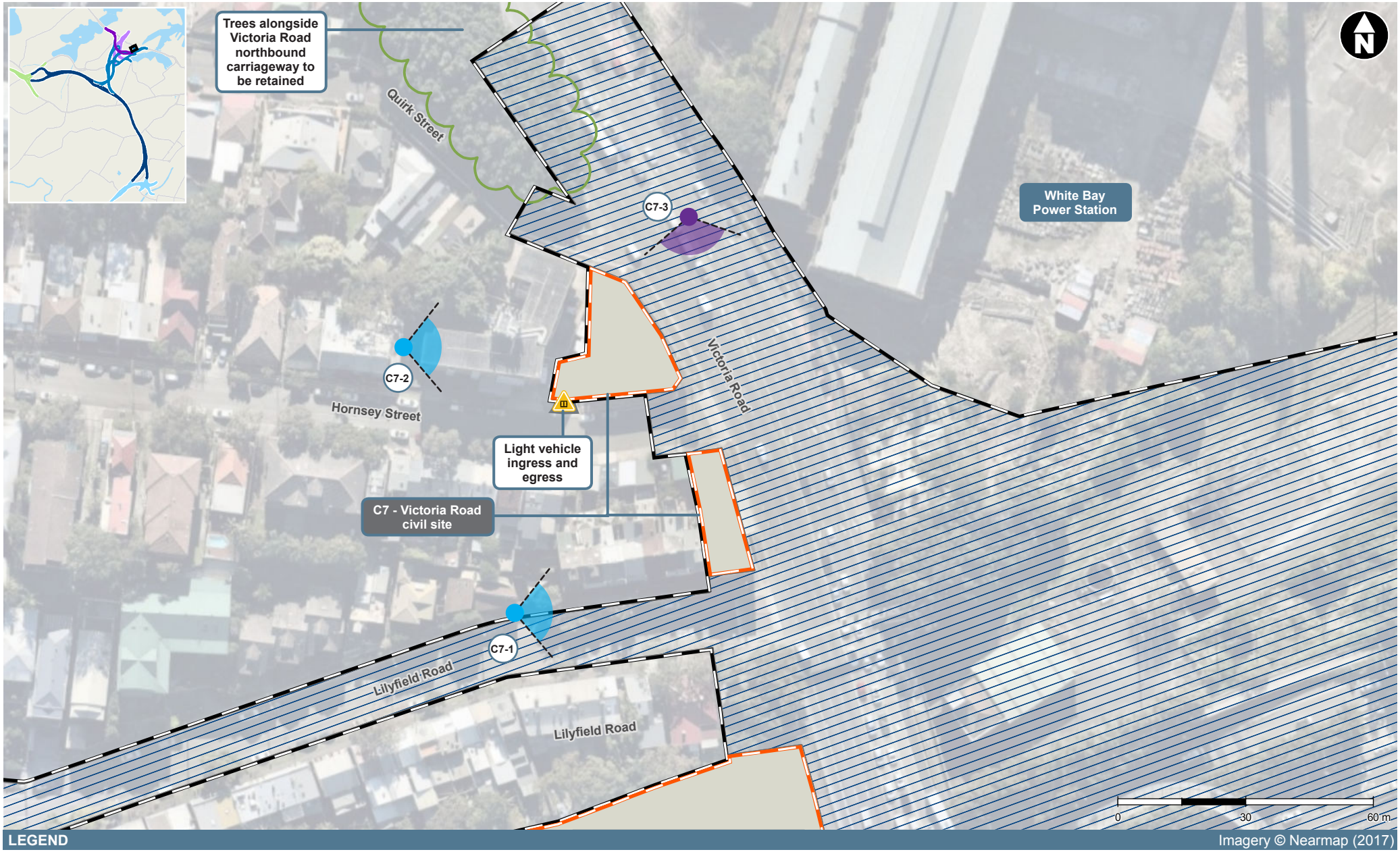


Figure 6-9 Victoria Road civil site (C7) visual receptor locations

6.11 Iron Cove Link civil site (C8)

The Iron Cove Link civil site (C8) would be located along the southern side of Victoria Road at Rozelle between Byrnes Street and Springside Street.

The site would be located on land currently occupied by Victoria Road and residential and commercial properties which are to be acquired to the south. The site would be mainly used to support the construction of tunnel entry and exit ramps that would connect Victoria Road with the Iron Cove Link, and the widening of Victoria Road. The site may be used to support limited excavation of the initial sections of the Iron Cove Link tunnels.

Key construction activities to be carried out at the Iron Cove Link civil site would include:

- Vegetation clearing and removal
- Demolition of existing structures including residential and commercial buildings that have been acquired, and clearing of vegetation
- Establishment of site offices, amenities and temporary infrastructure including temporary noise barriers
- Utility, drainage and road treatments
- Stockpiling of material and limited spoil haulage
- Construction of the Iron Cove Link motorway operations complex (MOC4) and ventilation facility
- Construction of the bioretention facility and improved car park works at King George Park (adjacent to Manning Street).

A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Iron Cove Link civil site is shown in **Figure 6-10**.

The site would include temporary site offices, a workshop and storage facilities, sediment basin and construction water treatment plant, a temporary substation, workforce amenities and car parking. Heavy and light vehicles would enter and exit the site to and from the southern (westbound) Victoria Road carriageway.

The westbound pedestrian and cyclist route along the southern side of Victoria Road would be temporarily relocated during construction. Following the completion of construction, the pedestrian and cyclist network would be reinstated. During construction, a small section of King George Park adjacent to Iron Cove Bridge would be used to support the widening works along Victoria Road. A section of The Bay Run would be temporarily realigned to ensure pedestrian and cycle connectivity with the Iron Cove Bridge is retained, and the existing arrangement would be reinstated at the completion of construction.

Representative receptor locations have been identified and are detailed in **Table 6-17** and shown in **Figure 6-10**. A night time lighting impact assessment has not been undertaken for this site as they will be carried out during standard daytime construction hours.

Table 6-17 Iron Cove Link civil site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C8-1 Recreational users – King George Park Provides a representative view for recreational users of King George Park.	The construction of a bioretention facility and car park in Manning Street and proposed temporary changes to the Bay Run, which is well known for its exceptional views, would have a high number of receptors associated with recreational users who use the Bay Run and King George Park. These receptors would view the site over relatively short periods of time. Within this context, the sensitivity of this receptor is considered to be Moderate.	The bioretention facility and car park works area would be subject to limited screening by a row of mature trees. Users of the Bay Run would have views to the site, albeit only in passing. Users of the play equipment at the north-western edge of the park would have closer views and these are likely to be over longer periods. The fences and hoarding would constitute a noticeable visual change, although the footprint for this work would be relatively minor. The duration of the works for the bio retention facility and car park would be relatively low, over a period of months, whereas the works adjoining the Iron Cove Bridge would be in place over a period of years. Within this context, the magnitude of change from of the project is considered to be Moderate.	**Moderate**
C8-2 Pedestrians and cyclists – path across Iron Cove Bridge Provides a representative view for pedestrians using the footpath across Iron Cove Bridge heading south-east towards the project.	The sensitivity of the receptor to this change would be considered to be Low given the bulk of the civil construction ancillary facility is set within the Victoria Road corridor which is already of low visual quality, the view is not an important one within the context of the Bay Run, and is seen for a relatively short period of time as part of a much longer, scenic journey. The primary receptors impacted would be pedestrians and cyclists travelling in an eastbound direction	The bridge would provide an elevated viewing location to the construction works, although seen at distance. Viewing times would be short in duration but would be in high contrast to the existing view The magnitude of change is considered to be High given the scale of the construction ancillary facility in conjunction with temporary noise barriers, fences and hoarding.	**Moderate**
C8-3 Pedestrians – footpath near Byrnes Street	Provides a representative view for pedestrians using the path to King George Park from Victoria Road, adjacent to Byrnes Street. The sensitivity of the receptor at this location would be Low.	The magnitude of change would be moderate given the proximity to the construction ancillary facility. However, from this location potentially little of the overall construction ancillary facility would be visible above the hoarding.	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
C8-4 Residents – Callan Street, Springside Street, Toelle Street and Clubb Street Provides a representative view for residences on the southern side of Victoria Road.	The sensitivity of residents closer to Victoria Road is considered likely to be High given their proximity to the construction site and the duration of the construction period. The streets to the south of Victoria Road all slope down towards King George Park, restricting views for residents further south. Those residents located closer to Victoria Road however have relatively unobstructed views to the construction site.	Existing buildings along Victoria Road would be demolished as part of the construction works. The demolition of these structures and construction of larger elements such as the ventilation facility, ventilation outlet, and substation, in conjunction with temporary noise barriers/hoarding would constitute a High magnitude of visual impact.	**High**.
C8-5 Residents – Nagurra Place, Terry Street and Victoria Road Provides a representative view for apartments on Nagurra Place and Terry Street with views to Victoria Road.	A six storey apartment complex is located within three separate buildings and has frontages to Nagurra Place, Warayama Place and Terry Street. As the topography slopes down towards Victoria Road, the upper south facing levels have windows and balconies with views to Iron Cove, the parklands and toward the construction site. The sensitivity of these residents, particularly at the upper levels, is considered to be Moderate, given the open views to much of the construction activities.	The construction area would comprise a relatively small portion of the overall view available to these residents, which is currently of low amenity due to the busy road environment of the Victoria Road corridor and the associated industrial/commercial built form. The view from these residences would comprise more distant district views including the historic hilltop Callan Park Kirkbride building complex, and parts of Iron Cove. Within this context, the magnitude of change is considered to be Moderate	**Moderate**
C8-6 Motorists – Victoria Road Provides representative views for motorists driving on Victoria Road.	The sensitivity of motorists is considered to be Low due to the relatively short period of time the civil site would be visible within a longer journey, the driver's attention being focused on the road, and the existing low amenity character of Victoria Road.	The magnitude of change is considered to be Moderate given the extent of the Victoria Road corridor that would be subject to works, and the construction duration.	**Moderate-Low**

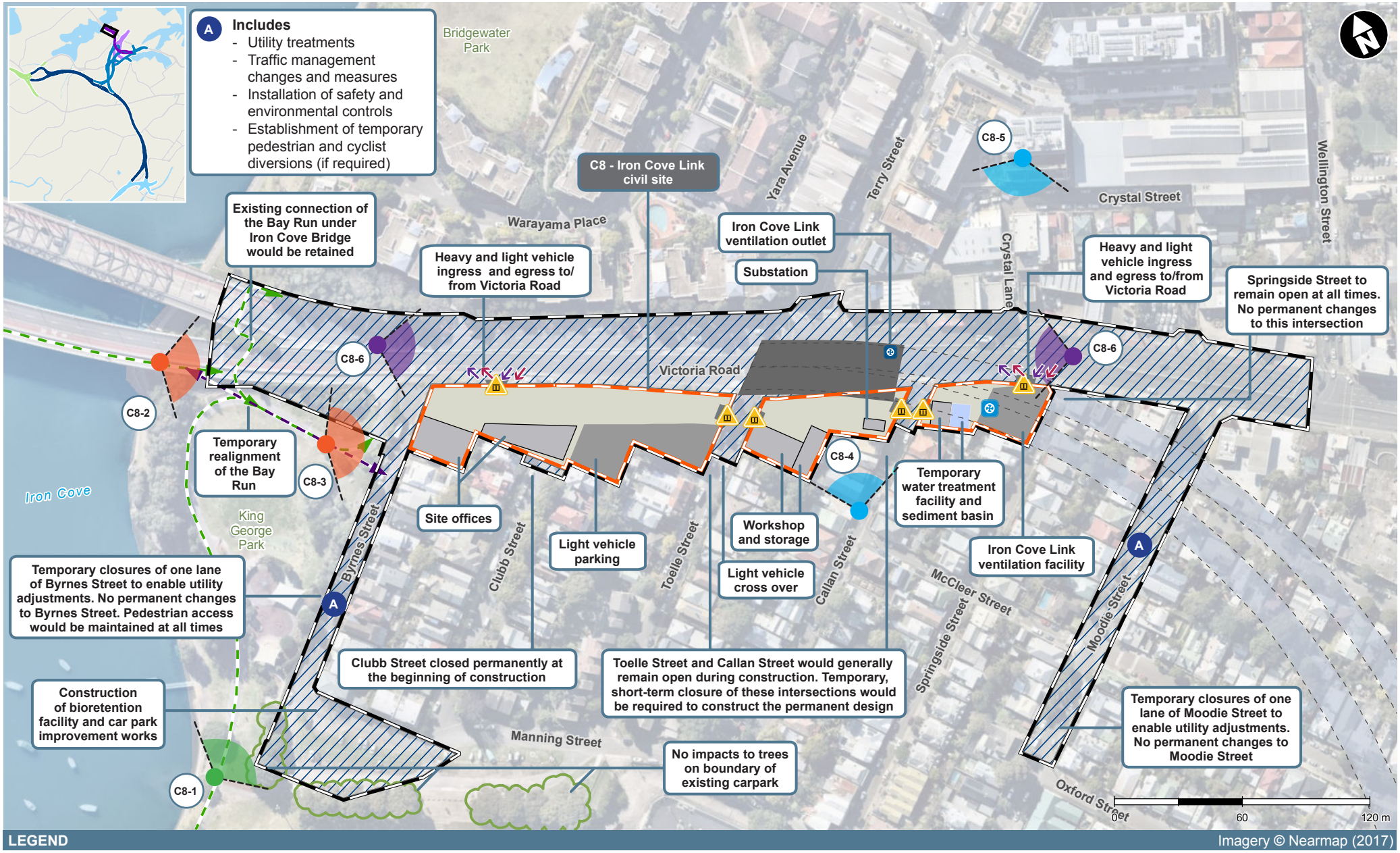


Figure 6-10 Iron Cove civil site (C8) visual receptor locations

6.12 Pyrmont Bridge Road tunnel site (C9)

The Pyrmont Bridge Road tunnel site (C9) would be located between Parramatta Road and Pyrmont Bridge Road at Annandale on land that currently comprises commercial and industrial businesses (which are to be acquired). The construction ancillary facility would be mainly used to support tunnelling construction activities.

The site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking. Spoil handling associated with the tunnelling works supported by the site would occur 24 hours a day, seven days a week. Where practical, spoil would be handled below ground and removed during the day, outside of peak periods. A detailed description of this construction ancillary facility is provided in Chapter 6 (Construction work) of the EIS. An indicative construction site layout for the Pyrmont Bridge Road tunnel site is shown in **Figure 6-11**.

Representative receptor locations have been identified as described in **Table 6-18** and shown in **Figure 6-11.** Night lighting impacts are detailed in **Table 6-19**.

6.12.1 Visual impacts

Table 6-18 Pyrmont Bridge Road tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C9-1 Residents – Pyrmont Bridge Road Provides a representative view for residences on Pyrmont Bridge Road.	There are two rows of terraces adjoining and adjacent to the site to the south and north of Pyrmont Bridge Road respectively. The residences that adjoin the construction site currently back onto a large industrial style building, (separated by Bignell Lane) and adjoin a large warehouse building to the west. The residences on the northern side of Pyrmont Bridge Road overlook the residential terraces and the warehouse building on the opposite side of the road. While these residents are in close proximity to the construction site and would potentially have views to it from within the residences, the current commercial/industrial land uses and frontage to busy Pyrmont Bridge Road comprise a landscape of relatively low amenity. The sensitivity of these nearby residents to the proposed change is therefore considered to be Moderate.	The extent of visibility of the construction site, ancillary works and construction traffic would be high and would be in close proximity. However, the duration of viewing would generally be low. The demolition of the warehouse building (as well as others adjoining it), construction of an acoustic shed, and the presence of temporary noise barriers, fences and hoarding would comprise a contrasting view to the existing. Within this context, the magnitude of change is considered to be High.	**High–Moderate**
C9-2 Residents – Booth Street and Mallett Street Provides a representative view for residences on the eastern side of Booth Street and Mallett Street.	Two apartment buildings are located near the construction site on the northern and southern sides of the intersection of Booth Street/Mallett Street and Pyrmont Bridge Road. The buildings are around 15 storeys high (Booth Street) and about five to six storeys high (Mallett Street) respectively. Both buildings have balconies and windows that overlook the site, the mid to upper levels of which would be have views across Mallett Street and intervening buildings to the construction site. Due to their elevated position and view of the site, the sensitivity of receptors at this location is therefore considered to be High.	The extent of the of the project visible from this receptor would generally be high. The view of the project would primarily affect the lower floors of the 15 storey building and up to the mid floors of the six storey building, with the project comprising a primary part of the view. However, the primary aspect of the 15 storey building is west, looking past the construction site which is to the south-west. The number of most affected residences would therefore be relatively low. Within this context, the magnitude of change is considered to be Moderate.	**High–Moderate**

Receptor	Sensitivity	Magnitude	Rating
C9-3 Motorists – Parramatta Road Provides representative views for motorists driving on Parramatta Road.	The sensitivity of motorists is considered to be Low due to the relatively short period of time the civil site would be visible within the context of their overall trip, and also as the driver's attention would be focused on the road.	Temporary noise barriers, fences and hoarding as well as facilities such as an acoustic shed would replace the existing view of two to three storey commercial premises. The magnitude of change is therefore considered to be Low.	**Low**
C9-4 Residents – Parramatta Road Provides a representative view for residences on south side of Parramatta Road.	Two apartment buildings are located near the construction site on the southern side of Parramatta Road. The buildings are four storeys and six storeys high respectively. The four storey building is located opposite the site with windows and balconies facing north toward it, but there is a low number of affected apartments. The six storey building is located a block to the west and has some side windows that face toward the construction site, however the apartments are primarily oriented north (away from the site), and has a higher number of affected apartments. On balance, the sensitivity of these receptors is considered to be Moderate.	Currently views at the location comprise a relatively consistent height two storey frontage of commercial buildings. The provision of hoarding and an acoustic shed would comprise a high level of contrast with the existing view. Views to the project would primarily affect the residences opposite with their balconies facing it, and comprising their primary view. The number of most affected residences would therefore be relatively low. Within this context, the magnitude of change is considered to be Moderate.	**Moderate**

6.12.2 Night lighting impacts

The visual setting of the construction ancillary facility includes lighting associated with Parramatta Road and Pyrmont Bridge Road as large arterial roads, local streets, related traffic and illuminated windows of the residential and commercial properties.

Lighting during construction would occur when necessary to support tunnelling and would be associated with the acoustic shed, temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, workforce amenities and car parking. Lighting would be designed to minimise light spill, which would reduce the amount of light trespass onto adjoining residential properties.

Table 6-19 Pyrmont Bridge Road tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C9-1 Residents – Pyrmont Bridge Road Provides a representative view for residences on Pyrmont Bridge Road.	The terrace houses on both sides of the road are located within a relatively low lit setting compared with high light setting of Parramatta Road. A low to moderate number of residents would be expected to be affected by the project. The project would be in place for up to five years. Most of the night time activity associated with these residences would be expected to be focussed indoors. Within this context the sensitivity to increased night lighting arising from the project is considered to be Low	Visibility of night lighting from this receptor is considered likely to be low given the much of it within the compound will be shielded / well directed or within buildings such as the acoustic shed. Much of the lighting would be expected to come from spoil removal trucks which would not enter and leave the site via Mallett Street. Within this context the magnitude of increased night lighting arising from the project and affecting this receptor is considered to be Low.	**Low-**
C9-2 Residents – Booth Street and Mallett Street Provides a representative view for residences on the eastern side of Booth Street and Mallett Street.	Given the district and regional views available from many of these dwellings, night viewing from balconies would be expected to occur. Many of these residents would have views into the project site, but these would in most cases not be expected to generally be the focus of viewing, which would be expected to look above the site to the more distant and regional highly lit night-time setting. Notwithstanding, a high number of residents would have views looking into the site, with the project in place for up to five years. Within this context the sensitivity to increased night lighting arising from the project is considered to be Moderate.	The magnitude of lighting impacts is considered to be Low given that although a large number of surrounding residents in apartment buildings would overlook the site, this would be within the context of a brightly lit night-time landscape, including Parramatta Road	**Moderate-Low**

Receptor	Sensitivity	Magnitude	Rating
C9-3 Motorists – Parramatta Road Provides representative views for motorists driving on Parramatta Road.	The sensitivity of motorists is considered to be Low due to the relatively short period of time the civil site would be visible within the context of an overall trip, and also as the driver's attention would be focused on the road.	Lighting within the construction ancillary facility would primarily be shielded from this receptor group by hoarding and the acoustic shed. The magnitude of change is therefore considered to be Low.	**Low**
C9-4 Residents – Parramatta Road Provides a representative view for residences on the south side of Parramatta Road.	The key residential receptors comprise those within the apartment building opposite the project. These receptors are located on a highly lit road that is subject to moderate to heavy traffic volumes. The quality of this existing view is considered to be low, with the number of residents able to access this view likely to be moderate to low. Within this context, the sensitivity of the residents is considered to be Low.	Within the context of the highly lit Parramatta Road with associated glare, the degree of contrast with the existing view would be considered likely to be low. The magnitude of lighting impacts arising from the project is considered to be Low	**Low**

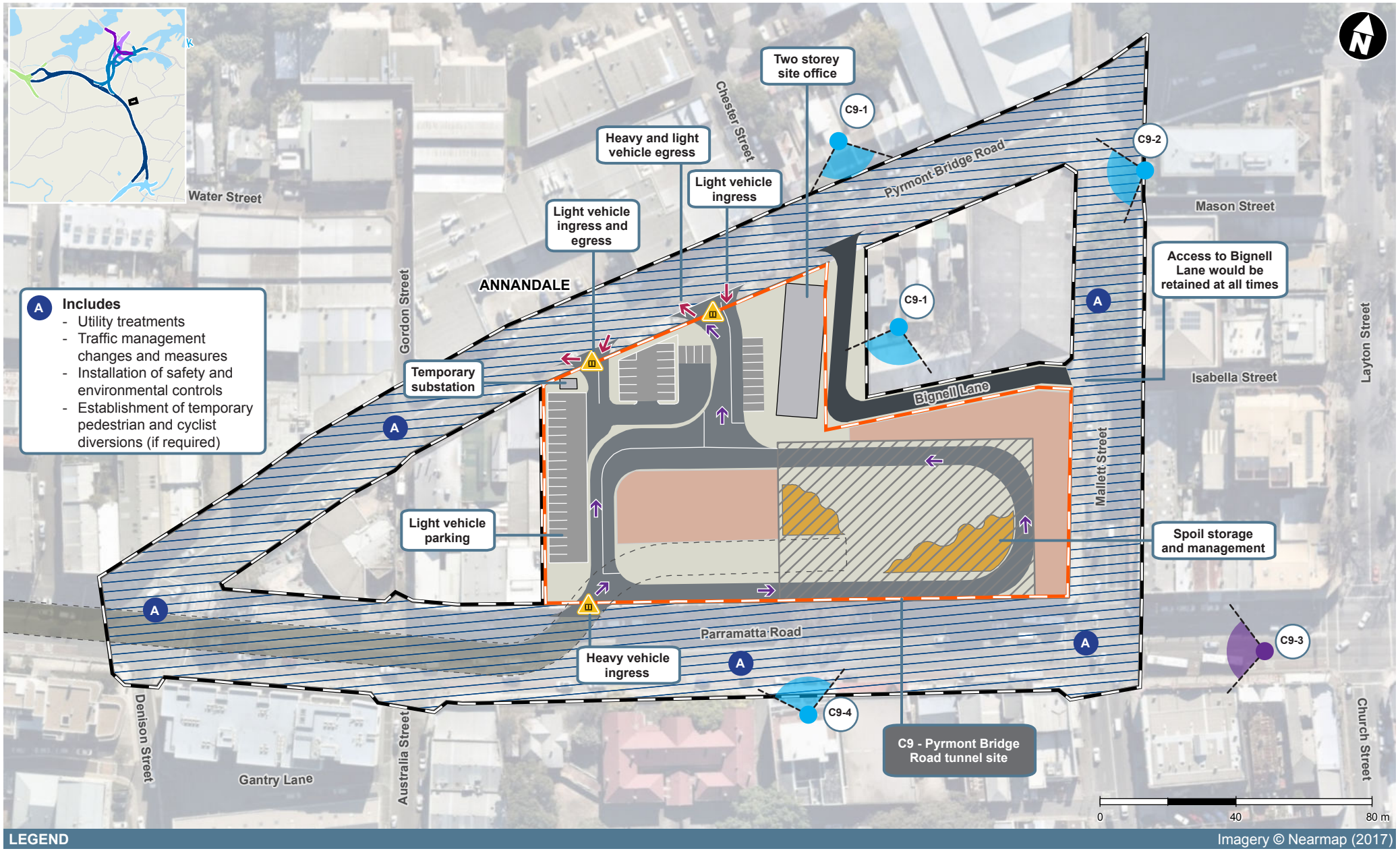


Figure 6-11 Pyrmont Bridge Road tunnel site (C9) visual receptor locations

6.13 Campbell Road civil and tunnel site (C10)

The Campbell Road civil and tunnel site (C10) would be located within the St Peters interchange site on the southern side of Albert Street and Campbell Road in St Peters. The Campbell Road civil and tunnel site would use land that is being used as a construction site for the New M5 project. This land would be handed over to the project in a staged manner once it is no longer needed for New M5 construction. An additional area at the eastern end of the Campbell Road civil and tunnel site would be made available in 2020, following the completion of the use of this area for construction of the New M5 project.

The site would be used to support tunnelling and for construction of the Campbell Road motorway operations complex (MOC5) including the Campbell Road ventilation facility. On completion of construction, the remainder of the site would be rehabilitated and landscaped in accordance with the UDLP for the New M5 project.

The construction site would include temporary site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, a temporary substation, temporary ventilation for the tunnels, a temporary water treatment plant and sediment pond, workforce amenities and car parking. Spoil handling associated with tunnelling work supported by the site would occur 24 hours a day, seven days a week. A detailed description of this construction ancillary facility is provided in **Chapter 6** (Construction work) of the EIS. An indicative construction site layout for the Campbell Road civil and tunnel site is shown in **Figure 6-12**.

These uses represent a significant downgrade from the use of the site for the New M5 project both in terms of footprint and intensity of construction activity. The landscape and visual impact assessment for the New M5 construction site found that:

- For residents at Campbell Road, the overall visual impact rating during construction would be High or Moderate
- For active and passive recreation at Sydney Park, the overall visual impact rating during construction would be High–Moderate
- For residents at Barwon Park Road, the overall visual impact rating during construction would be High.

Chapter 13 of the New M5 EIS provides further details regarding the assessment.

Given the existing environment (including land uses), construction activities and construction footprint has changed since this initial assessment; a new assessment based on the current environment and new construction ancillary facility specifications has been carried out and is detailed in **Table 6-20.**

For an assessment of the cumulative impacts of the two consecutive construction projects, please refer to **section 8.1**.

Representative receptor locations have been identified as described in **Table 6-20** and shown in **Figure 6-12.** Night lighting impacts are detailed in **Table 6-21**.

6.13.1 Visual impacts

Table 6-20 Campbell Road civil and tunnel site visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C10-1 Residents – houses on Campbell Street adjacent to the western end of the project site. Provides a representative view for the row of houses (predominately terraces) on the northern side of Campbell Street adjacent the western end of the project site.	The location of these residences is obliquely opposite the project with potential views available from within these dwellings. Residents would obtain daily views of the project as they left and returned to their homes. The number of residential receptors would potentially be high. Within this context, the sensitivity of residents to the project is considered to be High.	Currently housing along Campbell Street has views to the New M5 construction site. The receptors existing view is therefore one of very low amenity. The construction of an acoustic shed, ventilation facility and associated infrastructure as part of the M4-M5 Link project would be likely to result in a significant change of the existing view. At its closest point, the residences would be about 70 metres from the project, across Campbell Street and Albert Street. The magnitude of change is therefore considered to be High.	**High**
C10-2 Residents – corner of Barwon Park Road and Campbell Street Provides a representative view for residences on Barwon Park Road near the project site.	A four storey building is located opposite the construction site on the corner of Barwon Park Road, the top storey of which is set back from Barwon Park Road. The front of the building faces east on to Barwon Park Road and Sydney Park opposite. However, the building also has angled views to the south east toward part of the construction site. There appear to be no living area windows on the south side of the apartment building, and therefore no sensitive direct views from the four apartments adjoining at the south end wall of the building. Nonetheless, the number of affected residents would be high, with the project in place for a period of up to five years. Within this context, the sensitivity of receptors at this location is considered to be High.	The construction of an acoustic shed, ventilation facility and associated infrastructure as part of the M4-M5 Link project would be likely to result in increased visual prominence of construction elements as viewed from the opposite side of Campbell road. However, direct views to these construction elements would be primarily angled views as a result of the orientation of the apartment building to the east. The magnitude of change for this receptor is therefore considered to be Moderate.	**High–Moderate**

Receptor	Sensitivity	Magnitude	Rating
C10-3 Pedestrians – Campbell Road Provides representative views for pedestrians walking past the site.	Local residents would likely view the site as they walk to and from Sydney Park and other nearby locations. As these views would only be experienced in passing and as construction elements would be partially obscured by fencing and hoarding, it is considered that the sensitivity of these receptors is Moderate.	Pedestrians would have the option of travelling on the north side of Campbell Street/Road separated from the construction site. Pedestrians would also be at street level and so their views into the site would be screened to some degree by hoardings around the perimeter of the site. The magnitude is therefore considered to be Low.	**Moderate–Low**
C10-4 Residents – terraces on Campbell Road adjacent to the eastern end of the project site. Provides a representative view for the row of terraces on the northern side of Campbell Road adjoining Sydney Park.	At completion of the New M5 project in 2020, an avenue of trees would have been planted to both sides of Campbell Road, which would over time partially screen the M4-M5 Link construction works area. However, as the construction site is scheduled to commence begin late 2018, no significant level of vegetative screening from the New M5 project is likely to be in place for some years after that date. Residents would therefore have direct visibility from south facing windows and balconies towards the construction site. The area opposite these dwellings would comprise a materials laydown and construction worker car park set behind a tall hoarding. The sensitivity of residents is considered to be High.	At the time of writing, the terraces have views to the New M5 construction site which includes fencing and hoarding, an acoustic shed, site offices and large mounds of soil. Additionally, as part of the New M5 project Campbell Road would be subject to major upgrading works, extending to the front boundary of the residential lots, and along the length of Campbell Street/Campbell Road. The receptors at this location would still be in relatively close proximity to the site, with views from living areas, bedrooms and balconies in the front of the house and front garden to the construction site located opposite. However, the main construction facilities would be located around 150 metres west of these dwellings, viewed at an oblique angle, and above the construction hoarding. Within this context the magnitude of change is considered to be Moderate.	**High–Moderate**
C10-5 Motorists – Campbell Road Provides representative views for motorists driving on Campbell Road.	The sensitivity of motorists is considered to be Low due to the relatively short period of time the construction site would be visible within the context of their overall trip, and also as the driver's attention would likely be focused on the road.	Temporary noise barriers, fences and hoarding as well as acoustic shed and construction of ventilation facilities would be visible, replacing the existing New M5 construction site. The magnitude of change is therefore considered to be Low.	**Low**

6.13.2 Night lighting impacts

Lighting during construction would occur when necessary and would be associated with site offices, a workshop and storage facilities, a laydown area, entry and exit points for construction traffic, workforce amenities and car parking. Fixed lighting would be designed to minimise light spill, which would reduce the amount of light spill onto adjoining residential properties.

Table 6-21 Campbell Road civil and tunnel site night lighting visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
C10-1 Residents – houses on Campbell Street adjacent to the western end of the project site. Provides a representative view for the row of houses (predominately terraces) on the northern side of Campbell Street adjacent the western end of the project site.	The location of these residences is obliquely opposite the project. As outlined in **section 5.1.3**, residents would have high levels of visibility to the construction site during the construction period from the likely location of main living areas and bedrooms as well as views experienced when entering and leaving the residences. The number of residential receptors would potentially be high. However, in most cases residents would be considered likely to be focussed on activities within their homes at night. The project would be ongoing for up to five years. On balance, the sensitivity of residents to night lighting from the project is considered to be Low	Residences would be subject to existing lighting impacts associated with the completed New M5 project, specifically the surface road upgrade of Campbell Street. This would be expected to cause some reduction in the visual prominence of lighting from the construction site. Further, given the high to moderate traffic levels along Campbell Street, the duration of viewing towards the project from the ground floor living areas would likely be limited. Within this context, the magnitude of change is therefore considered to be Low.	**Low**
C10-2 Residents – corner of Barwon Park Road and Campbell Street Provides a representative view for residences on Barwon Park Road near the project site.	A four storey residential apartment building is located on the corner of Barwon Park Road opposite the south-west corner of Sydney Park. In most cases residents would be considered likely to be focussed on activities within their homes at night, particularly given Sydney Park is largely unlit. The project would be in place for a period of about five years, with the number of affected residents being high. Within this context, the sensitivity of receptors at this location is considered to be Moderate	The front of the building faces east to Barwon Park Road and Sydney Park opposite. However, the apartments are orientated south east towards the construction site. Views would incorporate the completed New M5 Campbell Street / Road upgrade which would be subject to potentially high levels of street lighting commensurate with a substantial transport artery. This would be expected to cause some reduction in the visual prominence of lighting from the construction site. Within this context, the magnitude of change is therefore considered to be Low.	**Moderate-Low**

Receptor	Sensitivity	Magnitude	Rating
C10-3 Pedestrians – Campbell Road Provides representative views for pedestrians walking past the site	Local residents would likely view the site as they walk to and from Sydney Park and other nearby locations. As these views would only be experienced in passing and as lighting would be generally obscured by fencing and hoarding, it is considered that the sensitivity of these receptors is Low.	Pedestrians would have the option of travelling on the north side of Campbell Street / Road separated from the construction site. Pedestrians would also be at street level and so their views into the site would be screened to some degree by hoardings around the perimeter of the site. The magnitude is therefore considered to be Low	**Low**
C10-4 Residents – terraces on Campbell Road adjacent to the eastern end of the project site. Provides a representative view for the row of terraces on the northern side of Campbell Road adjoining Sydney Park.	No significant level of vegetative screening from the New M5 project is likely to be in place for the majority of the construction period and so a small number of residents would therefore have visibility towards the construction site. The area opposite these dwellings would comprise a materials laydown and construction worker car park set behind a tall hoarding. Notwithstanding, the sensitivity of residents is considered to be High.	The receptors at this location are in close proximity to the site, with views from living areas, bedrooms and balconies in the front of the house and front garden. Currently, the housing has views to the New M5 construction site. Within this context, the magnitude of change is therefore considered to be Moderate.	**High–Moderate**
C10-5 Motorists – Campbell Road Provides representative views for motorists driving on Campbell Road.	The sensitivity of motorists is considered to be Low due to the relatively short period of time the civil site would be visible within the context of their overall trip, and also as the driver's attention would be focused on the road.	Given the current use as the New M5 construction site, the magnitude of change is considered to be Low.	**Low**

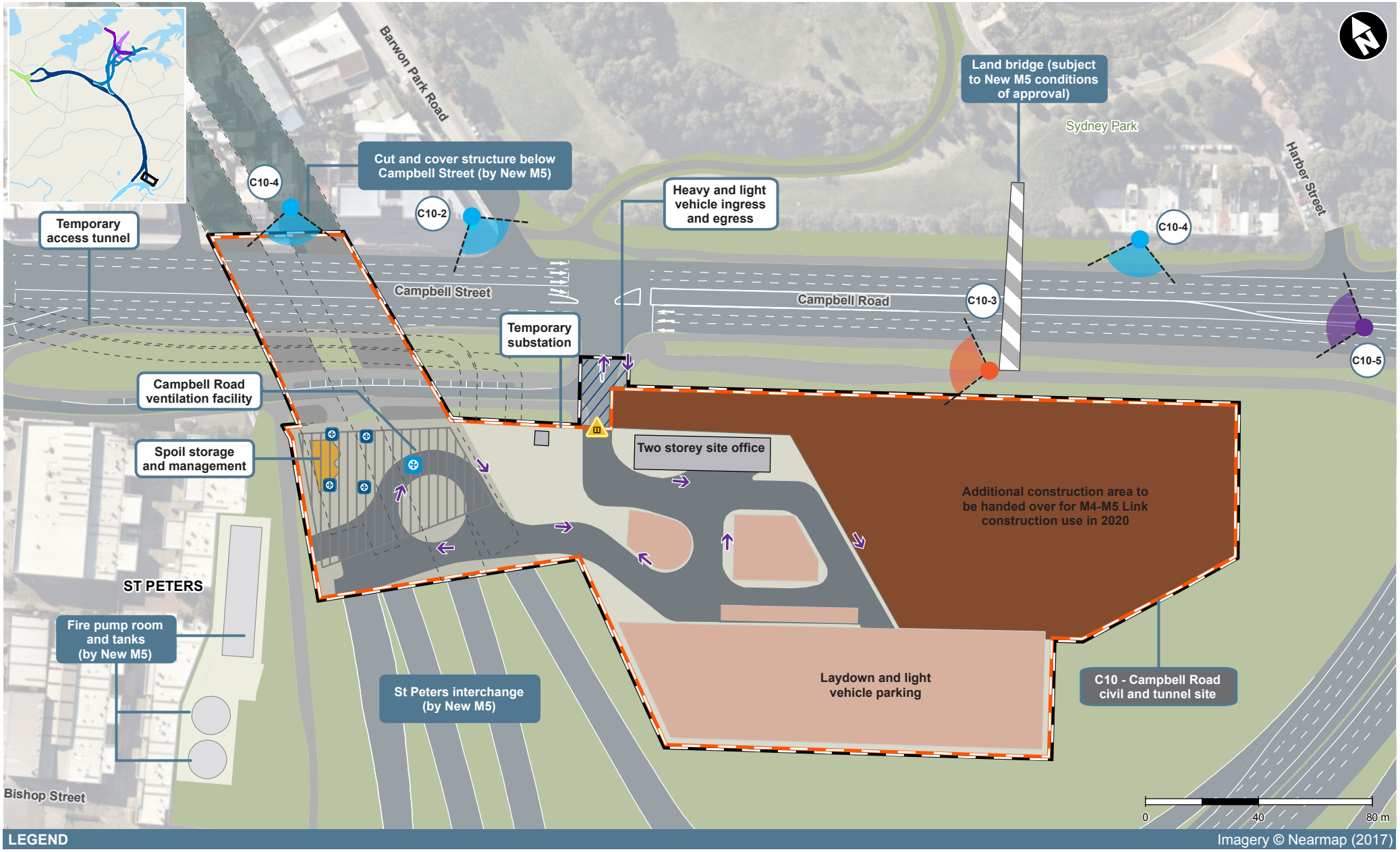


Figure 6-12 Campbell Road civil and tunnel site (C10) visual receptor locations

6.14 Summary of visual impacts during construction

6.14.1 Construction visual impacts

A summary of the construction visual impact assessments for the relevant receptor groups impacted by the project is provided below in **Table 6-22**. Mitigation measures for the Moderate and High impact areas are outlined in **Chapter 9**.

Table 6-22 Summary of construction visual impacts

Receptor		Sensitivity to change	Magnitude of change	Overall rating	Sensitivity to change	Magnitude of change	Overall rating
		Construction			Night lighting		
Wattle Street civil and tunnel site (C1a)							
1	Religious congregation – Wattle Street	Low	Moderate	**Moderate-Low**	Low	Low	**Low**
2	Residents – Wattle Street, Walker Avenue and Ramsay Street	High	Moderate	**High–Moderate**	Low	Moderate	**Moderate–Low**
3	Motorists on Wattle Street, Ramsay Street and Parramatta Road	Low	Low	**Low**	Low	Low	**Low**
4	Pedestrians – Wattle Street, Walker Avenue, Ramsay Street and Parramatta Road	Low	Low	**Low**	Low	Low	**Low**
Haberfield civil and tunnel site (C2a)							
1	Motorists – Wattle Street, Walker Avenue and Parramatta Road	Low	Low	**Low**	Low	Low	**Low**
2	Religious congregation – Wattle Street	Low	Moderate	**Moderate-Low**	Low	Moderate	**Moderate–Low**
3	Residents – Wattle Street and Walker Avenue	High	Moderate	**High–Moderate**	Low	Moderate	**Moderate–Low**
4	Pedestrians – Wattle Street, Walker Avenue and Parramatta Road	Low	Moderate	**Moderate–Low**	Low	Low	**Low**

	Receptor	Sensitivity to change	Magnitude of change	Overall rating	Sensitivity to change	Magnitude of change	Overall rating
Northcote Street civil site (C3a)							
1	Religious congregation – Wattle Street	Low	Low	**Low**	Low	Low	**Low**
2	Motorists – Wattle Street, Parramatta Road	Low	Moderate	**Moderate–Low**	Low	Low	**Low**
3	Residents – Wattle Street, Northcote Street, Wolseley Street, Parramatta Road	Moderate	Moderate	**Moderate**	Low	Moderate	**Moderate–Low**
4	Pedestrians – Wattle Street, Northcote Street, Wolseley Street, Parramatta Road, Page Avenue, Earle Avenue, Frederick Street	Low	Low	**Low**	Low	Low	**Low**
Parramatta Road West civil and tunnel site (C1b)							
1	Residents – Alt Street, Bland Street and Parramatta Road	High	High	**High**	Low	Moderate	**Moderate–Low**
2	Motorists on Alt Street, Bland Street and Parramatta Road	Low	Moderate	**Moderate–Low**	Low	Low	**Low**
3	Pedestrians – Alt Street, Bland Street and Parramatta Road	Low	Moderate	**Moderate–Low**	Low	Low	**Low**
Parramatta Road East civil site (C3b)							
1	Motorists – Alt Street, Bland Street and Parramatta Road	Low	Moderate	**Moderate–Low**	Low	Low	**Low**
2	Residents – Alt Street, Bland Street and Parramatta Road	Moderate	Moderate	**Moderate**	Low	Moderate	**Moderate–Low**
3	Pedestrians – Alt Street, Bland Street and Parramatta Road	Low	Low	**Low**	Low	Low	**Low**

	Receptor	Sensitivity to change	Magnitude of change	Overall rating	Sensitivity to change	Magnitude of change	Overall rating
Darley Road civil and tunnel site (C4)							
1	Pedestrians – Darley Road, City West Link pedestrian bridge	Low	Low	**Low**	Low	Low	**Low**
2	Motorists – Darley Road	Moderate	Low	**Moderate-Low**	Low	Low	**Low**
3	Residents – Darley Road, Charles Street, Hubert Street (south of Darley Road), Francis Street (south of Darley Road) and James Street	High	High	**High**	High	Moderate	**High-Moderate**
4	Light rail users – Leichhardt North light rail stop	Low	High	**Moderate**	Low	Moderate	**Moderate-Low**
Rozelle civil and tunnel site (C5)							
1	Motorists – City West Link	Moderate	Moderate	**Moderate**	Low	Moderate	**Moderate–Low**
2	Residents – Foucart Street and Cecily Street	High	High	**High**	Moderate	Moderate	**Moderate**
3	Residents – Lilyfield Road near Denison Street	High	High	**High**	High	High	**High**
4	Residents – Breillat Street, Annandale	Moderate	Low	**Moderate–Low**	Low	Low	**Low**
5	Recreational users – Easton Park	Moderate	High	**High–Moderate**	Low	High	**Moderate**
6	Recreational users – Glebe Foreshore Parklands	High	Moderate	**High-Moderate**	Low	Low	**Low**
The Crescent civil site (C6)							
1	Residents – Bayview Crescent and Johnston Street	High	High	**High**	NA	NA	NA
2	Motorists – The Crescent	Low	Moderate	**Moderate–Low**	NA	NA	NA
3	Recreational users – Rozelle Bay	Moderate	Moderate	**Moderate**	NA	NA	NA
4	Recreational users – Glebe Foreshore Parklands	High	Moderate	**High–Moderate**	NA	NA	NA

	Receptor	Sensitivity to change	Magnitude of change	Overall rating	Sensitivity to change	Magnitude of change	Overall rating
Victoria Road civil site (C7)							
1	Residents – Lilyfield Road	Moderate	Moderate	**Moderate**	NA	NA	NA
2	Residents – Hornsey Street and Quirk Street	High	High	**High**	NA	NA	NA
3	Motorists – Victoria Road	Low	Low	**Low**	NA	NA	NA
Iron Cove Link civil site (C8)							
1	Recreational users – King George Park	Moderate	Moderate	**Moderate**	NA	NA	NA
2	Pedestrians – footpath across Iron Cove Bridge	Low	High	**Moderate**	NA	NA	NA
3	Pedestrians – footpath near Byrnes Street	Low	Moderate	**Moderate–Low**	NA	NA	NA
4	Residents – Callan Street, Springside Street, Toelle Street and Clubb Street	High	High	**High**	NA	NA	NA
5	Residents – Nagurra Place, Terry Street and Victoria Road	Moderate	Moderate	**Moderate**	NA	NA	NA
6	Motorists – Victoria Road	Low	Moderate	**Moderate-Low**	NA	NA	NA
Pyrmont Bridge Road tunnel site (C9)							
1	Residents – Pyrmont Bridge Road	Moderate	High	**High–Moderate**	Low	Low	**Low**
2	Residents – Booth Street and Mallett Street	High	Moderate	**High–Moderate**	Moderate	Low	**Moderate-Low**
3	Motorists – Parramatta Road	Low	Low	**Low**	Low	Low	**Low**
4	Residents – Parramatta Road	Moderate	Moderate	**Moderate**	Low	Low	**Low**

	Receptor	Sensitivity to change	Magnitude of change	Overall rating	Sensitivity to change	Magnitude of change	Overall rating
Campbell Road civil and tunnel site (C10)							
1	Residents – houses on Campbell Street adjacent to the western end of the project site.	High	High	**High**	Low	Low	**Low**
2	Residents – corner of Barwon Park Road and Campbell Street	High	Moderate	**High–Moderate**	Moderate	Low	**Moderate-Low**
3	Pedestrians – Campbell Road	Moderate	Low	**Moderate–Low**	Low	Low	**Low**
4	Residents – terraces on Campbell Road adjacent to the eastern end of the project site.	High	Moderate	**High–Moderate**	High	Moderate	**High–Moderate**
5	Motorists – Campbell Road	Low	Low	**Low**	Low	Low	**Low**

7 Assessment of operational impacts

7.1 Impacts avoided through design

The project has gone through a process of design development and refinement resulting in the concept design that is presented within the EIS. The concept design has been developed to avoid or minimise impacts where possible, including:

- The majority of road infrastructure is located below ground
- The Rozelle interchange was moved mostly underground, reducing visual impacts associated with at grade and above ground motorway connections and facilitating the provision of open space including two major north south pedestrian / cycle crossing points of City West Link, connecting Lilyfield with Rozelle and one east west pedestrian / cycle connection under Victoria Road, with potential for future connection to The Bays Precinct
- Proposed ramps on Parramatta Road at Camperdown (the Camperdown interchange) were removed from the project which avoided visual impacts in a heritage sensitive area adjacent to the University of Sydney and Victoria Park
- Development of urban design master plans for Rozelle and Iron Cove, to guide future creation of landscaping and open space. Development of the landscaping and open space would be subject to UDLP as part of the detailed design of the project
- Relocation of proposed construction sites to avoid construction impacts to Easton Park, Blackmore Oval and Sydney Secondary College (Leichhardt)
- Revised design in the area east of Victoria Road to reduce land take surrounding the White Bay Power Station which is a State heritage listed item
- Re-use of existing construction sites from the M4 East and New M5, to avoid further property acquisitions in those areas
- Use of the M4 East and New M5 mainline tunnels (when open to traffic) to remove/reduce spoil haulage from the surface road network where possible
- Where feasible, ventilation facilities have been located to provide reasonable separation distance to the closest sensitive receivers (at Rozelle, Iron Cove and St Peters).

7.2 Landscape character impact assessment

This section assesses impacts of the project on the landscape character zones described in **section 5.3,** which have been identified in those areas that have the potential to be impacted by the surface components of the project both directly and indirectly, during operation. This assessment therefore focuses on sites containing permanent operational infrastructure within the central west, central east, northern and southern landscape character zones. The project elements described within this section would be further developed through the detailed design.

7.2.1 Central west landscape character zones

A total of three landscape character zones have been identified for the Darley Road motorway operations complex (MOC1). Refer to **Chapter 5** (Project description) of the EIS for full description of the infrastructure proposed as part of the Darley Road motorway operations complex (MOC1).

LCZ 1 – Darley Road residential precinct

Project effects

The project adjoins part of the northern boundary of the Darley Road residential precinct. The key effects of the project on this LCZ would be:

- The loss of the large ‘warehouse’ building, revealing an existing retaining wall to the elevated light rail corridor

- The addition of a smaller group of project buildings and associated infrastructure elements (water treatment plant and substation), security fencing and vehicle access and parking to the western end of the site forming the motorway operations complex, in conjunction with low landscaping and street trees to the Darley Road frontage
- The disturbed areas on the remaining part of the site which are not used for permanent operational infrastructure would be rehabilitated for future development/use. These areas are termed remaining project land and would be subject to the Residual Land Management Plan.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the Leichhardt DCP 2013 (LDCP 2013) and is set out for a broader precinct (Helsarmel Estate precinct) which includes preserved and enhanced views (both of city landmarks and local features), enhanced and encouraged landscaping in the front building setbacks and potentially higher density development along Darley Road.	The proposed operational elements such as the water treatment facility and associated fencing would be located outside of this LCZ and would not impact its desired future character.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-1 LCZ 1 – Darley Road residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Darley Road residential precinct to the project is considered to be Low due to the following: • The landscape comprises generally well presented, predominantly Federation/post-war period housing on small lots, with wide tree lined streets, and is considered to have a high to moderate local level of value • The project is considered to have a high capacity for absorption within the landscape, given the relationship with the adjoining elevated light rail corridor and City West Link and the separation to the adjacent residential precinct provided by Darley Road.	The magnitude of change arising from the project is considered to be Low due to the following: • The project is abutting part of one edge of the residential LCZ • The existing large-scale warehouse building and existing trees will be removed and replaced by the water treatment plant which would be of different built form but of overall smaller scale • The addition of the motorway operations complex comprising a water treatment plant and associated infrastructure elements is broadly congruent with the scale and to a lesser extent the form of LCZ 1 • Operational infrastructure at the site would be viewed against the backdrop of the elevated light rail corridor and landscaping of its embankment.	Low

LCZ 2 – Darley Road commercial precinct

Project effects

The key effects of the project on the Darley Road commercial precinct would comprise:

- The removal of trees in the eastern portion of the site and removal of the large 'warehouse' building and parking. The remaining disturbed part of the site not required for the project following the completion of construction would be rehabilitated for future development These areas are termed remaining project land and would be subject to the Residual Land Management Plan
- Landscape works along the Darley Road motorway operations complex (MOC1) frontage, security fencing and vehicular access.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 is set out for a broader precinct of which the LCZ forms a small part and includes preserved and enhanced views (both of city landmarks and local features), new developments with built form and styles that complement the existing, maintained prevalence of street trees in addition to mature and visually significant trees on private land, street tree planting, landscaping in the front building setbacks and potentially higher, more dense development along Darley Road.	The motorway operations complex would comprise a new, low scale infrastructure element adjoining the Leichhardt light rail precinct. The western part of this LCZ is proposed for permanent operational infrastructure and would be subject to the UDLP for the project, which would allow the desired future character to be further considered during detailed design.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-2 LCZ 2 – Darley Road commercial precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Darley Road commercial precinct is Moderate, due to the following: • The warehouse / factory building has been re-purposed and has maintained a design that reflects the site's industrial context. This is considered to comprise an inherent landscape value for the LCZ, in conjunction with its location adjoining the light rail line and the Charles Street Underbridge (listed on the S170 heritage conservation register). • The landscape is considered to have a moderate capacity for absorption within the landscape, given the relationship with the adjoining elevated light rail corridor and City West Link, the separation to the adjacent residential precinct provided by Darley Road, and the	The magnitude of change arising from the project is considered to be Moderate due to the following: The loss of the large-scale warehouse building and existing trees will provide an open outlook from within this LCZ, including opening views to the light rail corridor and City West Link retaining/noise wall. However, future development on UDLP land may reduce the extent of this change in outlook • The addition of the water treatment plant and associated infrastructure elements would change the character of the LCZ within its immediate surrounds. This is in part due to the change of use to a private facility in what was previously open areas (parking) that could be accessed by the general public. • A design for the facility would be finalised during detailed design, however given that the facility would be designed in	Moderate

Sensitivity	Magnitude	Rating
footprint and scale of the existing commercial building on the site.	accordance with the M4-M5 Link UDLP, it would be likely to provide positive visual amenity and comprise an architecturally well-considered, relatively small group of buildings and ancillary infrastructure. It is recommended that the UDLP consider design principles that are congruent with the desired future character of the LCZ.	

LCZ 3 – Leichhardt light rail precinct

Project effects

The effects of the project on the Leichhardt light rail precinct would comprise an opening of the site to the light rail stop to Darley Road. It can however be expected that the character of this zone would remain broadly intact as a result of the project.

Desired future character

Desired future character	Assessment
The desired future character for the western part of this LCZ (to Charles Street) as detailed in the LDCP 2013 includes preserved and enhanced views (both of city landmarks and local features). There is no specific desired future character outlined for the eastern part of the LCZ in the LDCP 2013. However, based on zoning objectives set out in LLEP 2013 it is suggested that the future character include appropriate design that minimises amenity impacts to the light rail entry, support the vitality of a local centre, and prevention of development that is not compatible with or that may detract from the provision of infrastructure.	The project would not impact views to city landmarks and local features. The operational infrastructure at the site would be subject of urban design to ensure it minimises amenity impacts and does not detract from the surrounding residential development.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-3 LCZ 3 – Leichhardt light rail landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the landscape is rated as Low, due to the following: • The landscape value of the Leichhardt light rail LCZ is considered to be inherently low within the context of it being a highly contained, linear element with screening vegetation, precluding views from the elevated rail line to the surrounding landscape. In addition, the setting of the station between the City West Link retaining	The magnitude of change arising from the project is rated as Low, due to the following: • There would be no physical change or additional project elements within this LCZ • The project removes the existing warehouse building and substantial tree cover from part of the adjoining commercial precinct LCZ, temporarily opening up the view to the Darley Road residential LCZ, and conversely a view from the Darley Road residential precinct	Low

Sensitivity	Magnitude	Rating
wall/noise wall and the back of the warehouse building provides a low amenity value • The form, scale and utilitarian character of the LCZ has the capacity to accommodate the type of change envisaged without impacts on its character.	LCZ to the light rail stop • The type of replacement development that would occur within the UDLP land is unknown at this stage. The site is zoned for B2 Local Centre purposes however which sets out objectives for such land to provide for commercial, residential and community uses that reinforce and enhance the role, function and identity of a local centre. It also identifies the objective to ensure that development is appropriately designed to minimise amenity impacts.	

7.2.2 Central east landscape character zones (Rozelle interchange)

A total of 14 landscape character zones have been identified for the Rozelle interchange. For a description of each landscape character zone within this area, refer to **section 5.3.2**. Refer to **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS for full description of the works associated with Rozelle interchange.

LCZ 4 – Glebe Foreshore Parklands precinct

Project effects

The Glebe Foreshore Parklands comprise a highly valued open space setting, used regularly by large numbers of predominantly passive recreational receptors. The long foreshore edge provides extensive views towards the project from Glebe Point at the eastern end of the bay to the 'beach' and pontoon setting at the western end adjacent to The Crescent.

A diverse range of features are contained within this view including Anzac Bridge, the Glebe Island grain silos, the White Bay Power Station, the working port edge opposite, and the highly modulated backdrop of parts of the Rozelle hillside and Balmain, comprising generally individual small housing and commercial buildings within a well vegetated landscape.

The key effects of the project on the Glebe Foreshore Parklands precinct would comprise:

- Two new pedestrian/cycle bridges crossing City West Link, one at The Crescent and one further west near Brenan Street and Whites Creek. Both would sit below the Rozelle ridgeline
- Three ventilation outlets located near City West Link. The ventilation outlets are 35 metres above existing ground level and project well above the Rozelle ridgeline. The ventilation outlets are of prominent scale within the context of a new and extensive open space setting. However, the outlets do have congruency with other proximate tall built elements that also project above the skyline including:
  - White Bay Power Station with its two tall chimneys
  - Grain silos which comprise large formal groupings of cylindrical objects with high visual mass
  - Anzac Bridge
  - Working waterfront on the opposite (north) side of Rozelle Bay with large boat storage facility and substantial new buildings along the water's edge
- Bridges over Whites Creek at The Crescent and at Victoria Road near White Bay Power Station which are set relatively low within the overall landscape.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the SDCP 2012 includes clear and legible connections to Jubilee Park with a foreshore walk that continues Sydney's open space network. It also includes the protection of views and access between the parklands and the waterfront.	The Rozelle masterplan incorporates a share pathway system around the northwest corner of Rozelle Bay within the vicinity of the intersection of The Crescent with City West Link. This would assist in the continuation of the foreshore walk with the new bridge across City West Link and active transport link through the Rozelle Rail Yard site providing an effective connection between Easton Park at Rozelle and the open space along the Glebe foreshore. The project would not interfere with views and access between the open space and the waterfront, and would enhance connections to Jubilee Park.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-4 LCZ 4 – Glebe Foreshore Parklands precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Glebe Foreshore Parklands precinct to the project is considered to be Moderate, due to the following: • The landscape comprises a highly valued open space setting, used regularly by large numbers of predominantly passive recreational users. The harbourside setting of the park and extensive views from this location comprise an important element of its inherent landscape value • The landscape is well vegetated and has the ability to absorb project elements as a result of existing tree cover.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The scale and character of some elements of the project is strongly contrasting with this LCZ (particularly the ventilation outlets) • The outlook from the Glebe Foreshore Parklands would comprise a generally well vegetated landscape with substantial tree cover.	Moderate

LCZ 5 – Johnston Street precinct

Project effects

The project effects on the Johnston Street precinct would be limited to the additional right hand turn lane on The Crescent at the intersection with Johnston Street. This would entail:

- Widening of The Crescent along its eastern side
- Cutback of the existing kerb on the eastern side of Johnston Street below the light rail bridge
- Relocation of traffic signals
- Pavement and line marking works.

These works would not impact on the light rail bridge (including the piers). No widening would occur along Johnston Street and works would be constrained to the existing road reserve. The project results in a minor 'hardening' of the intersection of Johnston Street with The Crescent, through the additional paving and reduction of landscaping area.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 encompasses: • Land uses and urban design that enhance and contribute to the character and identity of the LCZ whilst protecting Heritage Items and Heritage Conservation Areas that help create that character, preservation and maintenance of the historic subdivision pattern of the LCZ; • Lower scale development complementary to the existing streetscape, • Improved environmental amenity and interest for pedestrians accessing the area, • Preservation of views over the city, Rozelle Bay, Leichhardt and Annandale, • Redevelopment of the TAFE College site for residential use consistent with the existing scale in the northern section of the LCZ; • Preservation of mature, regularly spaced street trees as well as mature and visually significant trees on private land; • Preservation and integration of natural rocky outcrops into the landscape of the area, particularly where visible from public place, ensure future neighbouring developments do not negatively affect the aspect to and from the group of buildings known as 'The Witches' Houses'.	The works proposed within this LCZ would not impact its character or identity as it would take place largely within an existing road corridor. It would be of low scale and would not significantly impact any heritage items. There would be no significant changes to amenity and views to the city, Rozelle Bay Leichhardt and Annandale from this LCZ. Views to and from 'The Witches' Houses would also not be impacted by the project.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-5 LCZ 5 – Johnston Street precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Johnston Street LCZ to the project is considered to be High, due to the following: • The landscape value of Johnston Street is high as Johnston Street itself is recognised for its landscape heritage, and several dwellings within the neighbourhood are recognised for their architectural heritage. This LCZ falls within the Annandale Heritage Conservation	The magnitude of change arising from the project is rated as Negligible, due to the following: • There would be a minor loss of a landscape area adjoining the intersection and reinstatement of existing footpath, resulting in a minor 'hardening' of the intersection • There would be no direct impact to the heritage conservation area or heritage	Negligible

Sensitivity	Magnitude	Rating
Area and contains the heritage listed Annandale (Johnston Street) Underbridge.	listed underbridge • The project causes a minor change within this LCZ.	

LCZ 6 – Annandale Street and Young Street precinct

Project effects

The project would have limited direct effects on this LCZ. The key effects of the project on the Annandale Street and Young Street precinct would comprise:

- The loss of trees to the Rozelle Bay edge where it adjoins The Crescent and within Buruwan Park resulting in a minor change to the outlook from Bayview Crescent along the northern edge of the LCZ
- The crossing of City West Link and associated pedestrian bridge crossing
- The ventilation outlets.

The future use of this site is not known at the time of writing and is assumed to be graded and grassed upon completion of the project, and retained for future road infrastructure projects.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 encompasses maintained and enhanced street trees, preserved and enhanced public and private views out over Rozelle Bay, Annandale and the city skyline and improved environmental amenity and interest for pedestrians accessing the area.	The project would not result in the loss of any street trees within this LCZ however trees adjacent to the northern boundary of the LCZ would be removed. Elements of the project such as the new pedestrian bridge and ventilation facilities would be visible from much of Bayview Crescent and likely be partially visible from the upper levels of some buildings in other nearby streets.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-6 LCZ 6 – Annandale Street and Young Street precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Moderate, due to the following: • Although the inherent landscape value of this LCZ is high, as recognised by most of it being located within the Annandale Heritage Conservation Area, the landscape is considered to have a high capacity for 'fit' with the project, with the exception of the Bayview Crescent northern extremity of the LCZ.	The magnitude of change arising from the project is considered to be Low due to the following: • The project would result in the loss of existing tree cover (outside the LCZ) which would change the outlook from a small section of the northern edge of this LCZ • While relatively close to the project, the LCZ is isolated from the changes by landform, existing planting and built form of residential development • The changes resulting from the Rozelle interchange would fall outside this LCZ and	Moderate-Low

Sensitivity	Magnitude	Rating
	it would not directly adjoin the project (it is separated by City West Link and the elevated light rail corridor).	

LCZ 7 – Whites Creek Valley precinct

Project effects

The project effect on this LCZ would be limited to the location of the pedestrian bridge linking Lilyfield Road near Ryan Street in Lilyfield, through the project open space, across City West Link and light rail corridor and landing near Brenan Street and the Whites Creek corridor. The pedestrian bridge would result in the loss of some trees and would be a new feature in the LCZ.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes preserved and enhanced views, particularly towards the city.	Elements of the project such as the pedestrian bridge would enhance views, particularly towards the city.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-7 LCZ 7 – Whites Creek Valley precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be High, due to the following: • This precinct has an intrinsically high landscape value as recognised by the heritage items located within it, and the landscaped character of the parkland along the Whites Creek corridor.	The magnitude of change arising from the project is considered to be Low due to the following: • There would be no physical change or addition of any project elements within this LCZ • There would be a minor change in outlook with the loss of some trees and presence of the new pedestrian bridge landing at Brenan Street • The assumed well-considered architectural detailing of the pedestrian bridge would comprise a good visual 'fit' with the Whites Creek Valley parkland.	Moderate

LCZ 8 – Catherine Street precinct

Project effects

The key effects of the project on the Catherine Street precinct would be limited to a change in outlook and comprise:

- The Rozelle West motorway operations complex (MOC2) which includes a proposed air intake substation building
- The proposed placement of tall tree planting within the vicinity of the proposed air intake.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 encompasses the preservation of mature and/or regularly spaced street trees and the preservation and enhancement of views, particularly towards the city.	Elements of the project such as the proposed air intake substation may be visible from some elevated locations within this LCZ, particularly along Brenan Street and upper levels of buildings in elevated areas. No street trees would be removed from this LCZ as part of the project.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-8 LCZ 8 – Catherine Street precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Moderate, due to the following: • The landscape comprises substantial changes in elevation across the precinct and prevailing low scale character and consistency of residential form in the area, and is considered to have a high landscape value. Notwithstanding the precinct does not fall within a heritage conservation area. • The landscape is considered to have a high capacity to absorb the project given the separation of the LCZ and in the context of the adjacent elevated light rail corridor.	The magnitude of change arising from the project is considered to be Negligible due to the following: • There would be no loss, change or addition of any feature within this LCZ • The built form elements would be relatively distant and have a low presence from within the LCZ.	Negligible

LCZ 9 – Catherine Street neighbourhood centre precinct

Project effects

The key project effects for the Catherine Street neighbourhood centre precinct would be experienced by the change in the outlook from the residential apartments on the corner with City West Link, with:

- Proximity of the proposed open space
- Widening of City West Link
- Rozelle West motorway operations complex (MOC2)
- Presence of the pedestrian/cyclist bridge crossings of City West Link.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes the preservation of mature and/or regularly spaced street trees and the preservation and enhancement of views, particularly towards the city.	Elements of the project such as the pedestrian bridge, substations, portals and ventilation facilities may impact on some existing views within this LCZ, particularly at the corner of Catherine Street and City West Link. However, the soft landscape works and creation of open space would result in greater visual amenity and vistas than is currently afforded. Views towards the city would be conserved and enhanced.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-9 LCZ 9 – Catherine Street neighbourhood centre precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ is Low, due to the following: • This LCZ comprises a well visited neighbourhood centre with gathering areas, community facilities and commercial enterprises set within period buildings, and contained within a relatively small corridor. • The project would have a moderate level of congruency with the existing derelict setting of the rail yards with intermittent large industrial sheds and laydown areas, given it would comprise an open space area with substantial landscape planting, and two localised nodes of operational infrastructure and built form.	The magnitude of change arising from the project is considered to be Low due to the following: • There would be no physical change or addition of any project elements within this LCZ • The proximity of project elements to the LCZ would result in a positive change in outlook with respect to the new open space created by the project, but would not change the landscape character of the LCZ.	Low

LCZ 10 – Balmain Road precinct

Project effects

The effect of the project on the Balmain Road precinct is negligible because of its location some distance to the west of the site.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes the preservation of mature and/or regularly spaced street trees and the preservation and enhancement of views, particularly towards the city.	No street trees would be removed from this LCZ as part of the project. Elements of the project such as the ventilation facilities may be partially visible in the distance from some locations this LCZ however views towards the city would be preserved.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-10 LCZ 10 – Balmain Road precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Balmain Road precinct to the project is considered to be Low, due to the following: • The inherent landscape character is significantly influenced by the regular road layout and subdivision pattern and vistas along the road • The LCZ has a high capacity to absorb the project given it is located at distance from this LCZ.	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or addition of any project elements within this LCZ.	Negligible

LCZ 11 – Nanny Goat Hill residential precinct

Project effects

The project is immediately adjacent to the LCZ along Lilyfield Road. The key project effects of the Nanny Goat Hill residential precinct would be:

- The removal of existing street tree planting along Lilyfield Road, which would be replaced as part of the project
- Greater proximity to proposed motorway infrastructure (including Rozelle West motorway operations complex (MOC2), tunnel portals and ventilation outlets) through the Rozelle Rail Yards
- Opportunities for improved outlooks to new Rozelle open spaces.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes ensuring the availability of views and glimpses of local and distant landmarks as well as scenic vistas from public place are maintained, significant views and vistas from rear lanes are retained, the preservation and enhancement of the value of Heritage Items and Heritage Conservation Areas (as identified in Leichhardt Local Environmental Plan 2013) and the preservation and enhancement of mature street trees, as well as mature and/or visually significant trees on private land.	Elements of the project such as the pedestrian bridges, road structures, substation, portals and ventilation facilities may impact on some existing views from this LCZ, particularly along Lilyfield Road and upper levels of buildings on elevated areas on nearby streets. The project would also result in the removal of some mature street trees from this LCZ along Lilyfield Road. The removal of industrial buildings near Lilyfield Road and the creation of open space areas and landscaping as part of the project however would result in greater visual amenity and vistas than is currently available. No heritage items or heritage conservation areas within this LCZ would be impacted by the project.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-11 LCZ 11 – Nanny Goat Hill residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Nanny Goat Hill residential precinct to the project is considered to be Low, due to the following: • While part of the precinct adjacent to the project is considered to have high landscape values due to it being incorporated into the Brennan's Estate Heritage Conservation Area, the project is considered to have a high level of congruency with the precinct, within the context of the proposed open space area and landscaping with localised infrastructure elements within it.	The magnitude of change arising from the project is considered to be Low, due to the following: • The street trees required to be removed along Lilyfield Road would be replaced resulting in little change to the present character over time • New open space and landscaping would be provided as part of the Rozelle interchange.	Low

LCZ 12 – Halloran Street commercial precinct

Project effects

The project would have no significant effect on this LCZ, which is located some 150 metres to the west of the project. A small number of large street trees on Lilyfield Road within the vicinity the LCZ may require removal as part of the project. The LCZ is by landform and the orientation of the built form facing away from the project.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes ensuring the availability of views and glimpses of local and distant landmarks as well as scenic vistas from public place are maintained, significant views and vistas from rear lanes are retained, the preservation and enhancement of the value of Heritage Items and Heritage Conservation Areas (as identified in Leichhardt Local Environmental Plan 2013) and the preservation and enhancement of mature street trees, as well as mature and/or visually significant trees on private land.	The project would result in the removal of some mature street trees adjacent to this LCZ along Lilyfield Road. The new open space and landscape works at the project site however would result in improved visual amenity and vistas than is currently provided. No heritage Items or heritage conservation areas within this LCZ would be impacted by the project.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-12 LCZ 12 – Halloran Street commercial precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the LCZ to the project is considered to be Low, due to the following: • The inherent landscape value of the	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or	Negligible

Sensitivity	Magnitude	Rating
precinct is considered to be moderate given the built form and setting of the small industrial precinct within the LCZ • However, the project is considered to have a high level of 'fit' with this precinct, within the context that it does not detract from it in any way.	addition of any project elements within this LCZ.	

LCZ 13 – Easton Park residential precinct

Project effects

The project is immediately adjacent to the LCZ along Lilyfield Road. The key project effects on the Easton Park residential precinct would be:

- Replacement of adjacent industrial development on the south side of Lilyfield Road with open space, wetland area and landscaping
- The introduction of new elements within the outlook of this LCZ, including views to new infrastructure facilities at Rozelle interchange comprising: ventilation facility, water treatment plant and pedestrian/cycle bridge.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 encompasses preserving view lines to the south and east.	Elements of the project such as the pedestrian bridges and ventilation facilities may impact on some existing views from this LCZ, particularly views to the south toward Lilyfield Road. The removal of industrial buildings near Lilyfield Road and the proposed open space and landscape works at the project site however would result in improved visual amenity and vistas than currently provided.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-13 LCZ 13 – Easton Park residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be High, due to the following: • The precinct is of cultural importance, incorporating part of Brennan's Estate, in addition to the Easton Park and Hornsey Street Heritage Conservation Areas • The precinct is of community importance, providing Easton Park and other small parks for recreation.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • There would be a minor addition to this LCZ as a result of the Victoria Road realignment and shared path • The proposed ventilation facility would comprise an uncharacteristic element in terms of scale, mass and form. All other built-form elements within the proposed open space would be considered likely to be accommodated with minimal impacts on	High-Moderate

Sensitivity	Magnitude	Rating
	landscape character • Over time the prominence of the ventilation facility would be expected to decrease with vegetation growth and the maturing of the open space landscape (refer to visual impact assessment, **section 7.3.2**).	

LCZ 14 – Victoria Road south precinct

Project effects

The project would have a direct effect on this LCZ. The key effects of the Victoria Road south precinct would be:

- Removal of pedestrian/cycle bridge crossing of Victoria Road at Lilyfield Road intersection
- Removal of existing Victoria Road Bridge identified as a potential local heritage item, and replacement with a new bridge, with potential for increased prominence from Glebe Foreshore Parklands
- Increased width of carriageway and complexity of Victoria Road intersection with City West Link.
- Creation of active transport link and landscape edge to the west side of Victoria Road between Quirk Street and the northern boundary of the proposed Rozelle open space area.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 encompasses preserving view lines to the south and east.	It is unlikely that the project would interfere with any south or east view lines from within this LCZ.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-14 LCZ 14 – Victoria Road south precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the LCZ to the project is considered to be Low, due to the following: • The existing context of the busy Victoria Road and adjacent commercial development is of low inherent landscape value.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would be congruent with the proposed change given that it retains the existing major arterial road function of the precinct • The project would remove the existing Victoria Road bridge and existing pedestrian/cycle overpass which comprises a substantial landscape character element • The project would increase the width of the Victoria Road carriageway at its intersection with City West Link • The new Victoria Road bridge would	Moderate-Low

Sensitivity	Magnitude	Rating
	comprise a minor increase in height compared to the existing bridge, which would may also marginally provide an increased presence from Glebe Foreshore Parklands.	

LCZ 15 – White Bay Power Station precinct

Project effects

The White Bay Power Station is a State heritage listed item which acts as a highly recognisable landmark within this locality. The existing Victoria Road bridge crossing of the disused rail line is located within proximity of the power station (about 100 metres), and has been identified as a potential heritage item[2]. Two other items are identified in the Conservation Management Plan for the White Bay Power Station, but are not heritage listed. These are the southern penstock and former hotel site.

The project would have a direct effect on the White Bay Power Station precinct. The key effects of the project on this LCZ would be:

- Widening of the City West Link carriageway and approach to Anzac Bridge, resulting in loss of tree cover
- Replacement and minor realignment of the Victoria Road bridge through the precinct, including anew active transport link beneath the bridge connecting to Anzac Bridge and Bays Precinct
- Replacement planting at the interface between the new Victoria Road bridge and White Bay Power Station, subject to detailed design.

Desired future character

Desired future character	Assessment
This LCZ falls within the bounds of a broader strategic planning area known as The Bays Precinct (the Bays). As outlined in **Chapter 4**, there are a number of sub-precincts within the Bays which each have their own vision. This LCZ is located within the White Bay Power Station sub-precinct. Work is currently underway to determine the specific desired future character for the White Bay Power Station and broader Bays Precinct. In the interim, the Sydney Regional Environmental Plan 26 – City West (SREP 26) provides high level planning principles for the entire Bays development area. Of relevance, the SREP states that the siting and form of development must consider creating, retaining and enhancing views and vistas from the water and public domain.	The proposed planting of trees north east of the Victoria Road/City West Link intersection would be located within the visual curtilage of the White Bay Power Station, and has potential to visually remove the alignment of the historic rail link to the White Bay Power Station from future opportunities for public domain within this precinct. However, the proposed soft landscape works approach would be readily amenable to modification in conjunction with the future design of The Bays Precinct. Landscaping in this area should be designed with respect to the heritage significance of the White Bay Power Station precinct and the proposed active transport connection with the Bays Precinct.

[2] GML, 2017, refer to **Appendix U** (Technical working paper: Non-Aboriginal Heritage) of the EIS

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-15 LCZ 15 – White Bay Power Station precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the White Bay Power Station precinct to the project is considered to be High, due to the following: • The inherent landscape value of the state heritage listed White Bay Power Station is considered to be high • The landscape comprises existing vegetation that borders the precinct along Victoria Road and City West link, providing a sense of enclosure.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • While there is no direct impact to the heritage curtilage of the White Bay Power Station, the proposed level of tree planting east of White Bay Power Station would have a low level of congruency with the industrial character of the heritage item and its historic rail/port setting curtilage and linkages. Landscaping in this area should be designed with respect to the heritage significance of the White Bay Power Station precinct and the proposed active transport connection with the Bays Precinct • The project would cause a change to the existing landform of the state heritage listed White Bay Power Station adjacent to the Victoria Road/City West Link intersection and from the loss of the existing Victoria Road bridge • The southern penstock which is associated with the heritage values of White Bay Power Station would be protected.	High-Moderate

LCZ 16 – Rozelle Bay wharves precinct

Project effects

The Rozelle Bays wharves precinct is characterised by a flat topography and working harbour industrial activities. Key project effects would comprise:

- Widening of the carriageway approach to Anzac Bridge which projects marginally into the LCZ
- Loss of a long corridor of planting along the south side of Anzac Bridge/City West Link to the east of James Craig Road.

Desired future character

Desired future character	Assessment
This LCZ falls within the bounds of a broader strategic planning area known as The Bays Precinct (the Bays). As outlined in **Chapter 4**, there are a number of sub-precincts which each have their own vision. This LCZ is located within the Rozelle Bay and Bays Waterways, Glebe Island and White Bay sub-precincts. Work is currently underway to determine the specific desired future character for these sub-precincts and broader Bays Precinct. In the interim, the Sydney Regional Environmental Plan 26 – City West (SREP 26) provides high	Loss of the landscape screening edge around the White Bay Power Station and along the approach to Anzac Bridge would be likely to open up some views to the project from areas to the north and south.

Desired future character	Assessment
level planning principles for the entire Bays development area. Of relevance, the SREP states that the siting and form of development must consider creating, retaining and enhancing views and vistas from the water and public domain.	

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-16 LCZ 16 – Rozelle Bay wharves precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Rozelle Bay wharves precinct to the project is considered to be Low, due to the following: • The LCZ comprises a working port edge that provides a contrasting landscape to the surrounding, predominantly residential setting to the north, south and west • In the context of existing infrastructure within this LCZ, the landscape is considered to have a moderate capacity to absorb project effects.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would result in the widening of the carriageway of the Victoria Road and City West Link approaches to Anzac Bridge, causing the loss of screening road side vegetation • The proposed open space component of the project would be considered a good fit with the precinct given that it would provide a supporting land use to the broader residential setting and would increase the complexity and interest of this landscape. It would also provide a clearly legible edge to the western part of this LCZ.	Moderate–Low

LCZ 17 – City West Link precinct

Project effects

The key project effects of City West Link precinct would be:

- Widening of sections of City West Link, The Crescent and Victoria Road
- A new, signalised intersection on City West Link around 300 metres west of The Crescent to provide a connection to the M4-M5 Link mainline tunnels
- Raising City West Link by up to 1.5 metres around the intersection with The Crescent to address drainage and flooding constraints
- Modification of the intersection of City West Link and The Crescent including a new bridge over Whites Creek
- Modification of the intersection of City West Link and James Craig Road
- Realignment, widening and resurfacing of the intersection of The Crescent and Victoria Road and new bridge
- Loss of existing corridor edge vegetation along City West Link much of which would be replaced on completion of the works.

Desired future character

Desired future character	Assessment
There is no detail relating to desired future character for this LCZ in the LDCP 2013 that is specifically relevant to both a) landscape and visual impact and b) the project.	N/A

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-17 LCZ 17 – City West Link precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the City West Link precinct to the project is considered to be Low, due to the following: • The inherent landscape value of this LCZ is considered to be low within the context of its major arterial road function and limited landscape value of the intermittent, corridor of tree planting.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would be congruent with the proposed change given that it retains the existing major arterial road function of the precinct • The project would result in a substantial change adjacent to the LCZ, associated with new motorway scale elements (primarily the ventilation facility and outlets, water treatment plant and substation buildings). However, all of these facilities would be subject to varying levels of visual screening, subject to detail design, and are contextual with that of a motorway interchange • The quality of urban design would play a significant part in mediating landscape character effects of the development within this LCZ.	Moderate–Low

LCZ 18 – Rozelle light rail corridor and Whites Creek canal precinct

Project effects

The Rozelle light rail corridor and Whites Creek canal precinct contains dense screen tree planting between the Lilyfield and Rozelle Bay light rail stops. The project would retain the existing noise walls on the southern edge of City West Link west of The Crescent and seek to minimise removal of vegetation. However, a number of trees would be removed from Buruwan Park in the 'triangle' of land north of Railway Parade, and where the pedestrian bridge linking this precinct with Lilyfield Road in Rozelle would land near Brenan Street. These elements would be subject to detail design, which would seek to maximise the retention of high value trees where possible within the area, as identified within the project arborist's report (refer to Annexure G of **Appendix S** (Technical working paper: Biodiversity) of the EIS).

The key effects of the project on the Rozelle light rail corridor and Whites Creek canal precinct would comprise:

- Removal of tree cover adjoining the northern edge of the Rozelle Bay light rail stop to facilitate the intersection of The Crescent with City West Link

- Widening of the intersection of The Crescent with City West Link with a new bridge over the Whites Creek channel.

The ventilation facility, water treatment plant, pedestrian/cycling bridge would also be obliquely visible from sections of the light rail corridor.

Desired future character

Desired future character	Assessment
There is no detail relating to desired future character for this LCZ in the LDCP 2013 that is specifically relevant to both a) landscape and visual impact and b) the project.	N/A

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-18 LCZ 18 – Rozelle light rail corridor and Whites Creek canal precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Moderate, due to the following: • The inherent landscape value of this LCZ is considered to be high within the context of the heritage items located within it • The form, character and quality of the experience of light rail users is also considered to have high landscape value given the vegetation lining parts of the light rail corridor and the views available to Rozelle Bay, open space areas, various heritage items, Anzac Bridge and the city skyline • The bridge across Whites Creek and new pedestrian bridge landing near Brenan Street would be subject to detail design, which would seek to maximise the retention of high value trees within the area, and is considered to provide for a moderate ability for the project to be absorbed into the landscape.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would result in the loss of a substantial stand of trees at the south-west corner of City West Link and The Crescent which would change the character and exposure of this precinct to the project, including to the ventilation facility and other motorway scale elements. However, this change occurs over only a small length of the overall light rail corridor, and in area where the focus of views is likely to be on the existing open harbour landscape with city skyline backdrop • The built-form elements of the project would be subject to well-considered architectural design.	Moderate

LCZ 19 – Rozelle Rail Yards precinct

Project effects

The key effects of the project on the Rozelle Rail Yards precinct would comprise:

- Removal of industrial/commercial buildings along Lilyfield Road

- A new interchange connecting the mainline tunnels with the Iron Cove Link and the surface road network at City West Link and Victoria Road/Anzac Bridge
- New infrastructure including:
  - Ventilation facility
  - Water treatment plant
  - Substation and pump house
  - Constructed wetland
  - Naturalised stormwater drainage channels
- New pedestrian and cycle bridges over City West Link at intersection with The Crescent and adjacent to Brenan Street, Lilyfield
- New areas of public open space, including tree cover, areas suitable for sports fields and contiguous connection with Easton Park
- Pedestrian pathways and active transport connection
- Replacement of street trees removed from along Lilyfield Road.

Desired future character

Desired future character	Assessment
This LCZ falls within the bounds of a broader strategic planning area known as The Bays Precinct (the Bays). As outlined in **section 4**, there are a number of sub-precincts within the Bays each with its own vision. This LCZ is located within the Rozelle Rail Yards sub-precinct. Work is currently underway to determine the specific desired future character for the Rozelle Rail Yards and broader Bays Precinct. In the interim, the Sydney Regional Environmental Plan 26 – City West (SREP 26) provides high level planning principles for the entire Bays development area. Of relevance, the SREP states that the siting and form of development must consider creating, retaining and enhancing views and vistas from the water and public domain.	Elements of the project such as the pedestrian bridges, road structures, substation, portals and ventilation facilities would comprise new elements within this LCZ. The removal of industrial buildings near Lilyfield Road and the soft landscape works at the project site however would result in greater visual amenity and vistas than are currently available.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-19 LCZ 19 – Rozelle Rail Yards precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Low, due to the following: • The inherent landscape value of this LCZ is considered to be low within the context of it comprising a disused and degraded brownfield site, notwithstanding the presence of two heritage listed items within the site, located on Lilyfield Road,	The magnitude of change arising from the project is considered to be Moderate, due to the following: • Removal of industrial/commercial buildings along the south side of Lilyfield Road that are visually incongruent with the surrounding landscape setting • The project with its extensive and well connected open space setting would comprise a good fit for the site within the	Moderate-Low

Sensitivity	Magnitude	Rating
opposite Easton Park.	context of adjacent residential areas • The project would result in the loss of two heritage items ('Cadden Le Messurier', 84 Lilyfield Road), the Lilyfield (Catherine Street) overbridge and potentially the Lilyfield stormwater canal subject to further heritage inspection • The project would comprise the addition of new built form features in the LCZ. Of particular note would be the ventilation facility, which would comprise an uncharacteristic element in terms of form, scale and mass.	

7.2.3 Northern landscape character zones (Iron Cove Link)

A total of six landscape character zones have been identified for the Iron Cove Link. For a description of each landscape character zone within this area, refer to **section 5.3.3**. Refer to **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS for full description of the works associated with Iron Cove Link.

LCZ 20 – Victoria Road north precinct

Project effects

The project would commence from the eastern approaches to Iron Cove Bridge, widening to contain four Iron Cove Link eastbound and westbound lanes with associated portals and retaining walls, and a further three surface lanes either side of these for Victoria Road. East of Toelle Street, the widened carriageway would gradually realign with the existing Victoria Road alignment at Springside Street.

The key effects of the project on the Victoria Road north precinct would comprise:

- Retaining walls located at the southern edge of part of the Victoria Road corridor and adjacent to the Iron Cove Link portals
- Widening of the road carriageway comprising areas of both hard landscape and soft landscape works to centre median areas east of Toelle Street and along the southern side of Victoria Road
- The ventilation facility building on the south side of Victoria Road and associated buffer tree planting between it and adjoining housing
- The ventilation outlet (around 20 metres above existing ground level) located east of Terry Street, within a central median area and landscape setting
- Land along the southern boundary of the project used for an active transport link and landscaping areas subject to UDLP.

There would be localised significant changes in level at the northern end of Clubb Street and Byrnes Street. Design issues addressing these changes in level would be addressed in an integrated manner in preparing the UDLP.

The character of the corridor would change from that of a busy arterial road set at grade between commercial development and a range of contemporary and period housing, to a wider corridor including both portal dive structures and arterial road surface lanes, subject to changes in level and associated retaining walls within the vicinity of the portals. The project also provides opportunity for improved landscaping for example around the new ventilation outlet and central median, and an enhanced active transport link and landscaping along the southern side of Victoria Road.

Desired future character

Desired future character	Assessment
As outlined in the LDCP 2013, the desired future character for this LCZ encompasses: • Improved streetscape amenity through improved design and layout of buildings as well as increased attention to site usage and ancillary uses • A mix and variety of uses and building styles that enhance and contribute to the character and identity of the neighbourhood, whilst protecting significant prominent buildings and the townscape • Predominant bulk, scale and siting of buildings compatible with adjoining development and the neighbourhood generally • Retention of traditional shopfronts • Enhanced vibrancy and visual interest on Victoria Road • Maintained and enhanced character of the area through retention of original buildings, where appropriate, and new development that is complementary in architectural style, form and materials • Appropriate lighting compatible with the predominant type along each local area section • Development that relates well to the street • View sharing between existing and proposed developments • Appropriate materials that relate to the established built form • Visual privacy incorporated into the design of all residential developments • Improved streetscape through limiting inappropriate colour schemes and encouraging colour schemes that complement the streetscape • A maximum building wall height of 10 metres, taken from the street frontage for buildings along Victoria Road • Buildings that cover the full width of the lots with a nil setback to Victoria Road • Developments serviced and vehicle access provided from side streets and laneways and openings to service bays. Work areas and storage areas not directly visible from the street.	The project would be in parts be in keeping with desired future character as: • The proposed design would improve streetscape amenity through landscape works and tree planting, particularly at the Toelle Street/Terry Street and Victoria Road intersection • No prominent buildings would be impacted by the design • Through landscape works and tree planting, as well as creating a more pedestrian friendly connection across Victoria Road, the project would enhance vibrancy and visual interest on Victoria Road • The new road infrastructure being developed as part of the project would be generally in keeping with the current character of the LCZ. The project would not be aligned with the desired future character for this LCZ in part as: • The ventilation facilities would depart from the surrounding built form bulk and scale as well as differ in current land use. This may detract from the character and identity of the neighbourhood • Original buildings would be removed as part of the project.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-20 LCZ 20 – Victoria Road north precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Victoria Road north precinct to the project is considered to be Low, due to the following: • The inherent landscape value affected by the project is low, characterised primarily by a mix of later 1900s industrial style buildings, Victorian style two storey shops and residences, and housing from the inter-war years • The project would have a high level of congruency with the existing arterial corridor in relation to scale and form, notwithstanding the introduction of new portal elements • Parts of the LCZ adjoining Victoria Road and contained within the Iron Cove Heritage Conservation Area would retain sufficient curtilage, particularly within the context of their ridgeline setting, to maintain the integrity of their character.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The substantial soft landscape treatments to the southern edge and centre median areas of the project would complement the existing tree and shrub planting alongside the frontage of the Balmain Shores residential apartments • The project would result in the loss of a limited number of commercial premises, and freestanding residential development along the southern side of Victoria Road; a substantial localised widening of the road including the addition of portal dive structures, ventilation outlet and ventilation facility outlet building; and addition of a significant landscape works component • The ventilation outlet in particular comprises an uncharacteristic element in terms of form, scale and mass. However, within the context of this major road corridor landscape, the form, scale and central setting of this new element within the widened carriageway is considered to have an appropriate level of fit • The project would be further refined through the detail design process. In particular, the ventilation outlet, ventilation facility building, motorway portals and associated retaining walls, would be subject to the UDLP. As such, these elements can reasonably be expected to comprise well-considered design elements within the context of both the project corridor and broader road corridor landscape.	Moderate–Low

LCZ 21 – Victoria Road light industrial precinct

Project effects

The key effects of the project on the Victoria Road light industrial precinct would comprise:

- Widening of the road carriageway comprising areas of both hard landscape and soft landscape works to centre median areas east of Toelle Street and along the southern side of Victoria Road
- The ventilation facility building on the south side of Victoria Road and associated buffer tree planting between it and adjoining housing

- The ventilation outlet located east of Terry Street, within a central median are and landscape setting.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes improved landscaping quality through encouraging appropriate landscaping of development.	The project would provide landscape works/tree planting to centre median areas of Victoria Road between Terry Street and Crystal Street. This would provide a moderate level of landscaping within proximity of the LCZ, in addition to a landscape backdrop of street tree planting along the southern side of Victoria Road between Springside Street and Byrnes Street.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-21 LCZ 21 – Victoria Road light industrial precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Moderate, due to the following: • The landscape value of the LCZ is considered to be moderate within the historical context of mid to late 1800's light industrial/factory precincts being within close proximity to and often highly integrated with working class residential areas • The LCZ is industrial in character and would have a moderate ability to absorb the contrasting project elements.	The magnitude of change arising from the project is considered to be Negligible, due to the following: • The project would not result in the loss, change or addition of any feature within the LCZ that would adversely affect its character.	Negligible

LCZ 22 – Iron Cove residential precinct

Project effects

The key effects of the project on the Iron Cove residential precinct would comprise:

- Addition of new elements including: additional traffic lanes within the vicinity of tunnel portals near Terry Street; ventilation facilities comprising a ventilation building on the southern side of Victoria Road between Springside Street and Callan Street, and a ventilation outlet located east of Terry Street in the centre of Victoria Road to the centre of the carriageway
- Addition of street tree planting and pedestrian / cycle paths along the southern side of Victoria Road and landscape plantings within the centre median of Victoria Road east of Terry Street.

Desired future character

Desired future character	Assessment
There is no detail relating to desired future character for this LCZ in the LDCP 2013 that is specifically relevant to both a) landscape and visual impact and b) the project.	N/A

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-22 LCZ 22 – Iron Cove residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Iron Cove residential precinct to the project is considered to be Low, due to the following: • The inherent landscape value of this LCZ is considered to be high within the context of most of it being incorporated within the Iron Cove Heritage Conservation Area, in addition to a number of heritage listed items. However, the project adjoins only a relatively small, well vegetated edge of the LCZ along the northern side of Victoria Road • The LCZ is considered to have a moderate level of congruency given the existing character and low amenity of the busy Victoria Road.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • There would be no physical change or addition of any project elements within this LCZ • However, it would result in a likely localised adverse change (subject to future architectural and urban design inputs) with the tunnel portals, retaining walls and ventilation outlet forming part of the adjacent streetscape. The project can reasonably be expected to comprise well-considered design elements given the architectural and urban design inputs that would continue to be applied to be compatible with the predominantly contemporary character of the built form.	Moderate–Low

LCZ 23 – King George Park precinct

Project effects

A bioretention facility would be located within King George Park adjacent to Manning Street in the location of an existing informal grassed car parking area. The bioretention facility would be the subject of a well-considered urban design process, integrating the structure within a formalised car parking arrangement that would incorporate landscape planting and maintain existing parking numbers. No trees would be removed as part of this work.

The bioretention facility and parking area would be subject to detail design in accordance with the provisions of the UDLP. Re-alignment of Victoria Road and reconnection of the Bay Run path would occur in the north eastern part of the LCZ.

Desired future character

Desired future character	Assessment
The LDCP 2013 acknowledges the importance of the interface between the Iron Cove open space area and the adjacent dwellings and notes that it contributes significantly to the character of these residential streets. It states that the open space provides important streetscape values to the locality and that the desired future character for the LCZ is that this should be retained.	The proposed stormwater treatment and parking area would be located in an area between the edge of the park and adjacent residences. This would be subject to detail design in accordance with the provisions of the UDLP, and as such would be likely to provide positive amenity.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-23 LCZ 23 – King George Park precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the King George Park precinct to the project is considered to be Moderate, due to the following: • This LCZ has high landscape values associated with: - The proximity of recreational waterways and open space - The Iron Cove Bay Run - The well vegetated backdrop to the west and south which provides a sense of enclosure - The substantial, bayside children's playground - The connectivity of the parkland site with the harbour • The LCZ has a moderate capacity to absorb the project effects within it, given the project elements would be congruent with the existing character of King George Park.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would comprise the addition of a stormwater treatment facility of a broadly regular shape, enclosed along two sides by formal parking bays. This has the potential to alter the character of the public domain in the LCZ • The project would result in minor changes along Victoria Road and the Iron Cove Bay Run within the LCZ, which are existing elements • The project would be subject to well-considered urban design inputs in accordance with the M4-M5 Link UDLP, and therefore has the potential for a substantial degree of congruency with existing landscape character.	Moderate

LCZ 24 – Callan Park residential precinct

Project effects

The key project effects on the Callan Park residential precinct would occur along the northern edge of the precinct, comprising the following:

- Closer proximity of existing residences to Victoria Road: This would have the effect of bringing the Victoria Road traffic noticeably closer to the residences at the northern end of Callan Street, Toelle Street, Clubb Street and Byrnes Street
- A significant change in built form character along the southern side of Victoria Road. The existing built form edge, which provides some protection to the residential areas behind, would be replaced by a new enhanced active transport link and landscaping areas

- Ventilation outlet, building and substation building
- Closure of the northern end of Clubb Street, and modified cul-de-sac to Byrnes Street
- The existing extent of vegetation at the northern end of Byrnes Street would be reduced.

Desired future character

Desired future character	Assessment
As outlined in the LDCP 2013, the relevant aspects of the desired future character for this LCZ encompass: • Development that follows the topography of the area and maintains the single storey scale on the mid slopes and mixed one and two storey scale at the top and bottom of the slope • Regular lot sizes, subdivision pattern and predominately detached and semi-detached houses with a prevalence of hipped and gabled roofs • Preservation of the established setbacks for each street • Preserve and enhance public and private views over the King George Park and Iron Cove • Retain stone cottages where they occur throughout the neighbourhood. Existing stone houses will be maintained, allowing for sensitive development on those sites utilising appropriate materials and styles • Retain and encourage street trees on the wider streets • Conserve the single storey, freestanding cottage form, style and materials characteristic of the neighbourhood • Preserve the consistency of architectural style appropriate to the existing style of each street • Maintain the character of the area by ensuring new development is complementary in terms of its architectural style, built form and materials • Maintain sandstone outcrops and remnant stone wall footings • A maximum building wall height of 3.6 metres applies to the neighbourhood • Changes to the front façades of existing dwellings will be kept to a minimum • New development will maintain the use of hipped or gabled roof forms and designs will be compatible to the existing unadorned built form • Building materials used will be compatible with the existing character of the streetscape,	The project would in parts be in keeping with desired future character as: • The project would broadly follow the topography of the area • The area would be landscaped in accordance with the UDLP • The ventilation facility and outlets would be subject to detailed design and subject to urban design inputs. The project would not be aligned with the desired future character for this LCZ in part as: • The project would create irregular lot sizes along Victoria Road • The grassed area within the car park that would be transformed into a water detention basin may impact on the current public and private views to King George Park and Iron Cove, and cause a 'hardening' of the existing grassed informal parking area.

Desired future character	Assessment
including rendered and painted surfaces and roof materials such as corrugated iron.	

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-24 LCZ 24 – Callan Park residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Callan Park residential precinct to the project is considered to be High. Notwithstanding that it is not included within a heritage conservation zone, it exhibits obvious qualities associated with the diversity of small, period worker's cottages and recent residential infill, within narrow streets sloping down the hillside. The Culturally important Sydney College of Arts heritage listed sandstone building group, and cultural landscape setting including mature Port Jackson fig trees (*Ficus rubiginosa*) have a presence as part of the LCZ.	The magnitude of change arising from the project is considered to be Moderate, due to the following: • The project would result in the loss of the existing built form edge along Victoria Road resulting in the increased presence of the arterial road corridor and associated traffic. The project would also include the addition of the structure of the ventilation facility building, located adjacent to existing residential development.	High–Moderate

LCZ 25 – Sydney College of the Arts precinct

Project effects

The key element of the project that would influence the character of the Sydney College of the Arts precinct would be the ventilation outlet.

Desired future character

Desired future character	Assessment
The LDCP 2013 acknowledges the importance of the interface between the Iron Cove parklands area and the adjacent dwellings and notes that it contributes significantly to the character of these residential streets. It states that the parklands provide important streetscape values to the locality and that the desired future character for the LCZ is that this should be retained.	Adjacent dwellings would not be impacted. Some views to the parklands may be interrupted but it would be at a distance and only impact a small portion of receptors and views.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-25 LCZ 25 – Sydney College of the Arts precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be High, due to the following: • The inherent landscape value of this LCZ is very high, comprising a State heritage listed sandstone building complex with cultural landscape curtilage (refer to **section 5.3.3**: **Table 5-21**) • The distant location of the LCZ from the project provides a moderate to high capacity to absorb project effects.	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The effects of the project on this location are likely to be beneficial for this LCZ • The project is likely to have a good fit with this LCZ • The project would remove all buildings along the southern edge of Victoria Road. However, this would be unlikely to open up significant views from this LCZ.	Negligible

LCZ 26 – Darling Street precinct

Project effects

The project effects of the Darling Street precinct would be limited given that the character of this LCZ is so strongly focussed on the Darling Street retail and community uses corridor. The project would be located some 300 metres north-west of this location, itself highly contained within the busy Victoria Road corridor. The key effects of the project on the Darling Street precinct would comprise:

- Local widening of Victoria Road between Springside Street and Byrnes Street
- In addition to the widening of Victoria Road the addition of the ventilation outlet, ventilation building and substation and associated tree planting within the centre median and southern edge of the project.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the LDCP 2013 includes the preservation and improvement of the pedestrian amenity and focus of Darling Street and adjacent streets.	The project would provide substantial streetscape improvements that would improve the amenity of Victoria Road. This in turn would improve the amenity of the view looking northwest from upper level windows and balconies of buildings along the commercial precinct and from the Darling Street intersection with Victoria Road.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-26 LCZ 26 – Darling Street precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Low, due to the following: • The landscape value of Darling Street is high, as evidenced by it	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or addition of any project elements within this	Negligible

Sensitivity	Magnitude	Rating
being incorporated into The Valley Heritage Conservation Area has and the presence of several separate heritage listed items within the LCZ. Additionally, the LCZ comprises a highly visited area with gathering areas, places of cultural significance, community facilities and commercial enterprises contained within this main street, highly enclosed corridor • The distant location of the LCZ from the project provides a high capacity to absorb project effects.	LCZ • The LCZ is well removed from the project.	

7.2.4 Southern landscape character zones (St Peters interchange)

A total of seven landscape character zones have been identified for the St Peters interchange. For a description of each landscape character zone within this area, refer to **section 5.3.4**. Refer to **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS for full description of the works associated with St Peters interchange.

LCZ 27 – Sydney Park precinct

Project effects

The primary effects of the project on Sydney Park precinct would comprise:

- Addition of new elements in the landscape including the new ventilation facility and associated infrastructure (Campbell Road motorway operations complex) located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would have a height of around 22 metres above existing ground level.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the SDCP 2012 includes: retention of the panoramic 360 degree views to important local cultural landmarks including the King Street Newtown ridge, the Eveleigh rail yards and further north to the city skyline from Sydney Park high points, and redevelopment of the isolated terraces on Campbell Road to a higher density and form that encourages active frontages overlooking Sydney Park.	The ventilation facility could comprise a new element within the panoramic 360-degree view from the park. The project would not, however, interfere with views to any of the identified cultural landmarks referenced.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-27 LCZ 27 – Sydney Park precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be High, due to the	The magnitude of change arising from the project is considered to be Low, due to the	Moderate

Sensitivity	Magnitude	Rating
following: • The inherent landscape value of the Sydney Park precinct is considered to be high within the context of the state heritage listed Former Bedford Brickworks Group located in the north-west corner of the site and the high amenity and well managed condition of the precinct.	following: • There would be no physical change or addition of any project elements within this LCZ • The wide Campbell Road boulevard provides considerable separation between the park and project elements • The project would cause a change comparable in scale to other nearby built form elements such as the Former Bedford Brickworks Group close to the existing New M5 St Peters Interchange.	

LCZ 28 – Sydney Park residential precinct

Project effects

The key effects of the project on Sydney Park residential precinct would comprise:

- Addition of a ventilation facility located above the portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above existing ground level.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the SDCP 2012 includes retention of the panoramic 360 degree views to important local cultural landmarks including the King Street Newtown ridge, the Eveleigh rail yards and further north to the city skyline from Sydney Park high points and redevelopment of the isolated terraces on Campbell Road to a higher density and form that encourages active frontages overlooking Sydney Park.	The ventilation facility could comprise a new element within the panoramic 360-degree view from the park. The project would not, however, interfere with views to any of the identified cultural landmarks referenced.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-28 LCZ 28 – Sydney Park residential precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Sydney Park residential precinct to the project is considered to be Moderate, due to the following: • The inherent landscape value of the Sydney Park residential precinct is considered to be high within the context of its cultural importance, as evidenced by the heritage listing of the dwellings	The magnitude of change arising from the project is considered to be Moderate, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The project would comprise a moderate scale addition to the backdrop of the LCZ, with the ventilation outlet located about 250 metres west of the precinct. The scale,	Moderate

Sensitivity	Magnitude	Rating
• The likely congruency with the project is considered to be moderate within the context of the precinct being set within the existing extensive Campbell Road boulevard planting • Within the large scale, formal setting context of the St Peters interchange, the project has the potential for a moderate level of 'fit' with regard to form, scale and mass.	bulk and form of the project would comprise contrasting elements within proximity of the precinct, notwithstanding the well-considered architectural and urban design inputs to the building group.	

LCZ 29 – Alexandra Canal industrial precinct

Project effects

The key project effects of the Alexandra Canal industrial precinct would be:

- Addition of a ventilation facility and associated infrastructure located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above ground level
- Any impact would be very limited due to the separation distance between the LCZ and the ventilation facility.

Desired future character

Desired future character	Assessment
There is no detail relating to desired future character for this LCZ in the SDCP 2013 that is specifically relevant to both a) landscape and visual impact and b) the project.	N/A

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-29 LCZ 29 – Alexandra Canal industrial precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Low, due to the following: • The inherent landscape value of the Alexandra Canal industrial precinct relates to the context of its cultural importance, as evidenced by its state heritage listing • The LCZ has a utilitarian character due to the nature of the land use. It is characterised by large, utilitarian industrial buildings and signage and heavy vehicle movement on the roads • The LCZ is industrial in character	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The distance of the project from this LCZ and extensive Campbell Road boulevard planting limits the presence of the project to and from within the LCZ.	Negligible

Sensitivity	Magnitude	Rating
which would have a moderate to high capacity to absorb project elements.		

LCZ 30 – Barwon Park precinct

Project effects

The key effects of the project on Barwon Park precinct would comprise:

- Addition of a ventilation facility and associated infrastructure located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above ground level.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the MDCP 2011 includes supporting pedestrian and cyclist access, activity and amenity including maintaining and enhancing the public domain quality. It also includes encouraging a greater scale of development fronting Princes Highway and at the northern end of Barwon Park Road, whilst ensuring new development is sympathetic to the low scale character of Crown Street.	The project site does not currently provide high quality amenity however upon completion of the New M5 works amenity will be improved. The proposed design of project elements such as the ventilation facility and soft landscape works would provide an improved public domain outcome. This in turn would provide improved amenity for cyclists. The project would not impede a greater scale of development fronting Princes Highway and at the northern end of Barwon Park Road. While the height of the ventilation facility may not be sympathetic to the low scale character of Crown Street, it would be separated by the width of the widened Campbell Road.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-30 LCZ 30 – Barwon Park precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of the Barwon Park precinct to the project is considered to be High, due to the following: • The inherent landscape value of the Barwon Park precinct is considered to be moderate within the context of its mixed use inner city character, and particularly the generally well conserved small housing, narrow streetscape character of Crown Street • The precinct includes a mix of period housing, medium rise residential infill development, and light industrial development.	The magnitude of change arising from the project is considered to be moderate, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The likely congruency of the project with the precinct is considered to be moderate notwithstanding the scale, bulk and form of the ventilation facility • The ventilation facility is some 70 metres to the south of the precinct, separated by a major new arterial road with extensive boulevard planting • The scale of the St Peters interchange	High–Moderate

Sensitivity	Magnitude	Rating
	located immediately to the south of the ventilation facility • The ventilation facility would be subject to a well-considered architectural and urban design process in accordance with the project UDLP. Further the precinct is opposite the large scaled St Peters interchange.	

LCZ 31 – Princes Highway precinct

Project effects

The key effects of the project on Princes Highway precinct would comprise:

- Addition of a ventilation facility and associated infrastructure located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above existing ground level.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the MDCP 2011 is to protect significant streetscapes and/or public domain elements within the precinct including landscaping, fencing, open space, sandstone kerbing and guttering, views and vistas and prevailing subdivision patterns and to enhance existing streets and encourage pedestrian activity, where appropriate, through improvements to road infrastructure and landscaping.	The ventilation facility could potentially impact on views and vistas from this LCZ, particularly for the upper levels of east facing apartment buildings that front the Princes Highway The New M5 project would provide improved shared pathway along Campbell Road which would connect in to the LCZ.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-31 LCZ 31 – Princes Highway precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Low, due to the following: • The inherent landscape value of the Princes Highway precinct is generally considered to be low, notwithstanding that it contains two heritage items, including St Peters Anglican Church, due to its predominantly low amenity environment • The LCZ is considered to have a high capacity to absorb the project, which would be set within the well landscaped St Peters interchange.	The magnitude of change arising from the project is considered to be Low, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The heritage listed St Peters Anglican Church is set upon a local high point within the precinct located about 500 metres from the ventilation outlet. However, the church grounds are well landscaped, creating a substantially enclosed setting which limits the presence of the ventilation outlet.	Low

LCZ 32 – St Peters triangle precinct

Project effects

The key project effects of the St Peters triangle precinct would be:

- Addition of a ventilation facility and associated infrastructure located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above existing ground level.

Desired future character

Desired future character	Assessment
The desired future character for this LCZ as detailed in the MDCP 2011 includes improving pedestrian amenity, to identify signature development opportunities along Princes Highway (at the Campbell Street and King Street intersections), to help define the precinct along this major road and to ensure that higher density development demonstrates good urban design and provides suitable amenity for occupants of those developments.	The ventilation facility could potentially be visible within distant views from the multi-storey developments within this LCZ, particularly from upper floors. This would be seen within the context of the landscaping associated with the upgraded Campbell Road and the St Peters interchange.

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-32 LCZ 32 – St Peters triangle precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Moderate, due to the following: • The inherent landscape value of the St Peters triangle precinct is considered to be moderate within the context of: one edge of the precinct falling within a heritage conservation area, but much of the remaining area comprising pockets of residential development, within an otherwise extensive, low amenity factory environment.	The magnitude of change arising from the project is considered to be Negligible, due to the following: • There would be no physical change or addition of any project elements within this LCZ • The likely congruency of the project with this precinct is considered to be high within the context of the precinct's predominantly low amenity factory environment, and the heritage conservation area being located on the edge furthest away from the project. The ventilation facility would be subject to a well-considered architectural and urban design process, and be set within an existing substantial, well vegetated landscape.	Negligible

LCZ 33 – St Peters interchange precinct

Project effects

The key project effects of the St Peters interchange precinct would be:

- Addition of a ventilation facility and associated infrastructure located above the M4-M5 Link portals in the north-west corner of the St Peters interchange. The ventilation facility would sit around 22 metres above existing ground level.

Desired future character

Desired future character	Assessment
There is no detail relating to desired future character for this LCZ in the SDCP 2013 that is specifically relevant to both a) landscape and visual impact and b) the project.	N/A

Landscape character impact assessment

The sensitivity and magnitude of the landscape to change is considered in the following table.

Table 7-33 LCZ 33 – St Peters interchange precinct landscape character assessment

Sensitivity	Magnitude	Rating
The sensitivity of this LCZ to the project is considered to be Negligible, due to the following: • The inherent landscape value of the St Peters interchange is considered to be moderate, within the context of the extensive landscape works, and application of well-considered architectural and urban design processes for both the road infrastructure and elevated buildings delivered by the New M5 project and UDLP • The likely congruency of the project with this precinct would be high given the ventilation facility has been located in the vicinity of the portals.	The magnitude of change arising from the project is considered to be Low, due to the following: • The project would comprise the addition an architecturally well-considered composition of portals and ventilation facility within the context of and as a continuation of the broader St Peters interchange landscape.	Negligible

7.2.5 Summary of landscape character zone assessments

A summary of the landscape character assessments for the relevant LCZs impacted by the project during operation is provided below in **Table 7-34.**

Table 7-34 Summary of LCZ assessments

Landscape character zone	Sensitivity to change	Magnitude of change	Overall rating
Central west landscape character zones (Darley Road MOC)			
LCZ 1 – Darley Road residential precinct	Low	Low	Low
LCZ 2 – Darley Road commercial precinct	Moderate	Moderate	Moderate
LCZ 3 – Leichhardt light rail precinct	Low	Low	Low
Central east landscape character zones (Rozelle interchange)			
LCZ 4 – Glebe Foreshore Parklands precinct	Moderate	Moderate	Moderate
LCZ 5 – Johnston Street precinct	High	Negligible	Negligible

Landscape character zone	Sensitivity to change	Magnitude of change	Overall rating
LCZ 6 – Annandale Street and Young Street precinct	Moderate	Low	Moderate-Low
LCZ 7 – Whites Creek Valley precinct	High	Low	Moderate
LCZ 8 – Catherine Street precinct	Moderate	Negligible	Negligible
LCZ 9 – Catherine Street neighbourhood centre precinct	Low	Low	Low
LCZ 10 – Balmain Road precinct	Low	Negligible	Negligible
LCZ 11 – Nanny Goat Hill residential precinct	Low	Low	Low
LCZ 12 – Halloran Street commercial precinct	Low	Negligible	Negligible
LCZ 13 – Easton Park residential precinct	High	Moderate	High-Moderate
LCZ 14 – Victoria Road south precinct	Low	Moderate	Moderate–Low
LCZ 15 – White Bay Power Station precinct	High	Moderate	High–Moderate
LCZ 16 – Rozelle Bay wharves precinct	Low	Moderate	Moderate–Low
LCZ 17 – City West Link precinct	Low	Moderate	Moderate–Low
LCZ 18 – Rozelle light rail corridor and Whites Creek canal precinct	Moderate	Moderate	Moderate
LCZ 19 – Rozelle Rail Yards precinct	Low	Moderate	Moderate-Low
Northern landscape character zones (Iron Cove Link)			
LCZ 20 – Victoria Road north precinct	Low	Moderate	Moderate–Low
LCZ 21 – Victoria Road light industrial precinct	Moderate	Negligible	Negligible
LCZ 22 – Iron Cove residential precinct	Low	Moderate	Moderate-Low
LCZ 23 – King George Park precinct	Moderate	Moderate	Moderate
LCZ 24 – Callan Park residential precinct	High	Moderate	High–Moderate
LCZ 25 – Sydney College of the Arts precinct	High	Negligible	Negligible
LCZ 26 – Darling Street precinct	Low	Negligible	Negligible
Southern landscape character zones (St Peters interchange)			
LCZ 27 – Sydney Park precinct	High	Low	Moderate
LCZ 28 – Sydney Park residential precinct	Moderate	Moderate	Moderate
LCZ 29 – Alexandra Canal industrial precinct	Low	Negligible	Negligible
LCZ 30 – Barwon Park precinct	High	Moderate	High-Moderate
LCZ 31 – Princes Highway precinct	Low	Low	Low
LCZ 32 – St Peters triangle precinct	Moderate	Negligible	Negligible
LCZ 33 – St Peters interchange precinct	Negligible	Low	Negligible

Mitigation measures have been recommended in **Chapter 9** to minimise landscape character impacts, particularly where impacts are predicted to be high.

7.3 Visual impact assessment

7.3.1 Visual envelope mapping

The visibility of the project is illustrated in visual envelope mapping (VEM) and outlined in this section. The VEM primarily considers existing landform as described previously in **section 3.2** . The VEM may not capture all viewing points, but provides a basis to inform the key viewing points of the project.

Central west (Darley Road motorway operations complex)

Figure 7-1 illustrates the potential visibility of the project from the surrounding area. As can be seen from the VEM, key views of the project are from homes and the roadway along Darley Road, from the light rail stop platform, entry stairs and parts of the light rail corridor, from part of the road way along Hubert Street, from part of the laneway to the west of Hubert Street and from a small number of homes on the western side of Charles Street near Darley Road. The VEM shows that there is limited visibility of the site from the north.

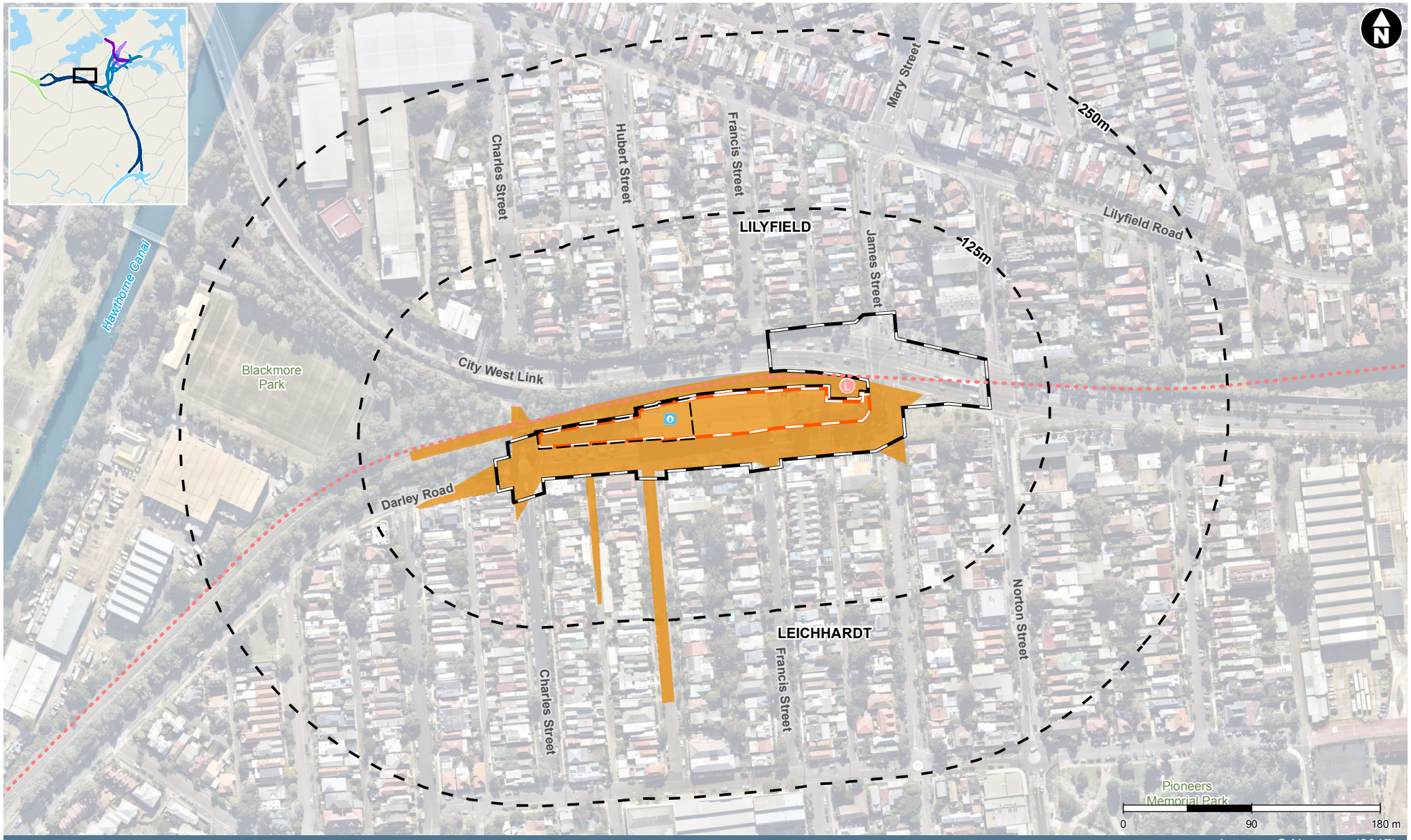


Figure 7-1 Visual envelope map of the central west area of the project (Darley Road)

Central east (Rozelle interchange)

Figure 7-2 illustrates the potential visibility of the project from the surrounding area. The height of the ventilation facility would make the project visible above surrounding residential and commercial properties and potentially also above some tree lines of Easton Park.

As can be seen from the VEM, key views of the project are from the roadways and residences in areas adjacent to the project at the Rozelle interchange, Glebe Foreshore Parklands, Rozelle Bay and associated wharves, Pyrmont Bridge, the light rail stops at Lilyfield and Rozelle Bay, the City West Link and Easton Park.

The height of the ventilation facility would make the project visible from a number of upper levels of multi storey residences located primarily adjacent to the project boundary, but also some high rise apartments located east of Anzac Bridge, towards the Balmain ridgeline, north of White Bay, and the Vance apartments at Harold Park which would comprise distant views.

In the short term (before replacement planting becomes well established), the loss of the landscape screening edge east of the White Bay Power Station would be likely to open up some views to the project (ie approaches to Anzac Bridge) from low -rise medium density residential development within the vicinity of Reynolds Avenue and Hyam Street, Balmain at a viewing distance of between 400 and 700 metres, and some elevated locations west of Victoria Road at a viewing distance of about 300 metres.

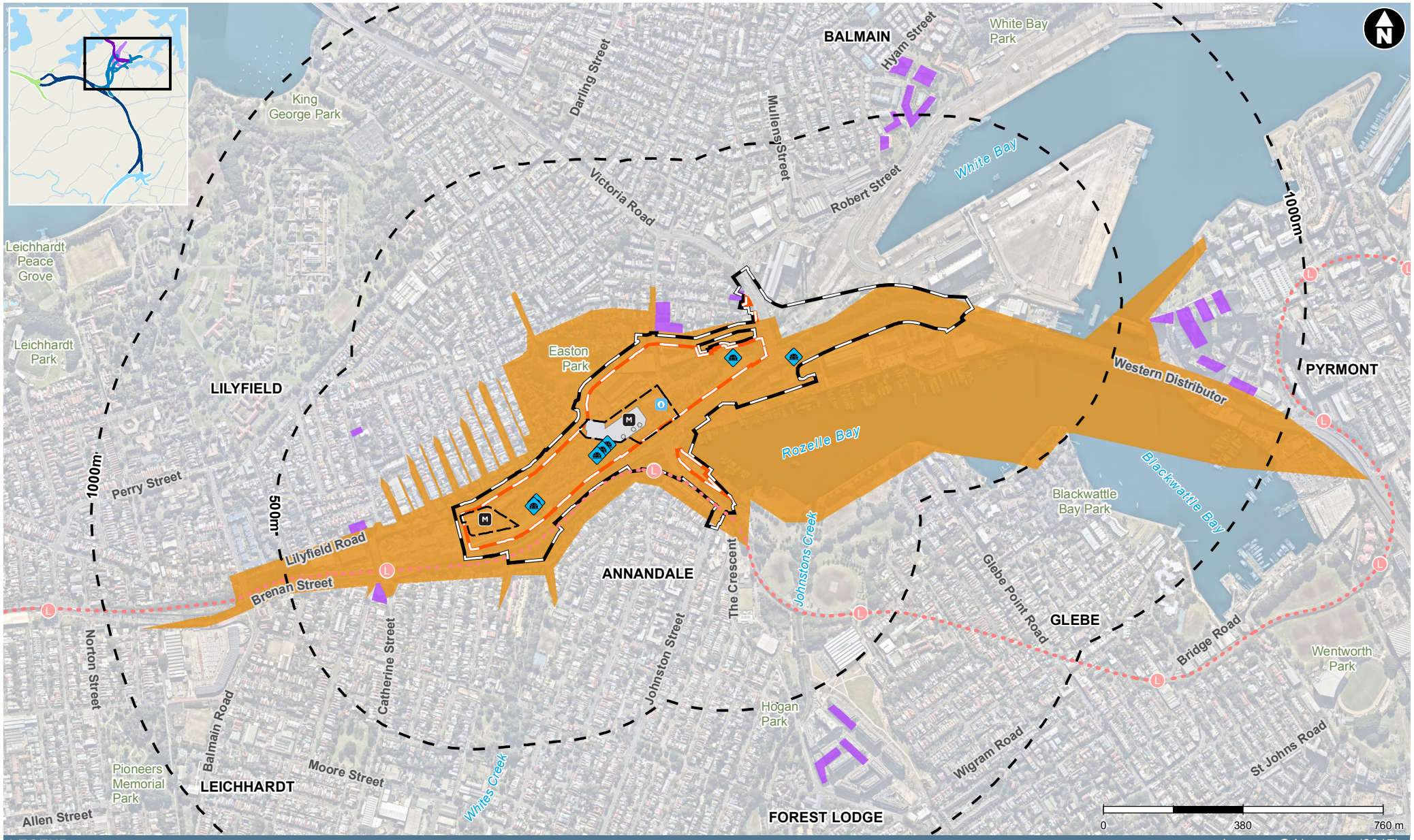


Figure 7-2 Visual envelope map of the central east area of the project (Rozelle interchange)

Northern (Iron Cove Link)

Figure 7-3 illustrates the potential visibility of the project from the surrounding area. The height of the ventilation facility would make the project visible above surrounding residential and commercial properties and potentially also above some tree lines towards Callan Park.

As can be seen from the VEM, views to the project would primarily be from residences adjacent to the project, along some adjoining residential streets, the length of Victoria Road to the ridgeline near Darling Street, and from Iron Cove Bridge.

Residences along Manning Street (to Callan Street), users of King George Park would have views to the bioretention facility. The multi storey apartments located in proximity of the project along Victoria Road, Terry Street and Nagurra Place would have views to the project from upper levels. Users of King George Park and the grounds of the Sydney College of the Arts would have views to the ventilation outlet and the ventilation outlet building from some areas, seen from a moderate distance, above residential properties and at street intersections. Some upper levels of buildings at the Sydney College of the Arts would also have views to the ventilation facilities.

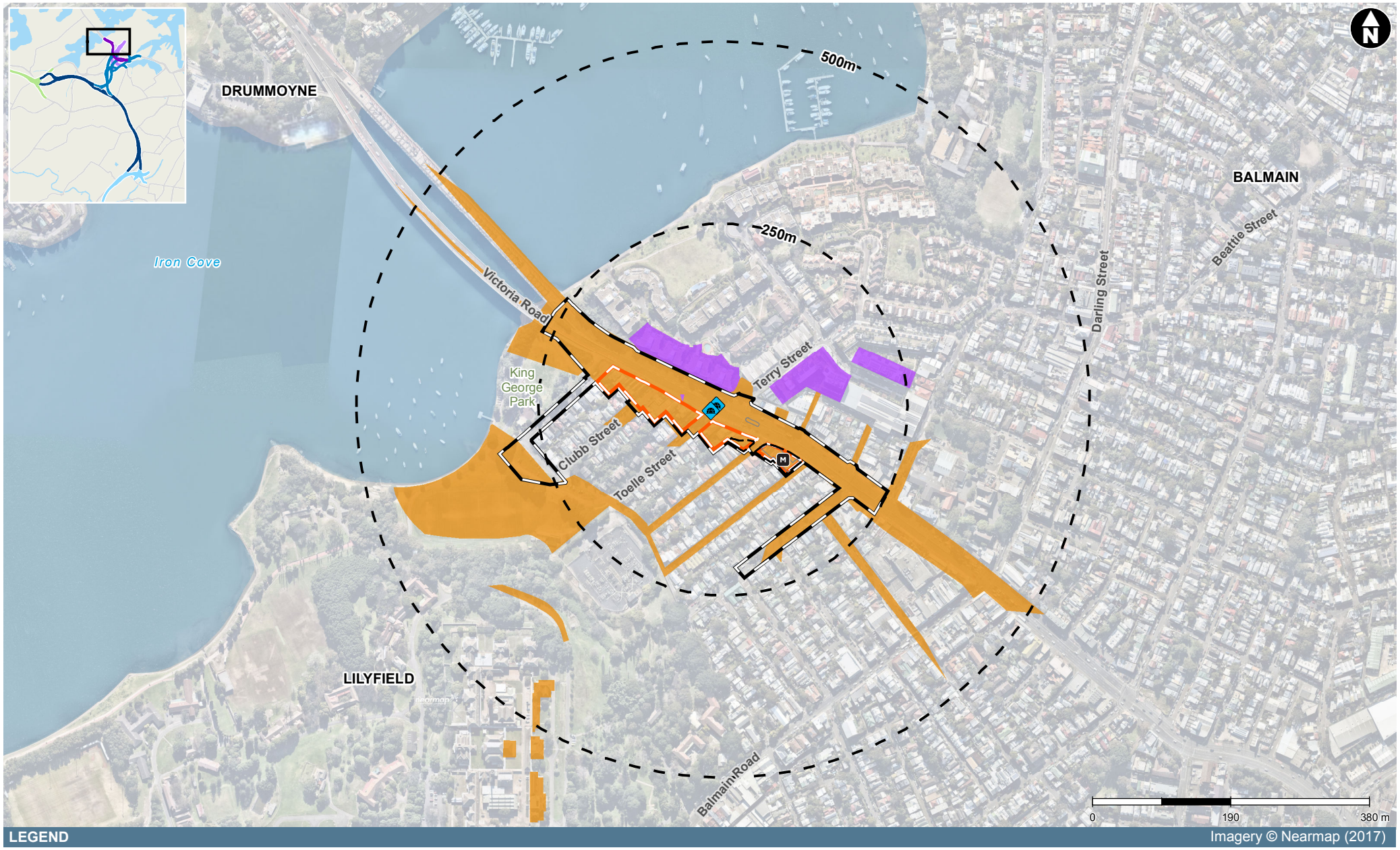


Figure 7-3 Visual envelope map of the northern area of the project (Iron Cove Link)

Southern (St Peters interchange)

Figure 7-4 illustrates the potential visibility of the project from the surrounding area. As can be seen from the VEM, views to the project would be from residences and commercial properties adjacent to the project boundary, along some adjoining residential streets, across the St Peters interchange site, and for recreational users of Sydney Park. The height of the ventilation facility would also make the project visible above surrounding residential and commercial properties and potentially also above some tree lines within Sydney Park.

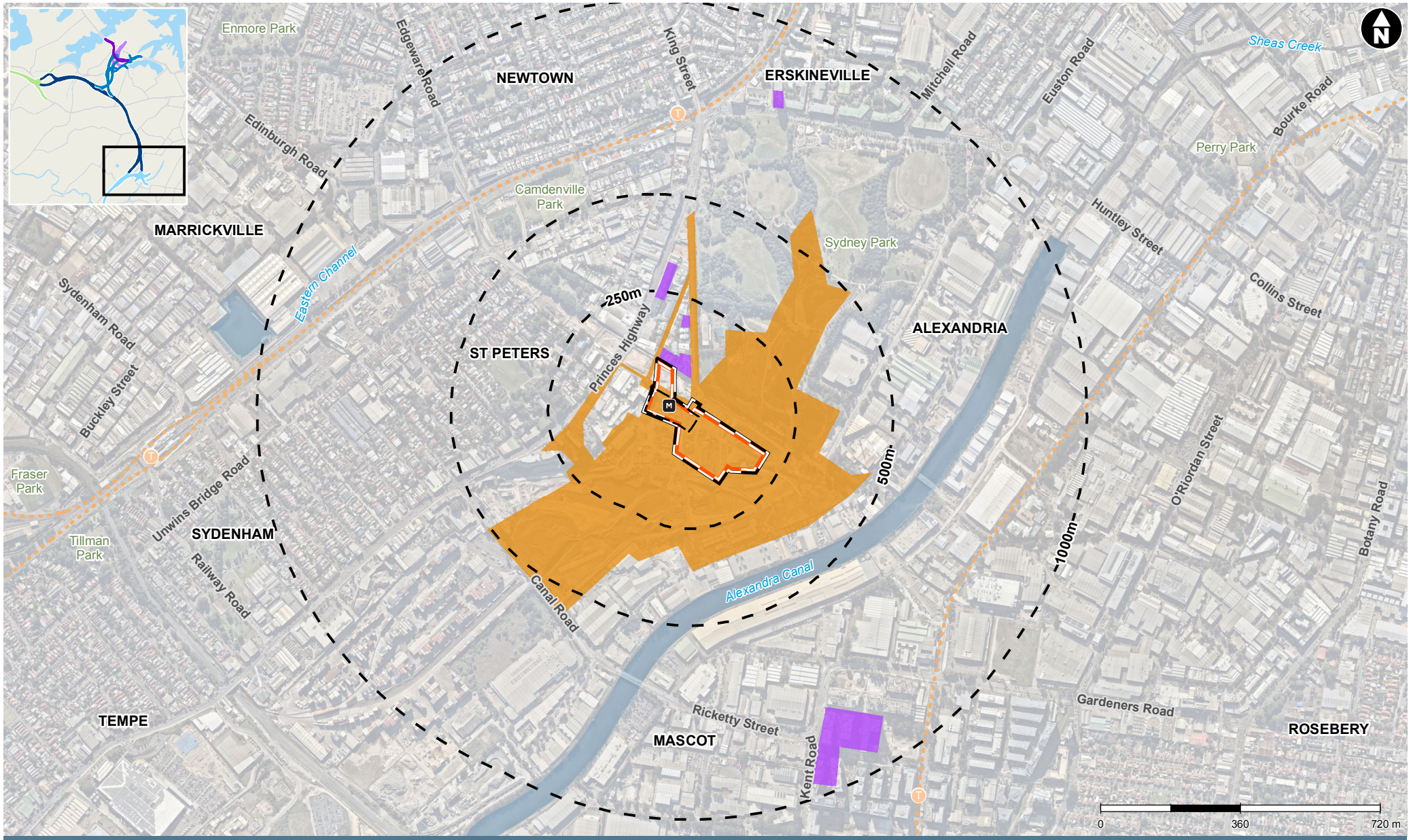


Figure 7-4 Visual envelope map of the southern area of the project (St Peters interchange)

7.3.2 Key viewpoints

The following section provides an assessment of key viewpoints surrounding the operational footprint of the project. To assess the concept design for the project in the context of these viewpoints, a series of visual impact assessment assumptions were adopted and are presented at **Annexure B**.

Wattle Street interchange

The operational landscape design approach at the Wattle Street interchange has been developed and assessed as part of the M4 East project. The approach is detailed in the Draft M4 East Urban Design and Landscape Plan (Hassell, 2016).

Impacts associated with the construction and operation of new motorway infrastructure (including the ventilation facility itself) at Haberfield have already been assessed in the WestConnex M4 East Urban Design, Landscape Character and Visual Impact Assessment (AECOM, 2015) for the M4 East project. No further visual impact assessment has been undertaken for Haberfield as no additional operational infrastructure is proposed as part of the M4-M5 Link project. Potential cumulative impacts however are considered in further detail in **section 8.1**.

Darley Road

Proposed operational infrastructure and the operational landscape design approach at the Darley Road motorway operations complex (MOC1) is described in **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS. **Figure 7-5** shows the operational layout of the site and the representative visual receptor locations assessed.

Figure 7-5 Darley Road operational receptor locations

Receptor location D1 – View looking east from Darley Road near corner of Charles Street

Existing situation

This receptor location is situated on Darley Road near the near the corner of Charles Street looking east, see **Figure 7-6**. The view comprises from left to right of frame:

- Existing light rail corridor with substantial tree cover
- Charles Street Underbridge, a rail bridge over Charles Street which is a RailCorp S170 heritage item
- Outdoor car parking abutting the light rail corridor, with brick retaining wall and steep batter densely vegetated with tree and groundcover species
- Retail 'warehouse' outlet with large trees behind
- Darley Road with overhead powerlines and street lighting to both sides of the road
- Free standing residential development to the southern side of the road. These houses do not front Darley Road but may have partial views to the road from side windows. However, a number of low street trees and foliage planted outside these side windows may preclude some views to the street.

Project effects

The change in view from this receptor location is shown in **Figure 7-6** and **Figure 7-8**. The key project effects that would be visible from this receptor location are:

- A low scale water treatment plant consisting of a grouping of architecturally well-considered buildings and set behind a security fence and gates
- A substation located at the western end of the site
- Retention of existing tree and ground layer vegetation to the light rail batter
- Low perimeter landscape works and street tree planting at the Darley Road frontage to the project.

The balance of the land in the eastern part of the site (remaining project land) would be grassed until its future development is determined by the Residual Land Management Plan.

Lighting

Minimal additional light would be introduced to project area during operation, with facility lighting limited to that necessary to meet security, and when required on site, worker safety requirements.

Figure 7-6 Existing view looking east along Darley Road near the corner of Charles Street

Figure 7-7 Artist's impression at 12–18 months of operation from near corner of Darley Road and Charles Street looking east to the project

Figure 7-8 Artist's impression at 10 years of operation from near corner of Darley Road and Charles Street looking east to the project

Visual impact assessment

Table 7-35 Receptor location D1 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Low** The Darley Road facility adjoins an infrastructure corridor located opposite free-standing residential development. Many of the residences adjoining Darley Road have measures in place to screen views to the road including building alterations to limit views; strategic planting of low street trees, large privacy/sun protection blinds, and tall hedges in front yards. The view to Darley Road from nearby residences is of poor to moderate quality within the context of the refurbished retail warehouse outlet.	**Magnitude of change: Moderate** The project would comprise a low scale, architecturally well-considered development to a portion of the Darley Road civil and tunnel site. The extent of visibility of the project from these residences is generally considered to be Low within the context of the observed measures put in place by residents to minimise views to Darley Road. Three dwellings would have direct views to the project. The design quality, including scale, size and character of the project would be expected to comprise an appropriate level of visual 'fit' with the street, including provision of street tree planting to the Darley Road frontage of the project.	**Moderate–Low**
Pedestrians	**Sensitivity to change: Low** It is likely there would be a moderate amount of pedestrian traffic passing the project from local streets and along Darley Road due to the location of the light rail stop. However, as most of the pedestrian traffic is likely to be related to weekly commuting to and from work, the sensitivity of these receptors is considered likely to be relatively low, particularly given the frequent exposure to the view.	**Magnitude of change: Low** The scale, size and character of the project would be expected to comprise an appropriate level of visual 'fit' with the street, within the context of its infrastructure purpose, including provision of street tree planting to the Darley Road frontage of the project. The project would be visually compatible with the adjoining light rail corridor and Charles Street Underbridge.	**Low**

Table 7-36 Receptor location D1 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	The sensitivity of residents to the low lighting levels likely to be required for the site is considered to be Low.	The magnitude of change in lighting is considered to be Low within the context of the existing street lighting present to both sides of the street.	**Low**
Pedestrians	The sensitivity of pedestrians to additional lighting is considered to be Low.	The magnitude of change for pedestrians passing the site at night is considered to be Low.	**Low**

Receptor location D2 – View looking west from Darley Road at entry to lane between James Street and Francis Street

Existing situation

This receptor location is situated on Darley Road at the entry to the lane between James Street and Francis Street looking west (see **Figure 7-9)**. The view comprises from left to right of frame:

- Free standing residential development to the southern side of the road
- Darley Road with overhead powerlines and street lighting to both sides of the road
- Existing light rail corridor with substantial tree cover in the foreground
- Retail 'warehouse' outlet with large trees to right of frame.

Figure 7-9 Existing view looking east along Darley Road near corner of Charles Street

Project effects

The view from this location would comprise a grassed area of remaining project land. The perimeter brick retaining wall, Leichhardt North light rail stop and City West Link noise walls would be visible to the rear of the site, given the removal of large trees in the foreground.

A security fence would demark the boundary of the Darley Road motorway operations complex. The project would comprise low scale, architecturally well-considered buildings with the water treatment plant the primary visible building from this receptor. The Darley Road frontage to the project would be subject to low perimeter landscape works and street tree planting. Existing overhead power and street lighting to both sides of the street would be retained intact.

Lighting

Minimal additional light would be introduced to project area during operation, with facility lighting limited to that necessary to meet security, and when required on site, worker safety requirements.

Visual impact assessment

Table 7-37 Receptor location D2 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Low** Refer to **Table 7-35**.	**Magnitude of change: Low** The extent of visibility of the project from these residences is generally considered to be low within the context of the observed measures put in place by residents to minimise views to Darley Road. The scale, size and character of the project would be expected to comprise an appropriate level of visual 'fit' within the context of its infrastructure purpose, including provision of street tree planting to the Darley Road frontage of the project.	**Low**
Pedestrians	**Sensitivity to change: Low** It is likely there would be a moderate amount of pedestrian traffic passing the project from local streets and along Darley Road due to the location of the light rail stop. However, as most of the pedestrian traffic is likely to be related to weekly commuting to and from work, the sensitivity of these receptors is considered likely to be relatively low, particularly given the frequent exposure to the view.	**Magnitude of change: Low** The scale, size and character of the project would be expected to comprise an appropriate level of visual 'fit' with the street, within the context of its infrastructure purpose, including provision of street tree planting to the Darley Road frontage of the project. The project would comprise a small part of the overall view.	**Low**

Table 7-38 Receptor location D2 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	The sensitivity of residents to the low lighting levels likely to be required for the site is considered to be Low.	The magnitude of change in lighting is considered to be Negligible within the context of the existing intervening street lighting present to both sides of the street.	**Negligible**
Pedestrians	The sensitivity of pedestrians to additional lighting from this location is considered to be Negligible.	The magnitude of change for pedestrians viewing the site at night from this location is considered to be Low.	**Negligible**

Rozelle interchange

Proposed operational infrastructure and the operational landscape design approach at the Rozelle interchange is described in **Chapter 5** (Project description) of the EIS and the **Appendix L** (Urban Design Report) of the EIS. **Figure 7-10** shows the operational layout of the site and the representative visual receptor locations assessed.

General arrangement/landscape setting

The open space landscape would be in the order of one-kilometre long and varies between 100 and 200 metres wide. The landform would be subject to two major changes in level running east to west with primary elevated landforms augmented by:

- Gently to moderately sloping rise and fall along the northern edge of the open space where it transitions to the adjoining Lilyfield Road street frontage
- Changes in level associated with the ventilation facility
- Constructed wetland
- Naturalised drainage channels taking stormwater from: the west, the north and the east and discharging this to Rozelle Bay
- Major infrastructure buildings would be limited to two locations, comprising the:
    - Rozelle West motorway operations complex (MOC2) located at the western end of the open space, with a tightly consolidated building group of air intake building (up to 12 metres high), substation (about 10 metres high) and fire suppression pump station (about 10 metres high) with water tanks
    - Rozelle East motorway operations complex (MOC3) located at the centre of the open space, with ventilation facility and outlets (about 35 metres high), and water treatment facility (about 10 metres high).

Surface landscape treatments would broadly comprise:

- Open space within the Rozelle Rail Yards
- Tree planting and landscaping surrounding permanent operational infrastructure including new portal structures
- Street tree planting along the northern edge of City West Link (most tree cover on the southern edge of this road, and west of The Crescent would be retained); the White Bay Power Station corner of Victoria Road, and the southern edge of the approaches to Anzac Bridge
- Wetland plantings to the naturalised drainage channels and the constructed wetland
- Heritage interpretation where possible.

The open space area would provide two elevated crossing points for pedestrians and cyclists between Rozelle and Annandale/Lilyfield comprising:

- A crossing of City West Link, connecting Lilyfield Road in Rozelle and Brenan Street in Lilyfield
- A crossing of City West Link, connecting Lilyfield Road near Easton Park in Rozelle and The Crescent in Annandale.

The existing views towards the city skyline in the vicinity of the Rozelle interchange include a number of existing structures that feature prominently. The relative scale of these prominent features has been considered as part of the visual impact assessment for Rozelle and is shown on **Figure 7-11**.

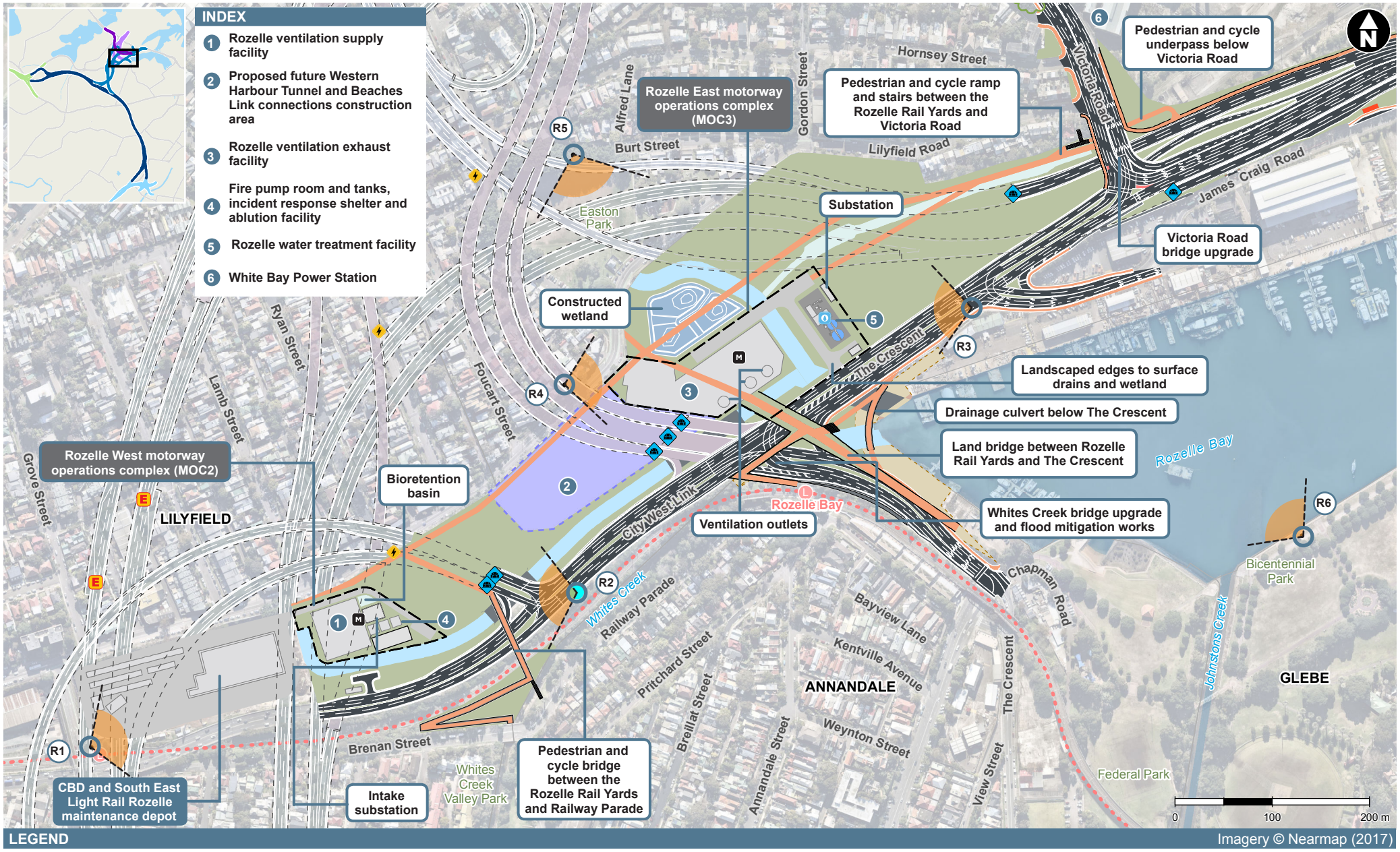


Figure 7-10 Rozelle interchange operational receptor locations

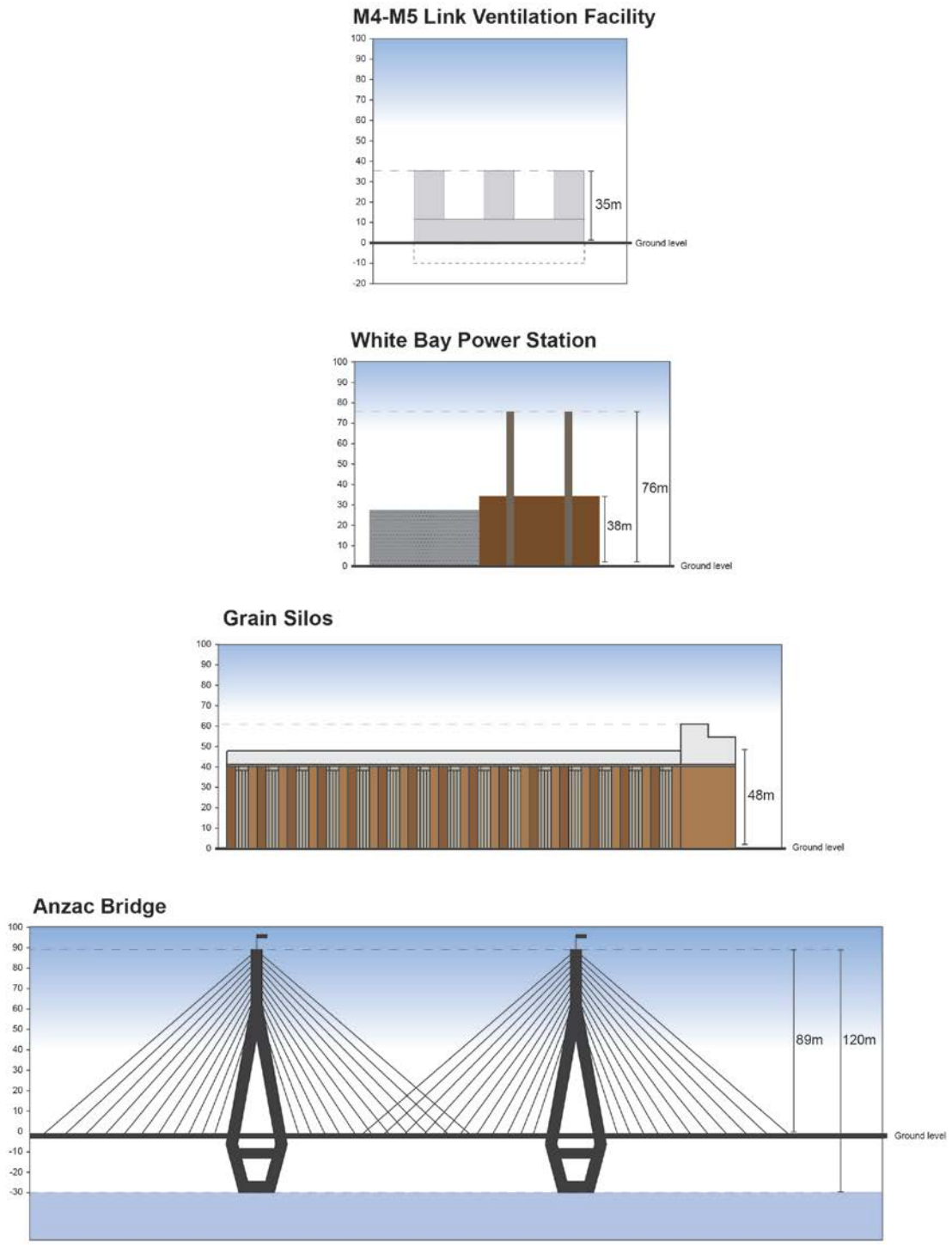


Figure 7-11 Height comparison of key elements in the vicinity of the proposed Rozelle ventilation facility

Receptor location R1 – View looking east from Catherine Street entry to Lilyfield Light Rail Stop

Existing situation

This receptor location is situated on Catherine Street between the entry steps and lift access to the Lilyfield light rail stop, looking east across the project site with the Rozelle maintenance depot in the foreground. This location is representative for light rail commuters, and residents within a nearby five storey mixed use development on the corner of Catherine Street and City West Link, with views oriented across the project site to the city.

The view from this receptor location is shown on **Figure 7-12**. The view comprises:

- Existing Rozelle Rail Yards with a moderate level of existing tree cover along the Lilyfield Road and vegetation along City West Link
- Distant city skyline including buildings within Barangaroo and the CBD, and the Sydney Harbour Bridge. Other elements include Anzac Bridge and the Glebe Island grain silos, all of which are seen against the skyline
- Residential development to the north of the Rozelle Rail Yards.

Views from single and double storey residences in proximity to this location are currently limited by dense built form and street/residential garden tree cover. It is noted that the construction of the Rozelle maintenance depot will result in a change in the addition of a new built form element to the foreground of the view.

Project effects

The change in view from this receptor location is shown in **Figure 7-13** and **Figure 7-14**. The key project effects that would be visible from this receptor location are:

- Part of the air intake, substation and pump house buildings, visible behind the Rozelle maintenance depot
- Ventilation outlets seen in the distance against the skyline
- The new Rozelle open space area and associated landscape plantings.

Beyond this, detail of the project site is predominantly screened by intervening tree cover. The ventilation outlets are seen at an oblique angle such that they visually read as a single mass, not dissimilar to the Glebe Island grain silos also seen in this view.

Lighting

Additional light would be introduced to this area during operation, commensurate with safety and security requirements. The lighting would not be expected to be visually prominent from this location due to the necessary light levels for the Lilyfield light rail stop and adjoining the Rozelle maintenance depot.

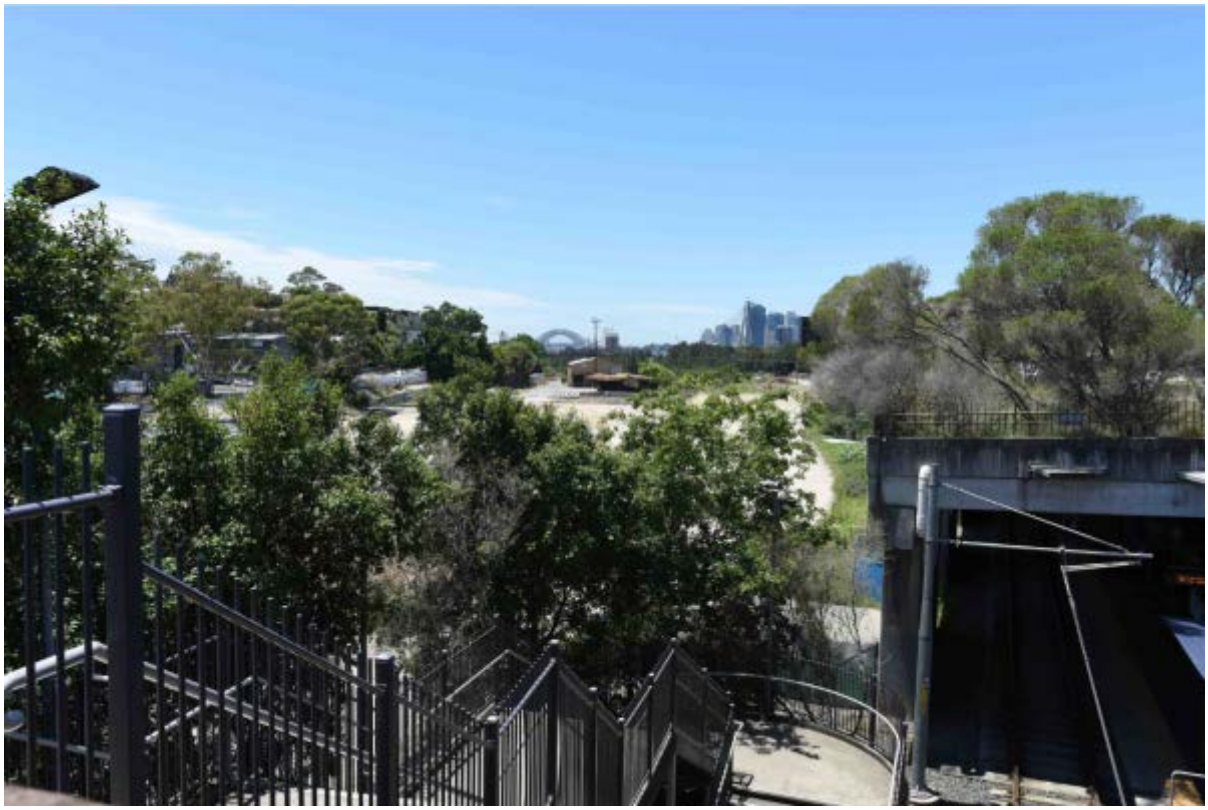


Figure 7-12 Existing view from Catherine Street at the entry to Lilyfield light rail stop

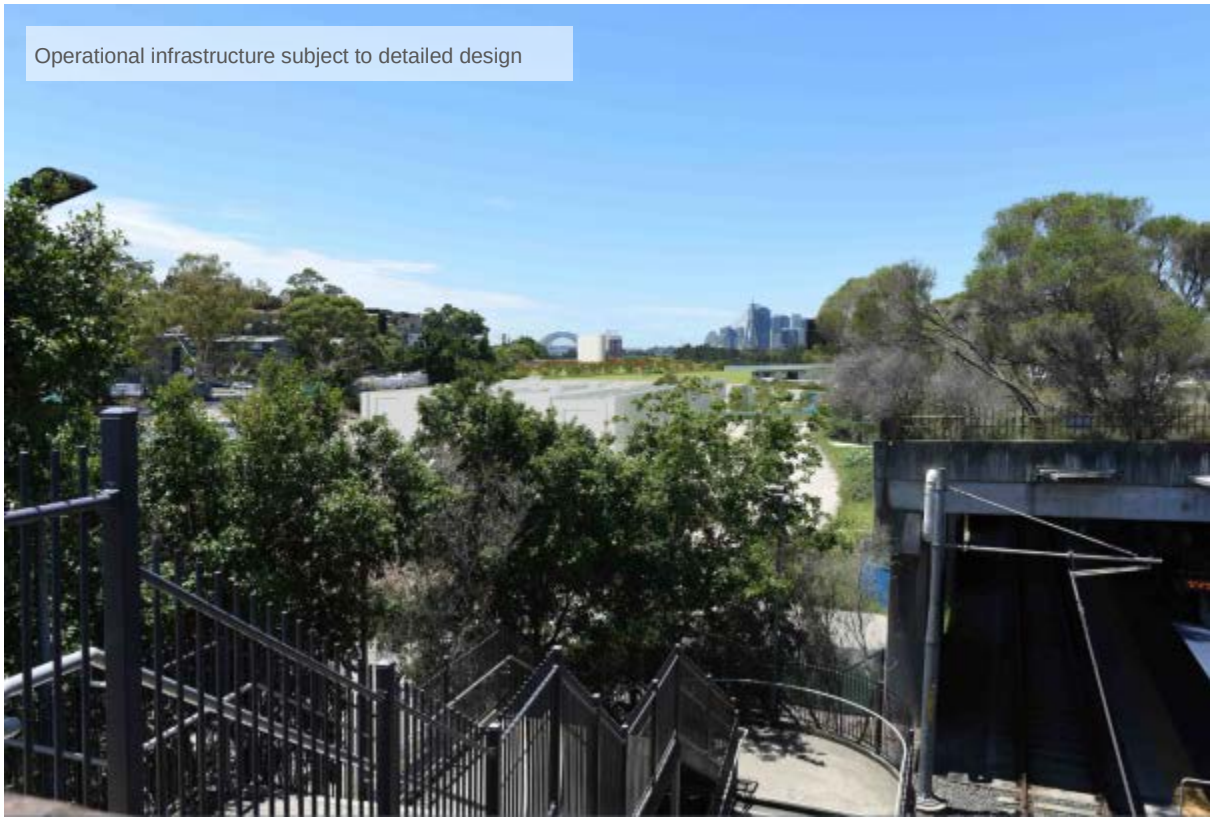


Figure 7-13 Artist's impression at 12–18 months of operation from Catherine Street at the entry to Lilyfield light rail stop

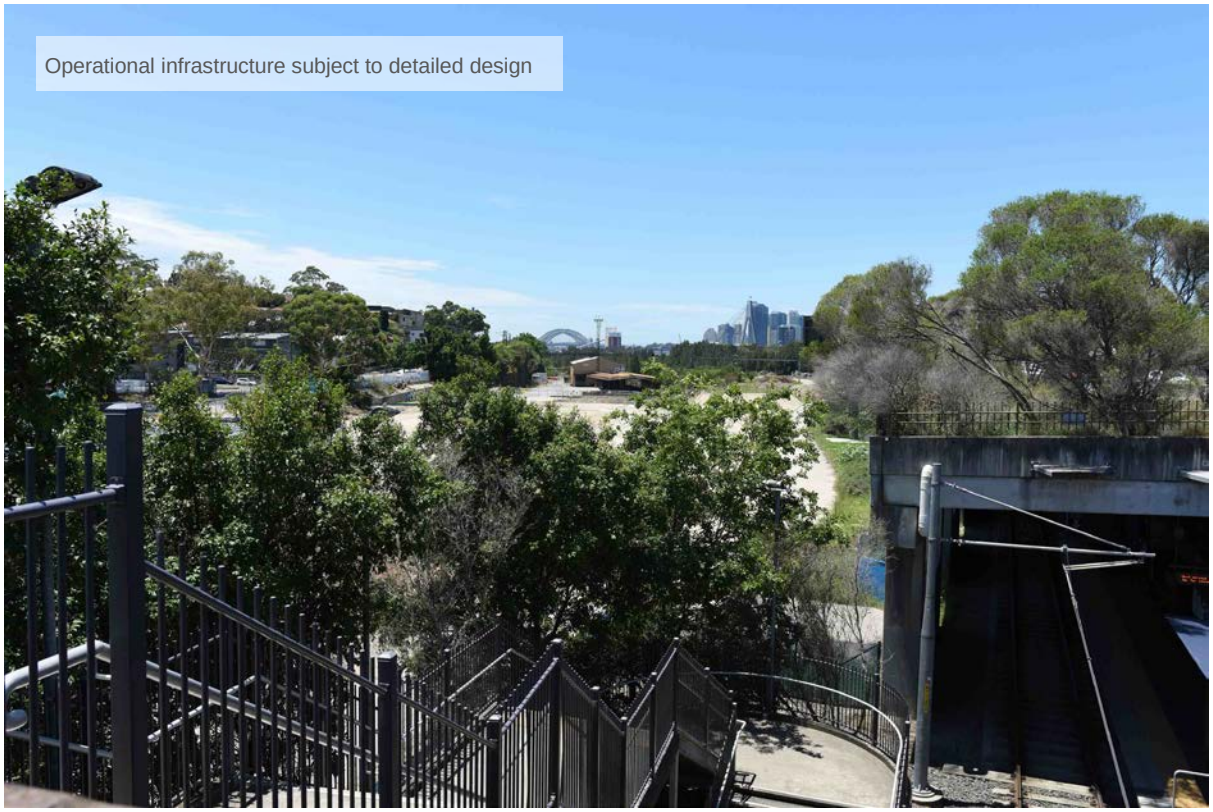


Figure 7-14 Artist's impression at 10 years of operation from Catherine Street at the entry to Lilyfield light rail stop

Visual impact assessment

Table 7-39 Receptor location R1 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Light rail users	**Sensitivity to change: Moderate** Workers travelling to and from their place of work are generally considered to have low levels of sensitivity to changes in their travel route environment and the limited duration of the view. However, in this case light rail commuters looking out to the project are considered to be moderately sensitive receptors given the frequency with which commuters use this stop and the context of the view of the city skyline.	**Magnitude of change: Low** The view of the project from this location predominantly comprises a broad open space setting with low levels of topographic relief, characterised by a large open grassed area with a naturalised waterway, and substantial tree cover beyond that. The ventilation outlets are visually prominent, contrasting elements in terms of bulk, scale and form. However, the bulk and scale of these features are softened due to the distance from the receptor location, and the outlets comprise a contained grouping of elements from this location that take up a small proportion of the overall valley floor view. Further, given that the finishing/cladding materials and colour of the outlets have not yet been considered, the visual prominence of these elements would be able to be reduced over that shown within **Figure 7-13** and **Figure 7-14**. The elevation of this receptor location within the landscape relative to the outlets reduces the extent of the structures that would be seen against the skyline, ie rather than being viewed from the lower ground level within the project site, where more of the structures would be seen against the skyline.	**Moderate–Low**
Residents	**Sensitivity to change: Low** The apartments are located in an elevated position, and orientated towards a panoramic view across the project site to the city and are assumed to have a high number of overall occupants. These sensitive receptors have balconies facing east-north-east and could be expected to spend time observing this view, which would be considered of high importance. Given the increased elevation of these receptors over those at the Lilyfield light rail stop, the ventilation outlets would be unlikely to be seen against the skyline, providing opportunity to have these elements subject to some level of visual absorption against the backdrop of the ground plane.	**Magnitude of change: Moderate** The project would be highly visible from this location. The view would be in moderate contrast to the existing view, comprising an ordered, and aesthetically pleasing passive, open space in lieu of the previously derelict rail yards. However, this component of the view needs to be considered in conjunction with the proposed increased width of City West Link, and the provision of the Rozelle interchange and associated portals. The elevated angle of viewing would tend to shorten the height of the ventilation outlets, which would in most cases be seen against the backdrop of the ground plane rather than the skyline, potentially reducing their visual prominence.	**Moderate–Low**

Table 7-40 Receptor location R1 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Light rail users	**Sensitivity to change: Low** The sensitivity of light rail users to project lighting is considered to be Low given most commuters would be expected to use the light rail during daylight hours, other than when coming home after dark when they would subject to the relatively bright lighting of City West Link in this location, and some of whom would have brief views into the open space from Catherine Street. However, this view would be seen across the Rozelle maintenance depot which may be subject to relatively high lighting levels for security.	**Magnitude of change: Low** The magnitude of change is considered to be Low within the context of existing relatively high lighting levels associated with City West Link, and the relatively limited amount of lighting anticipated to be present within the open space and subject to light spill cut-off measures and screening some screening from trees, and likely to be limited to path systems and recreation nodal points.	**Low**
Residents	**Sensitivity to change: Low** The sensitivity of residents to project lighting is considered to be Low within the context of the intervening busy and well illuminated City West Link and associated M4 East interchange, and Catherine Street intersection. In addition to the Rozelle maintenance depot which may be subject to relatively high lighting levels for security.	**Magnitude of change: Low** The magnitude of change is considered to be Moderate within the context of increased illumination levels associated with City West Link and associated M4 East interchange. The majority of the lighting within the open space would generally be expected to be relatively low level when viewed from this receptor location, subject to light spill cut-off measures and screening from landscape planting.	**Low**

Receptor location R2 – View looking west along City West Link to M5 Link portal

Existing situation

This receptor location is located on City West Link about 300 metres west of the intersection with The Crescent. The view is shown on **Figure 7-15** and comprises the existing City West Link, a four lane road closely bounded to the south by a noise wall and tree planting, and bounded to the north by narrow tree planting and a 1.8 metre chain wire fence. Filtered views are available through the northern edge planting to the Rozelle Rail Yards.

Project effects

The change in view from this receptor location is shown in **Figure 7-16** and **Figure 7-17**. The key project effects that would be visible from this receptor location are:

- The M5 portal, with an open passive space with planting of native trees and grass which drapes over the portal structure
- A pedestrian share pathway bridge that spans over City West Link to Lilyfield
- New open space to the north of City West Link.

All existing vegetation on the southern side of City West Link would be retained other than for select removal of trees where the pedestrian bridge lands next to Brenan Street in Lilyfield. Motorists on City West Link would have substantial views into the new open space area.

Lighting

Additional light including traffic lights would be introduced to this area during operation, commensurate with safety and security requirements.

Figure 7-15 Existing view looking west along City West Link

Figure 7-16 Artist's impression at 12–18 months of operation from City West Link to the M5 portal

Figure 7-17 Artist's impression at 10 years of operation from City West Link to the M5 portal

Visual impact assessment

Table 7-41 Receptor location R2 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Motorists	**Sensitivity to change: Low** The road would be subject to a very high number of users on a daily basis, with views to the landscape elements fluctuating between views for moving traffic to consider when vehicles were stopped at traffic lights. These transient receptors would have existing views for a relatively short duration.	**Magnitude of change: Moderate** The project would be highly visible from this location and would be in contrast with the narrow and highly enclosed nature of the existing view. The project would open views at this location, including views of new open space, as well as hard landscape elements of the M5 portal and the pedestrian bridge, which would comprise architecturally well-considered design elements. Within this context the quality of this view is considered to be a significant improvement over the existing view. The carriageway would increase in width in this location, however, the sense of openness and visual connectivity with the adjoining open space is considered to potentially mitigate this impact.	**Moderate–Low**

Table 7-42 Receptor location R2 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Motorists	**Sensitivity to change: Low** The sensitivity of motorists to project lighting is considered to be low given the provided lighting conditions would be typical for a motorway interchange of this type.	**Magnitude of change: Moderate** The magnitude of change is considered likely to be moderate within the context of existing City West Link lighting levels in this location.	**Moderate-Low**

Receptor location R3 – View looking west along City West Link to The Crescent

Existing situation

This receptor location is situated on the southern footpath of City West Link about 100 metres east of the existing intersection with The Crescent. The view is shown on **Figure 7-18** and comprises the existing City West Link which has a wide carriageway in this location, bounded to the south by a row of trees and the Rozelle Bay working port edge, and bounded to the north by the Rozelle Rail Yards and a row of trees within the road verge. The view is dominated by the extensive carriageway and a clutter of signage, lighting and powerlines.

Project effects

The change in view from this receptor location is shown in **Figure 7-19** and **Figure 7-20**. The key project effects that would be visible from this receptor location are:

- The upgraded City West Link with large motorway scale elements comprising a pedestrian-bridge spanning City West Link
- The Western Harbour Tunnel portal, with an open woodland planting of native trees and grass which drapes over the portal structure
- The ventilation facility and three ventilation outlets
- A water treatment plant east of the ventilation facility.

Most of the vegetation on the southern side of City West Link would be retained, with the northern edge of road subject to a new planted edge. It is recommended existing overhead power lines be relocated underground, reducing skyline clutter.

Lighting

Additional lighting would be provided to this area commensurate with the upgraded road conditions including to the Western Harbour Tunnel Link interchange.

Figure 7-18 Existing view looking west along City West Link to The Crescent

Figure 7-19 Artist's impression at 12–18 months of operation from City West Link looking west to The Crescent

Figure 7-20 Artist's impression at 10 years of operation from City West Link looking west to The Crescent

Visual impact assessment

Table 7-43 Receptor location R3 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians/ cyclists	**Sensitivity to change: Low** This receptor location adjoins the upgraded City West Link about 100 metres east of the new intersection with The Crescent. The share pathway along the southern edge of City West Link has relatively low pedestrian activity due to the poor amenity afforded by its marginal separation from the busy road and narrow planting of low ground layer species. A greater number of cyclists would be expected to use this route, particularly those travelling to/from Anzac Bridge. Due to the transient nature of the receptor and the low quality of the existing view, the sensitivity of these receptors to the project is considered to be low.	**Magnitude of change: Moderate** The project would be highly visible from this location given the new elements introduced into the landscape. The motorway scale elements would be in contrast with the existing Rozelle Rail Yards landscape, and would be seen across the busy City West Link. At a viewing distance of about 100 metres, the taller elements of the land bridge and ventilation facility would be prominent features in this view. However, the project would have a highly functional and ordered landscape character, comprising architecturally well-considered design elements which would be readily appreciable by this receptor group, with low to moderate viewing duration.	**Moderate–Low**
Motorists	**Sensitivity to change: Low** Motorists travelling along this major arterial link would be on route as part of a longer journey, with the attention of drivers on the road rather than the surrounding environment. The road would be subject to a very high number of motorists on a daily basis, with view to the landscape elements fluctuating between fleeting in moving traffic, to brief views when stopped at traffic lights.	**Magnitude of change: Moderate** The magnitude of change would be similar to that described above for pedestrians/cyclists. The quality of this view would be likely to comprise a significant improvement over the existing view.	**Moderate–Low**

Table 7-44 Receptor location R3 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians/ cyclists	**Sensitivity to change: Low** The sensitivity of pedestrians and cyclists to project lighting is considered to be low given the provided lighting conditions would be typical for a major arterial road setting of this type.	**Magnitude of change: Moderate** The magnitude of change is considered likely to be Moderate when compared to existing lighting levels experienced by these receptors.	**Moderate–Low**
Motorists	**Sensitivity to change: Low** The sensitivity of motorists to project lighting is considered to be low given the provided lighting conditions would be typical for a major arterial road setting of this type.	**Magnitude of change: Moderate** The magnitude of change is considered likely to be Moderate when compared with the existing City West Link lighting levels in this location.	**Moderate–Low**

Receptor location R4 – View looking east along Lilyfield Road at corner of Foucart Street

Existing situation

This receptor location is situated on the corner of Foucart Street and Lilyfield Road looking east across the project site towards the city skyline. The existing view is shown on **Figure 7-21**. The view comprises:

- Lilyfield Road, which runs along the toe of the Rozelle valley side which is subject to dense, generally free-standing residential development
- Existing Rozelle Rail Yards and street trees along the southern side of Lilyfield Road in the foreground, which partially obscures and periodically removes views across the valley floor to the city skyline in the background
- Intermittent planting of small street trees along the northern edge of Lilyfield Road.

Due to the north–south orientation of the streets which run up the hill from Lilyfield Road, most dwellings would look out either onto these residential streets, or towards the back yards of adjoining housing. However, a substantial number of these dwellings have upper floors, from which views to the city skyline may be available, including to the White Bay Power Station. The view may also in some cases incorporate partial views of the Rozelle Rail Yards.

Project effects

The change in view from this receptor location is shown in **Figure 7-22** and **Figure 7-23**. The key project effects that would be visible from this receptor location are:

- The landscape of the new open space with share pathways, tree planting, and a reinstated rail gantry as part of heritage interpretation
- The three ventilation outlets, seen through a new street tree planting along the southern edge of Lilyfield Road.

Lighting

Additional lighting seen from this location would comprise share pathway lighting and potentially nodal lighting within the park and in the vicinity of the ventilation facility.

Figure 7-21 Existing view looking east along Lilyfield Road at corner of Foucart Street

Figure 7-22 Artist's impression at 12–18 months of operation from Foucart Street looking east along Lilyfield Road at corner of Foucart Street

Figure 7-23 Artist's impression at 10 years of operation from Foucart Street looking east along Lilyfield Road at corner of Foucart Street

Visual impact assessment

Table 7-45 Receptor location R4 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** This receptor location is located within less than 20 metres from the project. A small to possibly moderate number of residents within Foucart Street would be expected to have views from their dwellings, including from balconies, front porches, and possibly also from the back of some residences. Residents walking from the top of the hill south along their street would obtain substantial vistas along the street to the existing Rozelle Rail Yards and beyond to the city skyline. However, this is not considered to be an important or quality view in the context of the existing character of the rail yards and existing streetscape of Lilyfield Road. The duration of the view could be expected to be from a few minutes while strolling down the hill, to substantial periods of time, eg as residents sit on their balconies.	**Magnitude of change: Moderate** When looking south along Foucart Street, and where views are available to the project from residences, some elements of the project would be highly visible. The visible elements in the view include the ventilation outlets which are prominent given the young age of the soft landscape treatments. The view would be in contrast to the existing view of the Rozelle Rail Yards landscape, notwithstanding the substantial amount of vegetative cover to both settings. The project would by contrast provide a well-considered and visually inviting landscape. Once the soft landscape treatments have grown in height, the ventilation outlets would no longer be visible and the open space setting would dominant the view. This would provide an overall improvement in the quality of the view. However, given the highly oblique angle of the view to the ventilation facility relative to the alignment of Foucart Street, the number of residents that would have substantial views of it is considered likely to be Moderate.	**Moderate**
Motorists	**Sensitivity to change: Negligible** Motorists travelling along Lilyfield Road have limited and periodic views across the Rozelle Rail Yards. Travel and views along this local road would be part of a longer journey, with the attention of drivers primarily on the road rather than the surrounding environment. The road is subject to periodically high numbers of motorists on a daily basis. The existing view would be considered likely to comprise one of low quality. Within this context, the sensitivity of motorists to the proposed change is considered to be Negligible.	**Magnitude of change: Low** The project would be highly visible from this location given the 12–18 months maturity of the soft landscape treatments, including the street trees along the southern edge of Lilyfield Road. Given the scale of the project, much of this high quality landscape would be broadly appreciable by motorists when driving, notwithstanding the generally brief duration of these views. Within this context, the magnitude of change is considered to be Low.	**Negligible**

Table 7-46 Receptor location R4 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Negligible** The sensitivity of residents to project lighting is considered to be Negligible given that lighting within the project open space would be relatively limited, eg share pathway lighting and potentially nodal lighting at some activity locations. Lighting levels along Lilyfield Road would not be expected to significantly increase over those currently in place.	**Magnitude of change: Low** The magnitude of change is considered likely to be Low within the context of existing lighting levels in this location, ie there would be more lighting visible given the existing Rozelle Rail Yards landscape, but also taking account of the likely low number of residents that would have views of the open space from their residences.	**Negligible**
Motorists	**Sensitivity to change: Low** The sensitivity of motorists to project lighting is considered to be low given their need to concentrate on the road, and the relatively minor amount of lighting visible within the highly undulating project landscape.	**Magnitude of change: Low** The magnitude of change is considered likely to be Low within the relatively limited areas of lighting visible from Lilyfield Road which would be predominantly set at a similar level to the road.	**Low**

Receptor location R5 – View looking south from Easton Park to the project

Existing situation

This receptor location is situated about midway along the northern boundary within the heritage listed Easton Park, looking south to the project. Easton Park is surrounded to the west, north and east by a number of 1800s period homes, interspersed with contemporary dwellings. The park also includes a substantial playground to the east, and a community building and Sydney Water S170 heritage listed sewage pumping station set alongside Lilyfield Road. All of this area falls within the Easton Park Heritage Conservation Area. The park is bordered along its western and northern boundaries by mature fig trees.

The existing view is shown on **Figure 7-24**. The view comprises Easton Park and Lilyfield Road, adjoined by a light industrial area which comprises most of the backdrop to the park from this location. There are distant views toward Annandale and the vegetated Whites Creek corridor.

Project effects

The change in view from this receptor location is shown in **Figure 7-25** and **Figure 7-26**. The key project effects that would be visible from this receptor location are:

- The removal of industrial buildings and vegetation within and adjacent to the Rozelle Rail Yards
- The new ventilation facility and outlets, which will present a visually prominent feature in the view.

The ventilation facility would comprise a visually prominent feature of high bulk, scale and contrasting form within the landscape when seen from this central location within Easton Park, particularly given the limited height of intervening tree planting, as shown at 12–18 months into operation[3] (see **Figure 7-25**).

The facility can usefully be looked at in two parts, ie the long, horizontal north facing walls of the ventilation building, and the squat, vertical ventilation outlet elements. The walls sit below the skyline, and are seen against the well vegetated backdrop of Glebe. The ventilation outlets being of greater height, extend into the skyline. Future architectural detailing of the ventilation facility in conjunction with the tree planting in the foreground within the park, would potentially result in a moderate reduction in the visual prominence of these elements.

Once the horizontal elements of the building have visually receded, or over time been substantially screened by intervening tree cover, the vertical ventilation outlet elements would reduce in contrast with the landscape (see **Figure 7-26**). While still large structures, these elements are more readily able to be visually accommodated at this distance, given they take up a lesser proportion of the overall view.

Residents

Residents would be expected to have varying degrees of visibility of the project, with the following locations considered:

- Double storey dwellings on Lilyfield Road just prior to the corner of Denison Street. These dwellings are situated on elevated land and orientated towards the ventilation facility
- Residences along Denison Street, where many of those houses closest to the project would have highly oblique views towards the ventilation facility. This view would be increasingly obscured by a substantial stand of moderately tall spreading trees at the Denison Street corner of Easton Park. Views further north on Denison Street are generally confined to the immediate street frontage

[3] This view is taken from about midway along the northern boundary of Easton Park to provide a representative view towards the project. This has resulted in the western ventilation outlet being screened from view by the large spreading trees in the foreground.

- Residences on the northern side of Burt Street which, although screened by tree canopies, would have partial to full views of the ventilation facility. It is anticipated residences on the southern side of Burt Street are unlikely to have significant views to the ventilation facility due to the intervening park playground and a stand of tall trees along Lilyfield Road, with the exception of three to four residences which could potentially have views from their rear windows and back gardens
- Three dwellings facing onto Lilyfield Road near the corner of Burt Street would also be likely to have prominent views of the ventilation facility.

Park users

Users of Easton Park would primarily be considered likely to comprise:

- Active recreation pursuits such as school children and teachers at weekday sporting activities, and parents and children at weekend sporting activities
- Passive recreation activities such as walking the dog, walking through the park as part of a longer walk, and quiet contemplation.

Lighting

Additional lighting seen from this location would comprise share pathway lighting and potentially nodal lighting within the park and in the vicinity of the ventilation facility.

Figure 7-24 Existing view looking south from Easton Park to the project

Figure 7-25 Artist's impression at 12–18 months of operation looking south from Easton Park to the project

Figure 7-26 Artist's impression at 10 years of operation looking south from Easton Park to the project

Visual impact assessment

Table 7-47 Receptor location R5 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: High** Residential receptors would likely have prominent views to the ventilation facility from living spaces. Existing views to Easton Park, which is a heritage listed item, would be expected to be highly valued by many of these residents, with substantial viewing durations likely from living areas including front verandahs/porches.	**Magnitude of change: High** Views to the ventilation facility would range from unimpeded for a low to moderate number of residents, to partially obscured for a further moderate number of residents. The view of the ventilation facility would be in high to moderate level of contrast with that of the existing view, notwithstanding that much of this view would comprise new open space. The quality of the design outcome is expected to be High. The exception to this may be the ventilation facility, which although subject to well-considered architectural and urban design, may nonetheless be perceived by some residents as to have a contrasting bulk and scale, and subsequent visual prominence4. Most views from residential receptors would be from a similar level to that of the facility. The primary exception to this would be those few dwellings on Lilyfield Road west of Denison Street, which would potentially have an elevated view across the new open space and ventilation facility. All of these residents would be located within between 150 and 350 metres of the ventilation facility.	**High**
Active recreational users	**Sensitivity to change: Low** Active recreational users would generally be expected to be primarily focused on their competitive activity and team mates rather than their broader surroundings. Receptor numbers would be anticipated to be high, and undertaken over a period of one to three hours. Within this context, the sensitivity of these active recreational receptors to the proposed change in the view is anticipated to be Low.	**Magnitude of change: Moderate** The magnitude of change would be Moderate within the context of the removal of the adjacent industrial development, and its replacement with a high quality open space and the bulk and scale of the ventilation facility seen in the view.	**Moderate-Low**

[4] It is noted that these issues would be expected to have been substantially resolved once the instated tree planting had developed.

Receptor	Sensitivity	Magnitude	Rating
Passive recreational users	**Sensitivity to change: Moderate** Passive recreational users would be considered likely to take an interest in their surroundings and the quality of these. The number of receptors would be considered likely to be moderate, with the duration of viewing likely to be in the order of say 15 minutes up to an hour or two. Within this context, the sensitivity of these passive recreational receptors to the proposed change is considered to be Moderate.	**Magnitude of change: High** The magnitude of change would be High within the context of the removal of the adjacent industrial development, and its replacement with a visually prominent feature of bulk, scale and contrasting form located within the new open space.	**High–Moderate**

Table 7-48 Receptor location R5 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Negligible** The sensitivity of residents to project lighting is considered to be Negligible given that lighting within the project open space would be relatively limited, eg shared pathway lighting and potentially nodal lighting at some activity locations. Lighting levels within Easton Park and along Lilyfield Road would not be expected to significantly increase over those currently in place.	**Magnitude of change: Low** The magnitude of change is considered likely to be Low within the context of existing lighting levels in this location, ie there would be more lighting visible given the existing Rozelle Rail Yards landscape, but also taking account of the likely low number of residents that would have views of the open space from their residences.	Negligible
Active recreational users	**Sensitivity to change: Negligible** There would be a low number of receptors using the park at night. Within this context, the sensitivity of these active recreational receptors to the proposed change in the view is anticipated to be Negligible.	**Magnitude of change: Low** The magnitude of change is considered likely to be Low given lighting would be designed to fit within the landscaping of the open space and would be a low contrast with the existing view.	Negligible
Passive recreational users	**Sensitivity to change: Negligible** There would be a low number of receptors using the park at night. Within this context, the sensitivity of these passive recreational receptors to the proposed change in the view is anticipated to be Negligible.	**Magnitude of change: Low** The magnitude of change is considered likely to be Low given lighting would be designed to fit within the landscaping of the open space and would be a low contrast with the existing view.	Negligible

Receptor location R6 – View looking north from Glebe Foreshore Parklands to the project

Existing situation

This receptor location is situated at a formal lookout point on the foreshore of Bicentennial Park, which provides a representative view for recreational users of the Glebe Foreshore Parklands. This receptor location provides a sweeping panorama across Rozelle Bay from Annandale in the west, across the Rozelle valley side and Balmain to the north, through to Pyrmont Point in the east. The existing view is shown on **Figure 7-27**.

Figure 7-27 Existing view (panorama) looking north from Glebe Foreshore Parklands to the project

The existing view comprises:

- An extensive water element extending from the foreground in Rozelle Bay to the middle ground of the view in Johnsons Bay
- A working port edge along the north and west sides of Rozelle Bay, behind which the vegetated cover of the Rozelle Rail Yards is seen in conjunction with tree cover within the Whites Creek corridor and alongside City West Link
- A diverse range of features are seen in the background including the state heritage listed White Bay Power Station, the Glebe Island grain silos, Anzac Bridge, the historic Glebe Island Bridge, and Sydney Harbour Bridge (partial view)
- The Rozelle valley side and western end of the Balmain peninsula provides a modulated backdrop to this view, comprising substantial vegetation with an interspersed, variable cover of generally small housing and commercial elements.

Project effects

Most of the infrastructure elements of the project which are not screened by intervening working port edge facilities along the northern edge of Rozelle Bay would be visible from this location. This is due to the project being assessed at 12–18 months into operation, when landscape planting works are at an early stage of growth and provide limited screening capability. The key project effects that would be visible from this receptor location are:

- Land bridge crossing of City West Link, including connected pedestrian bridge crossing to the western side of The Crescent
- Ventilation facility and outlets
- Water treatment plant
- Shared pathway that runs across the western corner of Rozelle Bay
- New Victoria Road bridge crossing and associated intersection with City West Link in the vicinity of White Bay Power Station and approaches to Anzac Bridge.

The ventilation outlets in particular would be visually prominent from this location, particularly given the limited height of intervening tree planting. These elements would protrude into the skyline and comprise visually contrasting elements within the immediate vicinity of the project. However, within the larger setting as viewed from this receptor location, these new elements would be broadly congruent with other proximate, large infrastructure elements in the skyline, such as the White Bay Power Station chimney stacks, the Glebe Island grain silos, and the Anzac Bridge. The relative scales of these elements have previously been shown in **Figure 7-11**. The project would, however, seek to integrate the potentially visually prominent elements together with the improved setting afforded by the new open space.

Lighting

Additional lighting seen from this location would comprise: street lighting to City West Link, including the intersection with The Crescent and the intersection with Victoria Road, and to the Anzac Bridge approaches; the land bridge/pedestrian bridge and associated ramps and steps; the share pathway at the western corner of Rozelle Bay and potentially nodal lighting at activity locations within the park.

Visual impact assessment

Table 7-49 Receptor location R6 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Passive recreational users	**Sensitivity to change: High** Passive recreational users of the open space are likely to be there for prolonged periods of time, and in high numbers, particularly on weekends. They can be expected to take a high level of interest in their surrounds, including the extensive view from the bayside edge of the open spaces. This is considered to be an important view within the context of the surrounding receptor catchment of densely populated suburbs, with views often enclosed, and dominated by narrow, busy streets. Additionally, the view is considered to be one of high quality within the context of the large, open and well maintained open space environment where it occurs, the extensive harbour element of the view, and the visually interesting combination other infrastructure and landscape elements (including port infrastructure, vegetated suburbs, White Bay Power Station, and Anzac Bridge). Visual receptors can be expected to be sensitive to the introduction of additional large, and visually prominent elements into the view.	**Magnitude of change: Moderate** The project would be visually prominent due to introduction of motorway infrastructure including the ventilation facility, land bridge and associated pedestrian bridge, and to a lesser extent the elevated carriageway of City West Link and the Victoria Road bridge. The visual prominence is in part due to limited screen planting along the southern edge of this part of the project. The ventilation outlets would comprise contrasting elements within the immediate context of the Rozelle Rail Yards. However, within the overall extent of this view, and due to the distance of the receptor from the project (in the order of 500 metres), it is considered that the landscape has the capacity to visually accommodate these elements particularly in the context of proximate elements such as the White Bay Power Station, Glebe Island grain silos and Anzac Bridge. In addition, these elements would be viewed within the context of an extensive open space setting, including the well vegetated backdrop of the Rozelle valley side, with the ventilation outlets seen as an integral component of the larger open space composition.	**High–Moderate**
Active recreational users	**Sensitivity to change: Low** Active recreational receptors are considered less likely to pay attention to their surrounding environment when compared to passive recreations users, given their primary focus would be on their active pursuit, eg cricket, football and running.	**Magnitude of change: Moderate** The magnitude of change is considered to be the same as for passive recreational users.	**Moderate–Low**

Table 7-50 Receptor location R6 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Passive recreational users	**Sensitivity to change: Low** The number of recreational receptors using the parkland at night is considered likely to be low. Within the context of the viewing distance, the breadth of the view, and illuminated elements within it including Anzac Bridge, and the nature of views across the harbour at night with reflections on the water, these receptors would be considered likely to have a relatively low level of sensitivity to the proposed level of increased lighting.	**Magnitude of change: Moderate** The magnitude of change is considered likely to be moderate given that City West Link and the approaches to Anzac Bridge already constitute major arterial roads with associated lighting levels. The extent and nature of lighting within the project open space is considered likely to be moderate to low with its focus on pedestrian and cyclists, notwithstanding the previously 'dark' setting of the derelict rail yards.	**Moderate–Low**
Active recreational users	**Sensitivity to change: Negligible** The number of recreational receptors using the parklands at night is considered likely to be low, with these receptors focussed on their active pursuit, eg running.	**Magnitude of change: Moderate** The magnitude of change is considered to be the same as for passive recreational users.	**Low**

Receptor location R7 – View looking north from Rozelle Bay Light Rail Stop to the project

Existing situation

This receptor location is situated on the west travelling platform close to the entry from Bayview Crescent. The existing view is shown on **Figure 7-28**. The view looks into the canopy of trees within Buruwan Park, which is set some six metres below the station. There is no view available through the canopy looking from this location. Buruwan Park is situated between City West Link, The Crescent, and the light rail corridor.

Project effects

The change in view from this receptor location is shown in **Figure 7-29** and **Figure 7-30**. The key project effect that would be visible from this receptor location is the upgrading of the intersection of The Crescent and City West Link. This upgrade would require the removal of Buruwan Park, and all of the adjacent vegetation between Whites Creek and City West Link. This would have the effect of removing the existing screening between the station and the project, opening up views to City West Link, the land bridge crossing of City West Link, pedestrian bridge crossing of The Crescent and the ventilation outlets. However, it would also open up views to Rozelle hillside, Balmain industrial area and the White Bay Power Station, and the city skyline, which were not previously available.

A key element of this change in view is that the extent of the project would make it highly unlikely that tree cover could be reinstated to this area, and consequently, this temporal duration of this change would be long-term.

Light rail patrons

Light rail patrons would have partial views of the project and panoramic views across the broader landscape.

Residents

Some residents upslope of the light rail stop in Bayview Crescent would be likely to have partial views of the project. The extent of views to visible elements would be highly variable, ranging from glimpse/filtered views through the substantial tree cover present across much of the residential hillside, to substantial views, albeit obtuse views to the ventilation facility from elevated locations looking over intervening development.

Pedestrians

There is potential for views of the project from residential streets including Bayview Crescent, Annandale Street, Breillat Street, and Pritchard Lane. These streets have the potential to provide substantial framed views of the project, and the ventilation facility and outlets in particular, as a result of the loss of the trees adjoining the light rail stop.

Lighting

Additional lighting seen from this location would be high, primarily comprising road lighting from the Iron Cove Link interchange, and intersection of The Crescent and City West Link, including light from vehicle headlights travelling east on City West Link. Other likely additional nearby lighting sources would include that to both the land bridge crossing of City West Link, and pedestrian bridge crossing of The Crescent. The lighting poles to the adjoining motorway would be assumed to be in the order of 10–12 metres high, with the luminaires therefore sitting about four to six metres above the light rail stop platform level.

Figure 7-28 Existing view looking north from Rozelle Bay light rail stop to the project

Figure 7-29 Artist's impression at 12–18 months of operation looking north from Rozelle Bay light rail stop to the project

Figure 7-30 Artist's impression at 10 years of operation looking north from Rozelle Bay light rail stop to the project

Visual impact assessment

Table 7-51 Receptor location R7 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Light rail patrons	**Sensitivity to change: Moderate** The Rozelle Bay light rail stop would be used by local Lilyfield and Annandale residents, primarily for commuting to and from work, although a significant number of people would also use it on weekends. The importance of the existing view is low. The quality of the existing view is considered to be Moderate, within the context of what is a quiet, well vegetated, visually enclosed setting.	**Magnitude of change: High** The project would open up views to new infrastructure elements introduced by the project such as the ventilation outlets and land bridge. Visibility would be high due to the elevated location. The quality of the design outcome however would be expected to be significant and could reduce the degree of contrast with the existing view. Relatively extended wait times on the station platforms would provide substantial time for this receptor group to appreciate an extensive view of the project, which would be seen from a close range with the land bridge at a distance of about 60 metres. Views would be opened to the city skyline at a distance of about three kilometres, and include other features in between.	**High–Moderate**
Residents	**Sensitivity to change: High** Some residents upslope of the Rozelle Bay light rail stop would have variable views to the project, ranging from glimpse/filtered views through the extensive tree cover present across much of the residential hillside, to substantial, albeit obtuse views to the ventilation facility from elevated locations looking over intervening development, as described above. The number of residential receptors with some level of view to the project is considered likely to be moderate to high. However, the number of residents likely to have substantial views of the project from living areas within their residences is considered likely to be moderate to low. The quality of the existing view would vary from: low, eg looking into a close, relatively dense canopy of vegetation; through to high, eg a view looking east from Bayview Crescent across Rozelle Bay to Anzac Bridge and the city skyline beyond. This is considered to be a view of High importance, particularly to those residents adjoining it.	**Magnitude of change: Moderate** The extent of visibility of the project would be highly variable and can be grouped as follows: • High visibility of the project from a few locations along Johnston Street and Bayview Crescent which may view a coverage of the project infrastructure elements, noting that this view would be seen at an oblique angle. These locations have a moderate degree of contrast due to other infrastructure elements in the field of view, moderate to high duration of viewing, and would be in the order of 200 to 300 metres from the project • Moderate to low visibility of the project from locations along Buruwan Lane, Kentville Avenue and Weynton Street that may have a partial view of the project, most often incorporating the ventilation facility. These locations have a moderate degree of contrast due to other infrastructure elements in the field of view, low duration of viewing, and would be in the order of 200 to 400 metres from the project (up to 700 metres from the open space extent) • Low visibility of the project from a few locations along Pritchard	**High–Moderate**

Receptor	Sensitivity	Magnitude	Rating
		Street and Breillat Street that would potentially be subject to glimpse/partial views, or views filtered by vegetation of the ventilation facility. These locations have a high degree of contrast due to (in most cases) no significant visual reference to major infrastructure other than the project, low duration of viewing and would be in the order of 200 metres to the project. Within the context of the above, the magnitude of change arising from the project for residents upslope of the Rozelle Bay light rail stop is considered to be Moderate, drawing particularly on the moderate to low number of residences with 'high visibility', and associated degree of contrast, duration of viewing and distance to the view.	
Pedestrians	**Sensitivity to change: High** There is potential for views to project infrastructure from: Bayview Crescent; Annandale Street, Breillat Street; and Pritchard Lane. These receptors would in many cases be walking along these streets either on their way to the light rail stop for work or other destination. Where the purpose of the walk is work/destination focused, the sensitivity of the receptor would be considered moderate within the context of the attractive environment. Where the purpose is for recreation, the sensitivity of the receptor to changes in the view would be considered to be high, with the number of receptors being moderate to potentially high. The quality of the existing streetscape view is High, as is the importance of these views, given that all of these streets are located within the Annandale Heritage Conservation Area.	**Magnitude of change: High** The extent of visibility of the project would in most cases be likely to be limited to the ventilation facility and outlets. The distance to the views would be in the order of 150 to 450 metres, meaning the ventilation outlets would be seen in a considerable level of detail. The duration of the view could be extended: given the lengths of those parts of the streets from which the view was available; and the speed at which the receptor was walking, or potentially ambling. The temporal duration of the change in view would potentially be long-term.	**High**

Table 7-52 Receptor location R7 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Light rail patrons	**Sensitivity to change: Low** The light rail stop is currently a relatively low light setting at night, generally well screened from Bayview Crescent (local road), and City West Link and The Crescent. The assumed extent and intensity of additional lighting would be considered likely to be high. The type and number of receptors is as described in **Table 7-51**. The sensitivity workers returning home after dark to the increased lighting levels is considered likely to be Low, given this would be a regular/daily occurrence during the working week, from which sensitivity to increased lighting levels would soon diminish.	**Magnitude of change: High** The current relatively low light/local light rail stop character would change to one of a primary public transport link with the new open spaces, with assumed high light levels primarily associated with the adjoining motorway infrastructure. However, as with the daytime views of project infrastructure, the pedestrian bridging structures and associated lighting effects would be the subject of well-considered urban design inputs. Moderate areas of the motorway interchange would be screened from view by the parapets to the bridge deck.	**Moderate**
Residents	**Sensitivity to change: High** A moderate and potentially high number of residential receptors would have direct visibility of what would be anticipated to be a significant increase in road lighting levels associated with the project, particularly at the intersection of the Western Harbour Tunnel portals, City West Link, and The Crescent. Additionally, the extent of screening vegetation along the southern edge of City West Link between the intersection with James Craig Road and midway between the Victoria Road intersection and the approaches to Anzac Bridge would be considerably reduced, potentially resulting in increased headlight glare from traffic. These increased levels of lighting would be visible from the living areas of some of the above 'high visibility' dwellings. The quality of the night-time district views from residences (where available) would be considered likely to be moderate to High. Residents within the 'low visibility' areas at the northern end of Bayview Crescent, Pritchard Street, Breillat Street and Railway Parade could be subject to a less direct, but nonetheless pervasive or prominent 'glow' effect through the limited remaining screening vegetation between them	**Magnitude of change: High** The extent of increased night lighting visible to residential receptors could be High for the above stated reasons, resulting in moderate to high levels of night-time contrast with the existing views. These increased lighting effects would be located within 50–60 metres of many residential receptors along the lower end of Bayview Crescent and much of Railway Parade. The elevated location of many of these residential receptors would cause a relative increase in seen lit areas, ie looking from above, across the road surface in three dimensions, compared for instance with views from Glebe Foreshore Parklands, which would be at or below the level of much of the above described lighting, and therefore see in elevation, ie in two dimensions. The duration of viewing from many of the above described 'low visibility' residences would generally be expected to be low, given that many of them may not have night-time views to the above major intersection from living areas, or where they did these would be inside and therefore generally lit, rather than from an unlit outdoor living area such as a balcony or verandah where a night-time view could be readily appreciated.	**High**

Receptor	Sensitivity	Magnitude	Rating
	and the intersection. In both cases, the temporal duration of any effect would be long-term.		
Pedestrians	**Sensitivity to change: Moderate** Pedestrians at this receptor location experience low level street lighting, light from the light rail stop and nearby busier roads including The Crescent. The number of pedestrian receptors at night time are expected to be low and with limited duration. The sensitivity of pedestrians to the introduction of a potentially high or even moderate point source of high light levels could be expected to be high, especially where seen from multiple locations. Were this view to be available, it would be in strong contrast to the generally well screened, low light suburban environment of Annandale.	**Magnitude of change: High** Lighting effects from the project on pedestrians would potentially be most likely to occur when walking at night. The views along Annandale Street, Breillat Street and Pritchard Lane would be aligned with the Rozelle interchange with City West Link and The Crescent, the likely primary focus point for increased light intensity arising from the project. Depending on the extent of visibility of this area resulting from project related tree loss, the view could comprise: an unobstructed terminus view of the interchange area, including parts of the land bridge and pedestrian bridge, or moderately or highly filtered views through intervening street trees, and/or garden trees of the well-lit motorway interchange. The distance to the views would be in the order of 100–400 metres. The magnitude of change in this case would relate to the introduction of a bright point source of light within an intrinsically low light suburban, heritage landscape setting.	**High-Moderate**

Iron Cove Link

Proposed operational infrastructure and the operational landscape design approach at Iron Cove Link is described in **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS. **Figure 7-31** shows the operational layout of the site and the representative visual receptor locations assessed.

General arrangement/landscape setting

The project would commence from the eastern approaches to Iron Cove Bridge, widening to contain four Iron Cove Link eastbound and westbound lanes with associated portals and retaining walls, and a further three lanes either side of these comprising through lanes for Victoria Road, the outer lanes of which would be bus lanes. East of Toelle Street, the widened carriageway would gradually realign with the existing Victoria Road alignment at Springside Street.

- Retaining walls located at the southern edge of part of the Victoria Road corridor and adjacent to the Iron Cove Link portals
- Widening of the road carriageway comprising areas of both hard landscape and soft landscape works to centre median areas east of Toelle Street and along the southern side of Victoria Road
- The verge south of Toelle Street would be grade separated from the Victoria Road westbound carriageway
- The pedestrian environment along the northern side of the project would be retained as is, maintaining the existing exposed, low amenity character of this pedestrian edge. Existing vegetation along this edge would also be retained
- The ventilation building would be located on the southern side of Victoria Road, between Springside Street and Callan Street, with the associated substation located on the western corner of Callan Street. The ventilation building would be about 10 metres high, and would incorporate a buffer tree planting between it and adjoining housing. The substation would be about four metres high
- The ventilation outlet would be located east of Terry Street, within a central median area. It would be 20 metres high. An early stage landscape setting including trees (12–18 months into operation) would be in place along the western, southern and northern edges of the ventilation outlet, in addition to an adjacent larger centre median area adjoining the eastern edge of the portals. The long north facing wall of the outlet would be subject to a narrow, low shrub/ground layer planting
- Land along the southern boundary of the project used for an active transport link and landscaping areas subject to UDLP.

There would be localised significant changes in level at the proposed turning head at the end of Clubb Street in the order of three metres, and about a four metre change in level between the Clubb Street and Byrnes Street turning heads. Design issues addressing these changes in level would be addressed in an integrated manner with architects and urban designers in conjunction with determining land uses for remaining project land.

Bioretention facility

A bioretention facility would be located within King George Park at Manning Street in the location of an existing informal car parking area. The bioretention facility would be the subject of an urban design process, integrating the structure within a formalised car parking arrangement that would incorporate landscape planting. The bioretention facility would be of a broadly triangular form, and have relatively low retaining walls. It would normally be dry, only filling with stormwater during rain events. No trees would be removed as part of this work.

Noise walls

Noise walls may be required along/within the vicinity of the southern boundary of the project, ranging between about four metres and five metres high, subject to detailed design. If required, the location of any noise walls would be assessed in a future stage of the project (note: noise walls are not shown on **Figure 7-33** or **Figure 7-34**). Noise walls are one of a number of noise mitigation options being considered including road pavement treatments and architectural treatments of properties. The preferred noise mitigation options would be determined during detailed design.

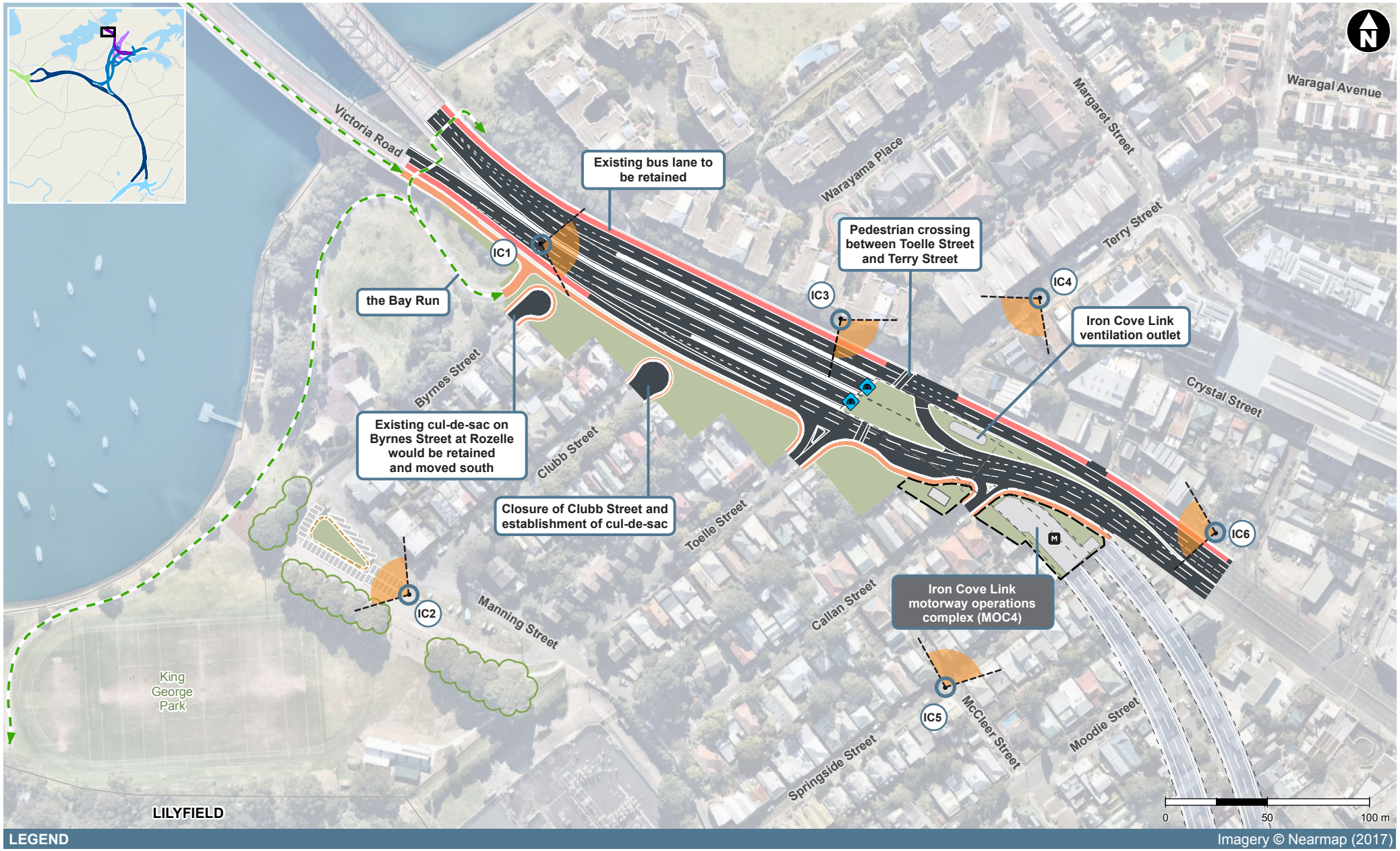


Figure 7-31 Iron Cove Link operational receptor locations

Receptor location IC1 – View looking east along Victoria Road from near Iron Cove Bridge

Existing situation

This receptor location is situated at the turn point of the Bay Run where it leaves Iron Cove Bridge and loops into King George Park. The existing view is shown on **Figure 7-32**. The view comprises the busy Victoria Road adjoined by dense low rise development along its western end (Balmain Shores), a mix of commercial and institutional development to the eastern part of the road corridor, and freestanding housing fronting the southern edge of Victoria Road.

The view terminates at the ridgeline along Darling Street, and which is seen against the skyline. Tree cover is concentrated in discrete locations along the road corridor, with key locations at: the frontage of the Balmain Shores apartments to left of frame; the south-west corner of Terry Street; and the Chapel Hill Estate and Rozelle Public School at the top of the hill, near the corner of Darling Street.

Project effects

The change in view from this receptor location is shown in **Figure 7-33** and **Figure 7-34**. The key project effects that would be visible from this receptor location are:

- Widening of Victoria Road and new tunnel portals
- The ventilation building and outlet visible beyond the new tunnel portals
- Substation building which may be visible during early stages of the project before screen planting is well established.

Lighting

Additional light would be introduced to this area during operation associated with the increased extent of road infrastructure including dive structures and increased headlight glare from vehicles exiting the Iron Cove Link portal. Project lighting would include cut-off fittings and would be directed to reduce light trespass. The extent of glare emanating from the new lighting towards the Balmain Shores residential development is likely to be moderately reduced by the existing dense planting along the frontage of this development.

Figure 7-32 Existing view from Victoria Road near Iron Cove Bridge looking east

Figure 7-33 Artist's impression at 12–18 months of operation from Victoria Road near Iron Cove Bridge looking east

Figure 7-34 Artist's impression at 10 years of operation from Victoria Road near Iron Cove Bridge looking east

Visual impact assessment

Table 7-53 Receptor location IC1 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** Residents impacted by the project would primarily be limited to those within Balmain Shores fronting onto the project given their close proximity and elevated viewing level. These residents would have filtered views to the project. Most of these apartments are oriented away from Victoria Road to face the water. However, this receptor location is anticipated to have a moderate number of residential receptors facing southward toward the project, but with an existing low quality view. It is expected that the existing view would afford a moderate level of change within the context of the existing busy road.	**Magnitude of change: Moderate** The project would on average be moderately to highly visible from the Balmain Shores apartments with some views obscured by intervening trees. The project would also be seen from elevated locations, in particular the new tunnel portals, retaining walls, and kerbside bus lanes. However, the scale of the project is broadly consistent with the existing situation, and viewing duration would be expected to be low. The view would comprise a moderate contrast to the existing view, but characterised by well-considered design, and incorporating a much improved streetscape backdrop. The nature of future development of remaining project land to the southern side of the project is not known at this time, and would be determined as part of the UDLP developed in consultation with the local council.	**Moderate**
Pedestrians	**Sensitivity to change: Low** Pedestrians impacted by the project are likely initially to be relatively low in number given that where alternative routes could be taken, eg to walk to Darling Street using back streets or utilising the Bay Run, it is unlikely pedestrians would choose to walk alongside the project. The exception to this would be people catching buses, predominantly related to work travel.	**Magnitude of change: Moderate** The project would be broadly contextual with the existing road corridor in terms of scale and character, and visually prominent from this location given the limited tree growth that would have occurred within the 12–18 months old streetscape and centre median plantings, since the opening of the project. The ventilation outlet building and the nearby ventilation outlet would both be seen projecting above the skyline from this location with a viewing distance of about 250 metres. The southern edge of the project would be subject to a substantial streetscape planting including separation between cycleway and pedestrian flows, with these areas predominantly set well above Victoria Road. This area has the potential to become part of a locally preferred pedestrian route. The pedestrian environment along the northern side of the project would be retained as is, maintaining the existing exposed, low amenity character of this location.	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
Recreation	**Sensitivity to change: Moderate** The quality of the existing view of Victoria Road is low. The view of the project would be seen by people actively running/jogging or passively walking or cycling the Bay Run for a moderate period of time when travelling west across Iron Cove Bridge towards the project. Passive users of this facility in particular could be expected to take some interest in this view given: the potentially visually interesting elements of the Iron Cove Link portals when seen from this location; and the ventilation outlet projecting well above much of the surrounding development, all set within the substantial landscape elements of the project. People travelling in the opposite direction from King George Park would come upon the view quite suddenly, and then turn away as they rounded the looping pathway towards Iron Cove Bridge. The sensitivity of the active recreational receptors can be expected to be relatively low given their primary preoccupation on their jogging/running/cycling, but that of passive receptors to be moderate, notwithstanding the context of the project within the longer journey they are taking, and the range of competing available views, eg west along the harbour and towards the Sydney College of Arts site. The number of both active and passive recreational users would be expected to be Moderate to high on weekends.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate, within the context of the: works being undertaken within an existing busy road corridor; moderate level of contrast with the existing situation, including substantial streetscape and centre median planting outcome; the moderate duration of viewing as recreational users approached the project from the west, and anticipated application of refined architectural, urban design for the project.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** Motorists travelling east towards the project would predominantly be doing so as part of the weekly commute to or from work, with these receptors focusing on the road, and the view of the project comprising a small part of a longer journey. Passengers in public transport and cars would be expected to have a moderate level of sensitivity to the project given the generally limited opportunity to view anything other than the passing road corridor landscape once they have crossed Iron Cove Bridge. Cyclists would be expected to be travelling towards the project both as part of a weekly commute, and also for recreation on weekends, and would be expected to be focussing on share path foot and cycle traffic. The number of these visual receptor types is broadly considered to be high seven days a week. The quality of the existing view to the project from Iron Cove Bridge is low specific to the project area, but moderate to high with the broader context of the views to Iron Cove and Callan Park.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate, within the context of the works being undertaken within an existing busy road corridor, the relatively brief viewing duration and anticipated refined architectural, urban design of the project.	**Moderate–Low**

Table 7-54 Receptor location IC1 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** The sensitivity of residents to lighting for the portals and widened carriageway is considered to be Moderate within the context of the motorway interchange setting, but acknowledging they are already located adjacent to a relatively well-lit, major arterial road.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate with the context of potentially increased lighting levels from traffic and anticipated well directed lighting including light spill cut-off measures.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be Low within the context of the motorway interchange setting.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate, given that reductions in glare from lighting on the southern edge of the project would not occur immediately, but would gradually improve as tree and understorey planting matures, filtering light intensity to pedestrian areas. Light intensity on the northern edge of the project would not reduce for pedestrians between Iron Cove Bridge and Terry Street due to no street tree planting being proposed along this edge of the project.	**Moderate-Low**
Recreational	**Sensitivity to change: Low** The sensitivity of recreational Bay Run receptors to additional lighting is considered to be Low within the context of the motorway interchange setting.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate given the motorway interchange can be expected to be noticeably more brightly lit than the existing situation for the reasons discussed above.	**Moderate–Low**
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** The sensitivity of motorists/public transport users and cyclists to additional lighting is considered to be Low within the context of the motorway interchange setting.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate given the motorway interchange can be expected to be noticeably more brightly lit than the existing situation for the reasons discussed above.	**Moderate–Low**

Receptor location IC2 – View looking west from Manning Street towards bioretention facility

Existing situation

This receptor location comprises an informal car park setting located adjacent to Manning Street within King George Park. The existing view is shown on **Figure 7-35** and **Figure 7-36**. The view comprises:

- an athletics field in the far left of frame with night lighting set against the well vegetated edge of Callan Park, and seen through a row of mature Tallowwood trees (*Eucalyptus microcorys*)
- an informal car parking area with views of the Bay Run and Iron Cove with a glimpse view of Drummoyne in the background
- double-storey residences overlooking the car parking area and King George Park.

The car park is primarily utilised during weekends and potentially some weekday evenings for local sporting events. It is also potentially used by people driving to use the Bay Run or the nearby bayside playground.

The car park is directly overlooked from three residences opposite on Manning Street, located on the 'no through road' end of the street, which intersects with Byrnes Street. Each of these residences have outdoor living areas that overlook the site. These are likely to be connected with indoor living spaces that share the view.

Project effects

A bioretention facility would be located to the centre of the car park as shown in **Figure 7-37**. Project effects would comprise, subject to detail design:

- A formalised composition of bioretention facility and parking situated within a well-considered landscape setting
- The basin being planted to a generally low cover of native grasses and shrubs
- A potential 'hardening' of the currently grassed setting with additional hardstand, marked parking areas.

The project would be unlikely to be visually prominent from the Bay Run, with users more likely to be interested in closer views to King George Park, Iron Cove or the adjoining children's playground.

Lighting

There would be no additional lighting proposed for this part of the project, subject to detail design.

Figure 7-35 Existing view from near corner of Manning Street and Clubb Street looking west

Figure 7-36 Existing view from near corner of Manning Street and Clubb Street looking west

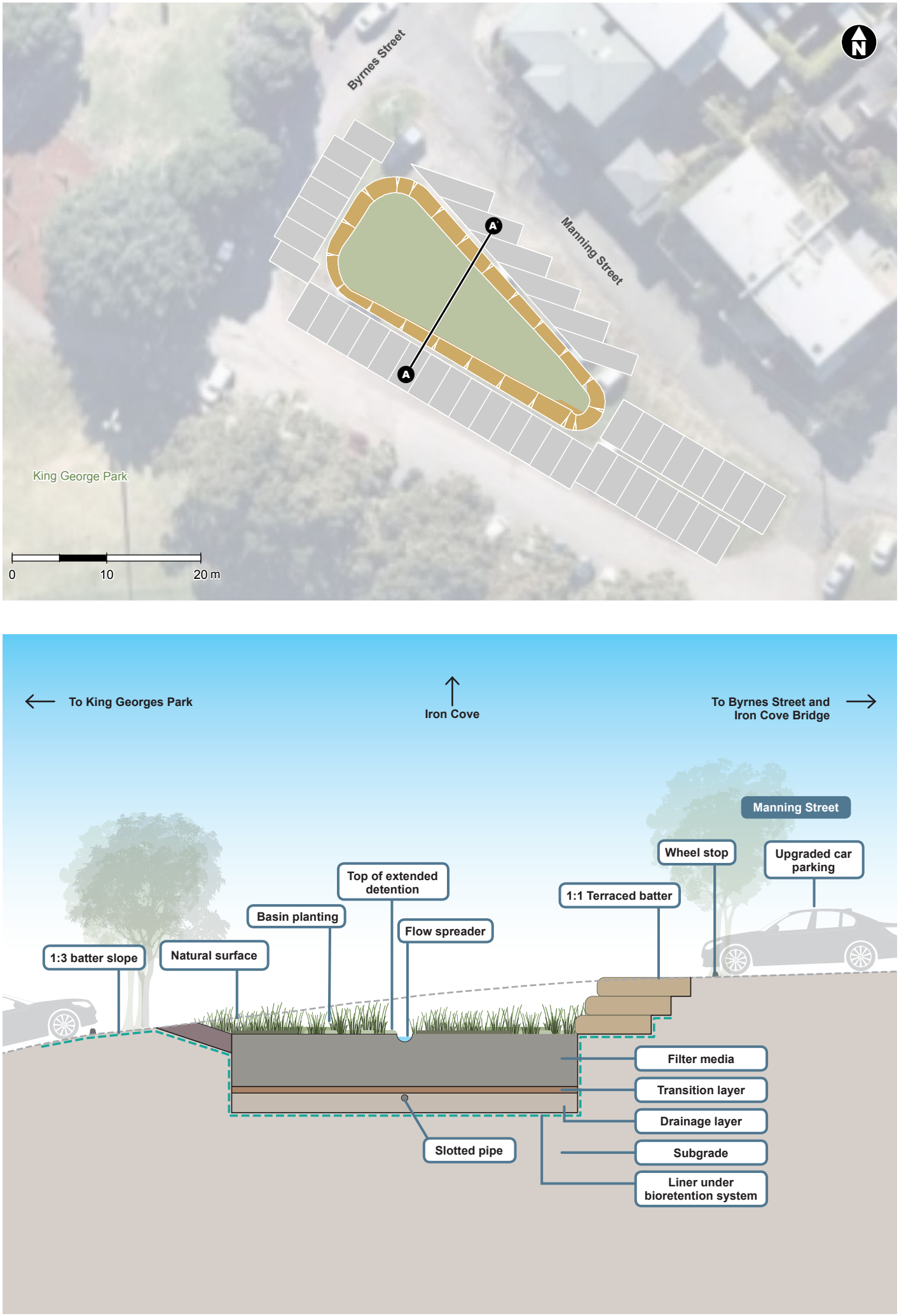


Figure 7-37 Indicative layout of the bioretention facility at Manning Street at Rozelle

Visual impact assessment

Table 7-55 Receptor location IC2 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** Residents impacted by the project would primarily be limited to those directly opposite the project. Overall, the view comprises a relatively soft 'green' outlook that could be expected to be valued by these residents. The number of receptors is considered likely to be low to moderate. The quality of the existing view is considered to be moderate to high. An oblique view would be available to the project from the front of the duplex residences on the eastern corner of Clubb Street.	**Magnitude of change: Low** The project would comprise a change in scale, with the planted basin area being in the order of 150 square metres. However, it would sit low within the landscape. The project would be broadly visually congruent with nearby areas such as the landscape setting of the bayside children's playground, and subject to well-considered urban design inputs and landscaping. The project would be seen from substantial outdoor living areas in addition to likely indoor living areas within the elevated residences, and orientated to the project. Within this context the project could be expected to be viewed over considerable periods of time.	**Moderate-Low**
Recreation	**Sensitivity to change: Moderate** Recreational users of the car parking area adjoining the project would be expected to include: • Parents and children attending sporting activities, or visiting the children's playground • People driving to use the Bay Run • Potentially owners of the moored boats in the adjacent embayment. The number of these receptors would be considered likely to be moderate to high, although their usage of the parking would be periodic, eg weekends, and potentially during the week before and after work. Other recreational users of the area include users of the Bay Run, who comprise very high numbers, but who would be unlikely to have a prominent view of the project at this location.	**Magnitude of change: Low** The project would be highly visible for these receptors using the adjoining parking facilities, and have low visibility when viewed from the Bay Run. The size of the bioretention facility is moderate within the context of the central informal parking area. However subject to urban design, the character of the development is considered have capability for a good visual 'fit' within the surrounding environment. The project would not significantly obstruct views of any features for this receptor.	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Moderate** Pedestrians who would pass along Manning Street would generally comprise local residents walking to the water's edge from nearby streets. The number of these receptors would be considered likely to be moderate, with frequent usage including weekends, weekday afternoons and evenings. However, the view of the project would comprise one small part of a potentially much longer walk.	**Magnitude of change: Low** The project would be visible for this receptor. The size of the bioretention facility is moderate within the context of the central informal parking area. However subject to urban design, the character of the development is considered have capability for a good visual 'fit' within the surrounding environment. The project would not significantly obstruct views of any features for this receptor.	**Moderate–Low**

Receptor location IC3 – View looking east along Victoria Road near Terry Street

Existing situation

This receptor location is situated about 30 to 40 metres west of Terry Street. The existing view is shown in **Figure 7-38**. The view comprises a busy arterial road adjoined by 'Balmain Shores' apartments, free standing residential development across the road, and a mix of commercial and institutional development beyond Terry Street. The view terminates at the Darling Street ridgeline, which is seen as part of a skyline view.

Project effects

The change in view from this receptor location is shown in **Figure 7-39** and **Figure 7-40**. The key project effects that would be visible from this receptor location are:

- Iron Cove Link portals
- Ventilation outlet within the centre median strip, east of Terry Street, and ventilation building immediately adjacent to the southern carriageway between Springside Street and Callan Street, and substation building to the western corner of Callan Street
- Retention of existing kerb line on the northern carriageway, including the existing footpath and planted vegetation
- New landscape treatments including substantial tree cover to centre medians east of the portals and along the southern edge of the project.

The ventilation outlet would comprise a dominant, feature of the view from this location, set within the broad expanse of the carriageway, projecting above the skyline, from close proximity, and in contrast to the adjacent lower dense residential and commercial development. The ventilation outlet building in the background would also exhibit many of the same characteristics, but to a substantially lesser degree. It is noted that the visibility of the ventilation and substation facilities would be expected to gradually recede with the maturing of project tree planting.

The character of the corridor would change from that of a relatively narrow, busy arterial road set tightly between commercial development and a range of contemporary and period housing, to that of a wide motorway interchange with portal dive structures/arterial road, subject to changes in level within the vicinity of the portals with associated retaining walls.

Lighting

Some additional light would be introduced to this area during operation associated with the increased extent of road infrastructure including nearby dive structures. Project lighting would include cut-off fittings and would be directed to reduce light spill. The extent of glare emanating from the new lighting towards the Balmain Shores residential development is anticipated to be moderately reduced by the existing dense planting along the frontage of this development. Over time, the existing freestanding residences located in the streets running off/close to Victoria Road would be subject to a minor reduction in increased glare due to proposed tree planting along the footpath/public domain edge.

Figure 7-38 Current view from Victoria Road near Terry Street looking east

Figure 7-39 Artist's impression at 12–18 months of operation from Victoria Road near Terry Street looking east

Figure 7-40 Artist's impression at 10 years of operation from Victoria Road near Terry Street looking east

Visual impact assessment

Table 7-56 Receptor location IC3 visual impact assessment – pedestrians

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** This receptor location incorporates no street tree planting or other soft landscape interventions, is highly exposed to the busy roadway, and constitutes an element of low visual quality within this context. The number of receptors would be likely to be low given that pedestrians would be expected to choose other quieter, more attractive routes where available.	**Magnitude of change: Moderate** The change in view would: • Comprise an increase in the size and scale of Victoria Road, including the addition of: further traffic lanes; large auxiliary infrastructure elements comprising the ventilation outlet, ventilation building and substation • Remove the existing commercial and residential buildings along the southern edge of Victoria Road, replacing these with a well-considered streetscape edge, and perception of a more open corridor • Be in moderate visual contrast to the existing situation given the context of the existing major arterial road setting • Be subject to well-considered landscape architectural and urban design inputs, in contrast to the current built form along much of the southern edge of the existing road corridor.	**Moderate–Low**
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** Motorists and cyclists travelling east towards the project would predominantly be doing so as part of the weekly commute to or from work, with these receptors focussing on the road, or for cyclists the pedestrian/bicycle shareway. Passengers in public transport and cars would be expected to have a low level of sensitivity to the project given the opportunity to view it, taking in increased levels of detail over time. For both of these sub-groups, the project would comprise a small part of a longer journey.	**Magnitude of change: Moderate** The scale and character of the project would be different to that existing within the context of: • The moderately increased width of the carriageway • The large interventions of the ventilation outlet and the substation, each of which would comprise visually contrasting elements within the context of the surrounding built form • The positive perception of increased openness and visual relief within the corridor created as a result of the proposed landscaping along the southern edge of the road • The consistent, well-considered design approach would be applied to all project elements. All of these elements would be seen over short to moderate periods of time.	**Moderate–Low**

Table 7-57 Receptor location IC3 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be low given that: • It is anticipated to be at similar levels to that currently in place at this location • Likely low to potentially moderate number of pedestrians walking along Victoria Road at night, other than early evening with commuters alighting from buses after work.	**Magnitude of change: Low** The magnitude of change is considered to be low given the portals would have been passed at this point, and as a result the intensity of lighting levels would be expected to be similar to those currently in place.	**Low**
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** The sensitivity of motorists/public transport users and cyclists to additional lighting within the carriageway is considered to be Low, given: • The lighting levels would be similar to other motorway interchange settings • The lighting would highlight the interchange as a different space within the road corridor, with refined architectural and urban design detailing associated with elements such at retaining walls, portals and streetscape improvements.	**Magnitude of change: Low** The magnitude of change is considered to be low given the portals would have been passed at this point, and as a result the intensity of lighting levels would be expected to be similar to those currently in place.	**Low**

Receptor location IC4 – View looking south along Terry Street towards project

Existing situation

This receptor location is situated about 50 metres north of Victoria Road. For the purposes of this assessment, this view also addresses the representative view from the upper storeys of apartment blocks in Nagurra Place, which is situated within 100 metres of this location.

The view from this receptor location is shown on **Figure 7-41** and comprises an attractive residential streetscape of primarily contemporary three and four storey medium density apartments and limited period housing, with an exceptional large fig tree 'bookending' the corner of Terry Street with Victoria Road. A limited area of Victoria Road is seen in the middle ground, including traffic lights, street lights, signage and overhead wiring. This is set against a well vegetated backdrop of exotic and native trees within Toelle Street, and a darker green mounding backdrop of large native trees including figs within King George Park and the Callan Park site in the background.

Residences with views towards Victoria Road comprise:

- Balmain Shores apartment building on the corner of Terry Street
- Medium rise apartments along the northern and southern side of Nagurra Place
- Low rise apartments on Terry Street.

Project effects

The change in view from this receptor location is shown in **Figure 7-42** and **Figure 7-43**. The key project effects that would be visible from this receptor location are the landscaped area along the southern boundary of the project, the ventilation outlet, street tree planting.

Lighting

Additional lighting would be introduced to this area during operation associated with the central landscaped median, sufficient to meet safety and security requirements. The lighting would include cut-off fittings and would be directed to reduce light spill.

Figure 7-41 Current view looking south along Terry Street to Victoria Road

Figure 7-42 Artist's impression at 12–18 months of operation looking south from Terry Street to Victoria Road

Note: The 'white boxes' have been provided to illustrate in a three-dimensional form the extent of the residual lots. The height of the boxes approximates a two storey building height in keeping with Inner West Council building heights for this zone.

Figure 7-43 Artist's impression at 10 years of operation looking south from Terry Street to Victoria Road

Visual impact assessment

Table 7-58 Receptor location IC4 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents – Balmain Shores corner of Terry Street	**Sensitivity to change: Low** Some of the Balmain Shores apartments on the corner of Terry Street have a view up Victoria Road to the ridgeline of Darling Street. This comprises a permanent, low quality view. The number of receptors is considered to be relatively low.	**Magnitude of change: Moderate** The project would comprise a contrasting and permanent change in the view. The area and scale of the project would be relatively large. However, the duration of viewing would be expected to be low. The ventilation outlet would be seen at a distance of between 40 and 60 metres and would obstruct a small part of an existing variable view east across the Rozelle hillside. The character of the ventilation outlet at this point in the design phase solely reflects its functional requirements, but would be subject to well-considered urban design inputs as part of the detailed design stage. For the purposes of this assessment, these urban design inputs are considered likely to provide a moderate improvement in the visual character of this element. Tree planting within the centre median islands and southern streetscape would provide an increase in tree cover and associated landscape works.	**Moderate–Low**
Residents – Nagurra Place: north side	**Sensitivity to change: Low** These apartments are orientated such that the higher dwellings have an extensive harbour view to the north, and a substantial district view to the south-west. This latter view looks across a foreground of industrial development and the project, then across Rozelle substantially period housing to the hilltop, heritage listed Sydney School of Arts building group located about 700 metres distant, set within a substantial cultural landscape including large fig trees. This significant heritage landscape would be visually prominent from the higher apartments, and comprises a high quality, permanent view for a moderate number of visually sensitive receptors. However, the view of the project from these apartments would appear broadly to be limited to the upper two to three floors of the eastern half of the building. The	**Magnitude of change: Low** The viewing distance to the project would be in the order of 150 to 200 metres. The ventilation outlet would either be just visible or not visible from this receptor due to obstruction by the adjacent apartments on the south side of the street. The scale of the project would be low given the relatively limited extent visible from this location, and the character of ‘hard’ infrastructure which already exists. The ventilation and substation would provide a low level of contrast with the existing view, given the nearby views to a large industrial ‘roofscape’ and the derelict Balmain Leagues Club. The duration of viewing of the project would be expected to be low given the more accessible primary view of the harbour.	**Low**

Receptor	Sensitivity	Magnitude	Rating
	quality of the existing view of the project area is low.		
Residents – Nagurra Place: south side	**Sensitivity to change: Moderate** These apartments are located along an east–west running ridge line. The building is orientated such that the higher dwellings have a substantial district view to the south-west, which looks across a foreground of industrial development and the project, then across predominantly period housing within Rozelle to the hilltop, heritage listed Sydney School of Arts building group located about 700 metres distant. This significant heritage landscape would be visually prominent and comprises a high quality, permanent view for a moderate number of sensitive visual receptors. However, the view of the project from these apartments appears likely to be predominantly limited to the main south facing apartments.	**Magnitude of change: High** The viewing distance to the project would be in the order of 100 to 130 metres. While the duration of viewing of the project would be expected to be low, the scale of the project would be moderate to high given the substantial area that is visible from this location, and the character of 'hard' infrastructure. The ventilation outlet would comprise a highly contrasting structure within the context of the existing environment, which would be visible to many of the apartments.	**High–Moderate**
Residents – Terry Street: west side	**Sensitivity to change: High** The three storey apartments on the western side of the street have oblique views from balconies on the street frontage to a few of the hilltop Sydney College of Arts buildings. The group of apartments at the southern end of the street also have varying district views looking southeast across the top of single storey period housing and a commercial building to the Rozelle ridge line. These apartments look out onto a well-considered, almost entirely residential streetscape of visual quality. The existing view along the street (see **Figure 7-41**), is on balance considered likely to be moderately important given its residential component and landscaping, notwithstanding the busy Victoria Road seen in the middle ground. The view to the ventilation outlet from the balconies and front gardens of these apartments would be permanent.	**Magnitude of change: High** The scale and character of the ventilation outlet is a highly contrasting element compared to the existing view. However, the removal of residential and commercial development fronting onto the southern side of Victoria Road, and replacement landscape works, is considered to comprise an improvement in the visual character of this central part of the view. Nonetheless the ventilation outlet is seen from a distance of between 40 metres to 120 metres and is visually prominent. The view would be seen over moderate periods of time when residents are utilising their balconies. The ventilation outlet would be seen in sharp profile against the skyline from this receptor and may obstruct existing district views of Rozelle, in addition to existing limited views of the Sydney College of Arts heritage building group. The visibility of the outlet increases from elevated locations.	**High**

Receptor	Sensitivity	Magnitude	Rating
Residents – Terry Street: east side	**Sensitivity to change: Moderate** These four storey apartments on the eastern side of Terry Street have district views from the back of the building looking southeast, broadly along Victoria Road to the Rozelle ridgeline, as well as limited views on the southern end of the building looking southwest across Victoria Road to King George Park, Callan Park and Iron Cove beyond. *View to the southeast* The view to the southeast would obliquely incorporate the eastern end of the project from Callan Street. The quality of the existing view is considered to be low to moderate. The temporal duration of the view to the project would be permanent and a moderate number of sensitive visual receptors can be expected. *View to the south-west* The quality of the existing view is considered to be moderate to high within the context of the view across the Rozelle residential precinct, to parklands and Iron Cove, notwithstanding potentially limited foreground views of Victoria Road. However, this view to the southwest would only be seen from an estimated two apartments.	**Magnitude of change: Low** *View to the south-east* The ventilation outlet building would comprise a moderately contrasting structure, seen at an oblique viewing angle, within the context of an immediate foreground 'roofscape' of light industrial development, and larger nearby buildings including the Balmain Leagues Club and two to three storey buildings with large advertising billboards atop them, the latter of which would be of a similar height to the proposed ventilation outlet building. The degree of obstruction of existing elements is low. The duration of viewing is considered to be relatively low given the southeast aspect which would receive very little direct sunlight, compared with the northeast aspect of the Terry Street frontage which has balconies. *View to the south-west* This view would be to face of the outlet. The ventilation outlet would: • Be seen in sharp profile against the skyline • Be likely to moderately obstruct existing district views of Rozelle • Not be expected to be viewed over long periods of time as the windows are unlikely to be from living areas • Be seen from a distance of about 70 metres • Be in moderate to high contrast to the existing view • Be subject to well-considered architectural and urban design inputs.	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The existing view along the street (see **Figure 7-41**), is on balance considered likely to be a moderately important part of the view given its residential component and landscape backdrop, notwithstanding the busy Victoria Road seen in the middle ground.	**Magnitude of change: Low** The scale and character of the ventilation outlet within this view would comprise a contrasting element. However, the removal of residential and commercial development fronting onto Victoria Road, and replacement with setbacks and landscape works, is considered to comprise an improvement in the visual character of this central part of the view. The ventilation outlet would be seen in sharp profile against the skyline, however this would be over short periods of time.	**Low**
Motorists/ cyclists	**Sensitivity to change: Low** Motorists and cyclists travelling south towards the project along Terry Street would be focussing on the road. The project would comprise a small part of a longer journey and therefore comprise a short duration of the view.	**Magnitude of change: Low** The scale and character of the project would be different to that existing, particularly the ventilation outlet. However, the project elements would be subject to well-considered architectural and urban design inputs, and although these would be highly visible, this would be over a short period of time.	**Low**

Table 7-59 Receptor location IC4 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Low** The sensitivity of residents to additional lighting is considered likely to be Low given: • Some increase in lighting would be reasonably expected as part of the increased size of carriageway • The quality of the existing view of Victoria Road is low.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The intensity of lighting levels seen from this location is expected to be similar to those currently in place • The degree of contrast with existing lighting levels would be low • The residential development would generally be moderately distant from the project lighting.	**Low**

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be Low given that: • It is likely a low number of pedestrians would be walking along Terry Street to Victoria Road at night • Increased lighting associated with a major arterial road and motorway interchange would be reasonably expected • The quality of the existing view of Victoria Road is low.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The intensity of lighting levels seen from this location is expected to be similar to those currently in place • The degree of contrast with existing lighting levels would be low • The duration of viewing would be relatively low, and seen as part of a longer journey.	**Low**
Motorists/ cyclists	**Sensitivity to change: Low** The sensitivity of motorists and cyclists to additional lighting from the project is considered to be Low, given: • Some increase in lighting would be reasonably expected as part of the increased size of carriageway • The quality of the existing view of Victoria Road is low.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The intensity of lighting levels seen from this location is expected to be similar to those currently in place • The degree of contrast with existing lighting levels would be low • The duration of viewing would be relatively low, and seen as part of a longer journey.	**Low**

Receptor location IC5 – View looking north along Springside Street towards Victoria Road

Existing situation

This receptor location is located on Springside Street looking east towards the project. This location is representative of residents, including two rows of single and double storey detached housing. The street is narrow and steep and has no street trees. Within this context, views up and down the length of the street are extensive albeit limited by the width of the street and the building form along the streetscape. The existing view from this receptor is shown on **Figure 7-44**.

Project effects

The change in view from this receptor location is shown in **Figure 7-45** and **Figure 7-46**. The key project effects that would be visible from this receptor location are:

- The ventilation building which would be moderately visible from areas on the eastern side of the street
- Proposed shrub and tree planting between the south-west wall of the ventilation building and adjoining housing.

Lighting

Lighting effects associated with the project would be marginal when seen from this location, limited to new street lighting along the ventilation facility frontage.

Figure 7-44 Current view from Springside Street looking northeast towards Victoria Road

Figure 7-45 Artist's impression at 12–18 months of operation Springside Street looking northeast towards Victoria Road

Figure 7-46 Artist's impression at 10 years of operation from Springside Street looking northeast towards Victoria Road

Visual impact assessment

Table 7-60 Receptor location IC5 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** The streetscape view is considered to be important in that, even though it is not included within a heritage conservation zone, it includes diversity of small, period workers cottages and typically visually sensitive recent residential infill, stepping down the steep and narrow street. However, the existing view of the project looking up Springside Street is one of low visual quality, comprising about a three-metre high formed concrete wall with a poorly maintained low timber fence/wall atop. The buildings fronting onto Victoria Road have historically comprised a mix of commercial, industrial and residential development, much of which is now degraded given the busy road corridor. In some ways, these buildings can be seen as comprising a protective 'wall' for the quieter residential streets downslope of them. Within this context, the sensitivity of the residential receptors in Springside Street and Callan Street to the type of new development would be moderate. A moderate number of visual receptors are expected.	**Magnitude of change: Moderate** The magnitude of change resulting from the proposed ventilation outlet building would be affected by: • It being moderately visually prominent from much of the eastern side of Springside Street, including being seen against the skyline, an effect that would increase when moving north up the hill from this location • The scale, form and visual mass of the building being moderately incongruent with the existing streetscape, particularly at the northern end of the street when viewing from a closer proximity • No visually significant elements being obstructed from this receptor location • The degree of contrast with the existing view being moderate, including within the context of the backdrop of larger buildings on the northern side of Victoria Road • The duration of viewing likely generally to be low, with most people generally exposed to the view when entering and leaving their residences, with the exception being views from back garden areas within proximity of the project, where the ventilation building would have the potential to be visually prominent • The viewing distance to the project would range from immediately adjoining to around 200 metres .	**Moderate**
Pedestrians	**Sensitivity to change: Moderate** Pedestrians walking up Springside Street would be subject to the same visibility of the project as described above for residents entering or leaving their homes.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate for the same reasons as described for residents above.	**Moderate**

Table 7-61 Receptor location IC5 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Low** The sensitivity of residents to additional lighting is considered likely to be Low given: • Some increase in lighting would be reasonably expected as part of the increased size of carriageway • The quality of the existing view of Victoria Road is low.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The intensity of lighting levels seen from this location is expected to be similar to those currently in place • The degree of contrast with existing lighting levels would be low • The residential development would generally be moderately distant from the project lighting.	**Low**
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be Low given that: • It is anticipated to be at similar levels to that currently in place at this location • Likely low to potentially moderate number of pedestrians walking along Springfield Street at night.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The intensity of lighting levels seen from this location is expected to be similar to those currently in place • The degree of contrast with existing lighting levels would be low • The duration of viewing would be relatively low, and seen as part of a longer journey.	**Low**

Receptor location IC6 – View looking west along Victoria Road at corner of Crystal Street towards project

Existing situation

The view is representative of those seen by pedestrians and cyclists looking west along Victoria Street. The existing view is shown on **Figure 7-47** and is generally of low amenity, comprising:

- Busy arterial road (Victoria Road), which is regularly congested with traffic
- An absence of street trees and consequent glare and heat impacts experienced during hot weather
- Roadside buildings, many of them subject to a busy road entropy effect
- Extensive road elements including pedestrian barrier fencing, power poles/wiring, lighting, road signage, traffic lights; and advertising signage.

The low amenity of this view is partially relieved by the large trees at the corner of Terry Street, and within the residential area to the south of Victoria Road seen projecting above signage to centre left of frame. Additionally, the well vegetated suburb of Drummoyne provides an impressive backdrop, although seen through power/light poles, overhead wiring and signage.

Project effects

The change in view from this receptor location is shown in **Figure 7-48** and **Figure 7-49**. The key project effects that would be visible from this receptor location are:

- The ventilation building on the southern edge of the view, which creates a new wall along this edge
- The ventilation outlet in the centre of the road, which is a new element of uncharacteristic form and scale, particularly given its location within the road reserve. Landscaping works including some tree planting is also visible.

Both elements would be seen against the skyline but would be subject to well-considered architectural, urban design inputs. The project would however help to visually organise and tie the road corridor together; providing separate pedestrian and cycle lanes within the verge tree planting in conjunction with associated low shrub understorey.

Lighting

Additional lighting would be introduced to this area during operation associated with the splitting of the Victoria Road carriageway west of Callan Street, sufficient to meet safety and security requirements. The lighting would include cut-off fittings and would be directed to reduce light spill.

Figure 7-47 Current view looking west along Victoria Road from corner of Crystal Street

Figure 7-48 Artist's impression at 12–18 months of operation looking west along Victoria Road from corner of Crystal Street

Figure 7-49 Artist's impression at 10 years of operation looking west along Victoria Road from corner of Crystal Street

Visual impact assessment

Table 7-62 Receptor location IC6 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The receptor location is situated on busy Victoria Road within a very low amenity environment. Receptors would be considered likely to primarily comprise local residents walking to and from bus stops east of Terry Street, with a lesser number walking from residential areas such as Balmain Shores and housing east of Toelle Street, taking the most direct route to Darling Street.	**Magnitude of change: Moderate** Both the ventilation outlet and the ventilation building would be highly visible from this location, seen against the skyline. The ventilation outlet would obstruct a relatively small portion of view to the Drummoyne backdrop. However, this view would be softened by the centre median planting associated with the portals and ventilation outlet as this matured. The view would be seen over a moderate period of time, and from a viewing distance of about 70 metres for the ventilation building and 140 metres for the ventilation outlet from the receptor location. Pedestrians may walk past these features at which the distance to the view would be immediate.	**Moderate–Low**
Cyclists	**Sensitivity to change: Low** Cyclists travelling west towards Iron Cove Bridge would predominantly be doing so as part of the weekly commute to or from work, with these receptors focusing on the share pathway/other cyclists and pedestrians, and the project comprising a small part of a longer journey. The sensitivity of this receptor group to the proposed change is considered on balance to be Low.	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate, within the context of the project being highly visible but within an existing busy road corridor. Further, the project elements would be subject to well-considered architectural, urban design inputs, and although these would be seen in a substantial level of detail, this would be over a short period of time.	**Moderate–Low**

Table 7-63 Receptor location IC6 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be Low given that: • It is anticipated to be at similar levels to that currently in place at this location • A likely low number of pedestrians would be walking	**Magnitude of change: Moderate** The magnitude of change is considered to be Moderate given: • The anticipated increases in lighting west of the portals would be visible, notwithstanding that the intensity of lighting levels at this location would be expected to be closer to those currently in place • The duration of viewing would be moderate, but seen as part of a	**Moderate–Low**

Receptor	Sensitivity	Magnitude	Rating
	along Victoria Road at night • Increased lighting associated with a major arterial road and motorway interchange would be reasonably expected • The quality of the existing view of Victoria Road is low.	longer journey.	
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** The sensitivity of cyclists to additional lighting within the carriageway is considered to be Low given that: • It is anticipated to be at similar levels to that currently in place at this location • They would be focussing on the share pathway/other cyclists and pedestrians, with the project comprising a small part of a longer journey • The number of cyclists at night using the share pathway would be expected to be low • Increased lighting associated with a major arterial road and motorway interchange would be reasonably expected • The quality of the existing view of Victoria Road is low.	**Magnitude of change: Low** The magnitude of change is considered to be Low given: • The anticipated increases in lighting west of the portals would be visible, notwithstanding that the intensity of lighting levels at this location would be expected to be closer to those currently in place • The duration of viewing would be low.	**Low**

St Peters interchange

Impacts associated with the construction and operation of the St Peters interchange have already been assessed in the WestConnex New M5 Urban Design, Landscape Character and Visual Impact Assessment (AECOM, 2015) for the New M5 project. In addition, the operational landscape design approach at the St Peters interchange has been detailed in the New M5 Urban Design and Landscape Plan (Hassell, 2016). However, the M4-M5 Link project proposes new permanent operational infrastructure to be located within this area, therefore requiring additional assessment.

Operational infrastructure proposed by the M4-M5 project is described in **Chapter 5** (Project description) of the EIS and **Appendix L** (Urban Design Report) of the EIS. **Figure 7-50** shows the operational layout of the site and the representative visual receptor locations assessed. The urban design outcome at the St Peters interchange would be delivered to be consistent with the New M5 Urban Design and Landscape Plan.

Given that this project will commence upon completion of the New M5 project, the St Peters Interchange component of the M4-M5 project is assessed assuming the New M5 works are in place. Therefore, where the existing conditions are discussed for each visual receptor location, these describe the finished New M5 landscape setting. Where within the 'existing situation' section of each assessment a photograph panorama of the view is provided, this is referred to as a 'recent view' to distinguish it from the 'existing situation'.

Further, as described within **Chapter 6** (Construction work) of the EIS, the New M5 construction compound on Campbell Road would be retained within the area proposed for the New M5 St Peters interchange Recreation Area, to be used as a construction compound for the M4-M5 Link project. For the purposes of this assessment it is assumed that all infrastructure associated with the New M5 construction compound such as site sheds and hoarding would have been removed and the site returned to a condition similar to that previously in place, all set behind a temporary security fence. The New M5 contractor would return to site and undertake the remaining St Peters interchange landscaping works once the M4-M5 contractor had vacated the construction compound site.

General arrangement/landscape setting

The project would be set within the widened Campbell Street and Campbell Road, with broad verges and street tree planting to both sides of the street. The majority of the verge on the northern side of the street would be subject to low plantings, comprising primarily of ornamental native grasses and low shrubs. The southern verges would be planted predominantly to turf including a stormwater swale system.

The western edge of the project site would be separated by an area six to 10 metres wide from the ventilation outlet building. As no treatment has been provided for this area at the time of writing, it is assessed as being hardstand. This area is adjoined by the existing New M5 share pathway, and then tree planting (estimated mature height of 10–12 metres[5]) adjoining the industrial development to the west. The eastern edge of the facility would be adjoined by the landscaped St Peters interchange, recently constructed by the New M5 contractor with early stage planting, with trees assumed to be in the order 1.5-2.5 metres high as shown in **Figure 7-55**.

Active transport routes (which include sensitive visual receptors) are shown on **Figure 7-52** and **Figure 7-56** located:

- Along the northern road verge and edge of Campbell Street and Campbell Road
- Along the southern road verge of Albert Street and through the St Peters interchange recreation area

[5] A height of 10–12 metres is assumed for all trees within proximity of the project other than the Sydney Red Gum and Broad-leaved Paperbark avenue planting to Campbell Street/Campbell Road, and the newly constructed St Peters Interchange Recreation Area, due to limited information being available at the time of writing as to specific tree species.

- Either side of the project, along the western rim of the interchange, and through a well wooded/active recreational setting to the east and south.

The ventilation outlet building would sit 16 metres above ground level (atop the portal – assumed to be ground level), with four outlets extending a further six metres above this to a total height of 22 metres. The remaining three buildings on the site (substation, motor control room, and amenities building) would be in the order of four to eight metres high. The overall facility frontage to Campbell Street would be about 125 metres long, 30 metres wide along the western edge, and 45 metres wide along the eastern edge adjoining the proposed recreation area, and can be seen in **Figure 7-58**.

The ventilation facility and associated buildings would sit above the wooded interchange landscape to the south. Vehicles travelling north towards the M4-M5 Link portals would view the project within the context of an existing tall retaining wall to the west and well vegetated, relatively steep batter to the right, travelling towards two large portals with the ventilation outlet facility atop.

The project has a broadly similar footprint to the New M5 ventilation facility to the south. However, the height of the project ventilation buildings and ventilation outlets (16 metres and 22 metres respectively above ground level) would be higher than the New M5 ventilation facility (about eight to nine metres and 16.5 metres respectively above ground level).

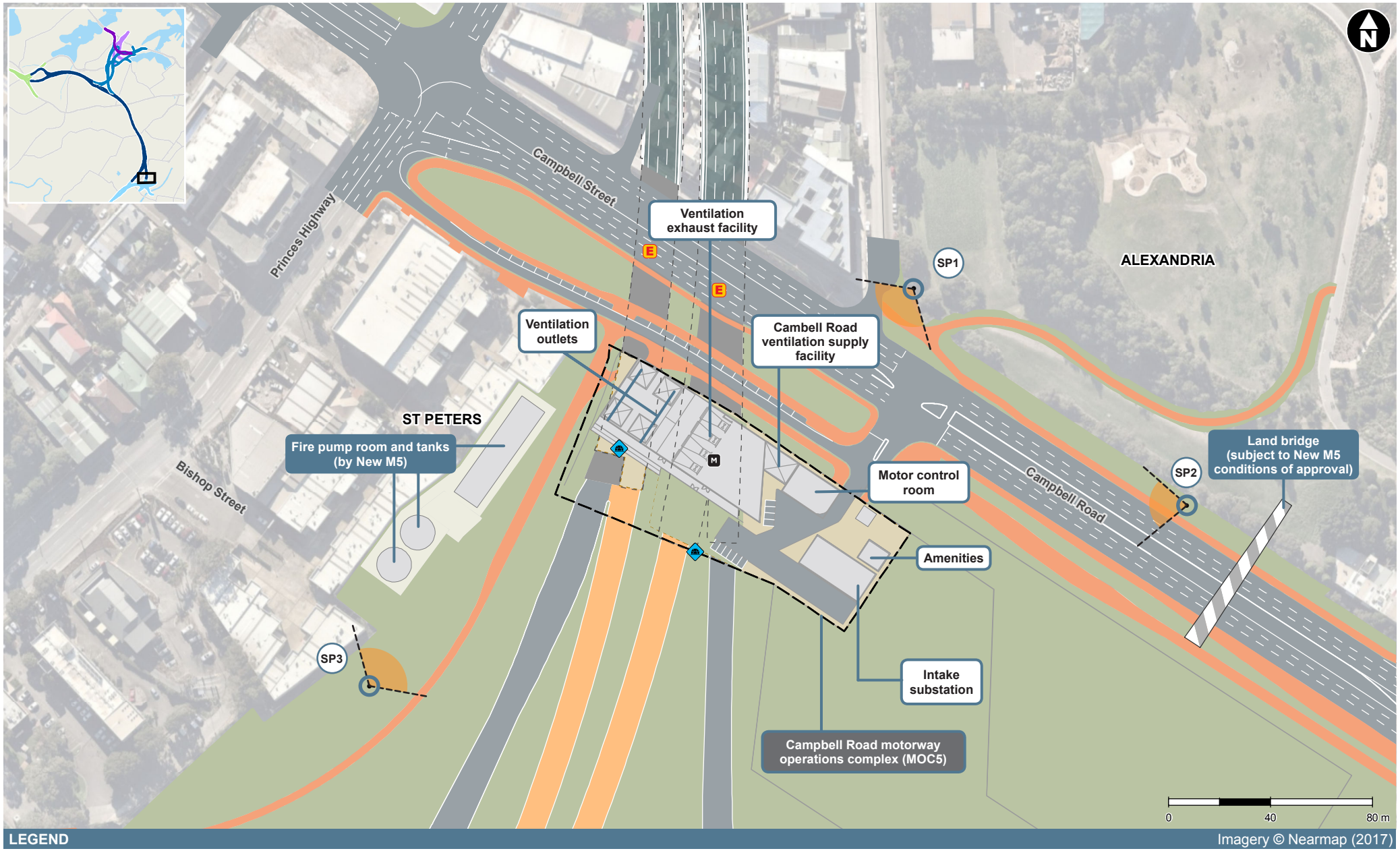


Figure 7-50 St Peters interchange operational receptor locations

Receptor Location SP1 – view looking south from corner of Barwon Park Road and Campbell Road

Existing situation

This receptor location is situated at the corner of Barwon Park Road and Campbell Road, and is representative for: residents in the adjacent apartment block and adjoining detached housing facing Campbell Road; pedestrians walking south along Barwon Park Road; and motorists/cyclists travelling south along Barwon Park Road. A recent view looking towards the project site from this receptor location (i.e. prior to completion of the New M5 project) is shown in **Figure 7-51**.

The existing situation view would comprise the widened Campbell Street and Campbell Road, with avenue planting to both sides, and substantial additional planting widths between Albert Street and Campbell Street and between the recreation area and the access road south of Campbell Road as described above. The newly established planting to Campbell Road still be relatively small with about five years of growth, in the order of five to six metres high for the Broad-leaved Paperbarks, and seven to eight metres high for the Sydney Red Gums. The M4-M5 Link construction site would be visible beyond this planting, comprising a construction site concrete deck above the M4-M5 Link portals/ tunnel stubs, and an adjoining elevated, flat grassed area for the project construction compound, all set behind a temporary security fence.

Active transport routes would run: along the northern road verge and edge of Campbell Street and Campbell Road; along the southern road verge of Albert Street and through the recreation area; and either side of the project site.

Project effects

The change in view from this receptor location is shown in **Figure 7-52** and **Figure 7-53**. The key project effects that would be visible from this receptor location are:

- Early to intermediate stage planting stretching along Campbell Street and Campbell Road. The ventilation outlet building would project above this planting when viewed from street level, with the four ventilation outlets further extending above this. It is likely that the project buildings would be the only proximate buildings clearly visible above this planting along the southern edge of Campbell Street/Campbell Road from this location
- A direct, but restricted view through the access gates to the substation would be available from this receptor location.

The ventilation building would comprise an uncharacteristically large structure, with the scale and mass of the facility in visual contrast to the adjacent, low industrial development to the west, and residential development on the northern side of Campbell Street. However, the facility would be viewed within the context of a long, well vegetated streetscape (albeit relatively immature), with the visually contrasting built form rising above it. Representative scale of the ventilation facility and other large infrastructure in the area, such as the Former Brickworks at Sydney Park, is shown in **Figure 7-54**.

With regard to adjacent residences, the key views from living spaces within the apartment building look south-east across Barwon Park Road to Sydney Park. The residences at the southern end of this building have balconies with large fixed metal louvres to minimise views of the project. The southern face of the apartment building opposite the project has no windows from indoor living spaces that face towards the project from the lower storeys, however upper storeys may have narrow window views to the project.

Two storey terraces and a semi-detached dwelling west of the apartment block on Campbell Street also face the project, and would have partially obscured views of the ventilation facility and some associated buildings. However, once the street trees reach maturity, the upper section of the ventilation buildings would be partially screened by the tree canopies. The lower half of the ventilation buildings and most of the motor control room would be seen between the vegetation.

Lighting

Additional light would be introduced to this area during operation, commensurate with safety and security requirements. The lighting would not be expected to be visually prominent from this location due to the necessary light levels for the upgraded Campbell Street/Campbell Road within the immediate foreground of the view. Visibility of lit areas would be expected to further diminish with the maturing of the street tree planting along the southern edge of Campbell Street/Campbell Road.

Figure 7-51 Receptor location SP1–Recent view looking south from corner of Barwon Park Road and Campbell Road

Figure 7-52 Receptor location SP1 – Artists impression at 12–18 months of operation of view looking south from corner of Barwon Park Road and Campbell Road

Figure 7-53 Receptor location SP1 – Artists impression at 10 years of view looking south from corner of Barwon Park Road and Campbell Road

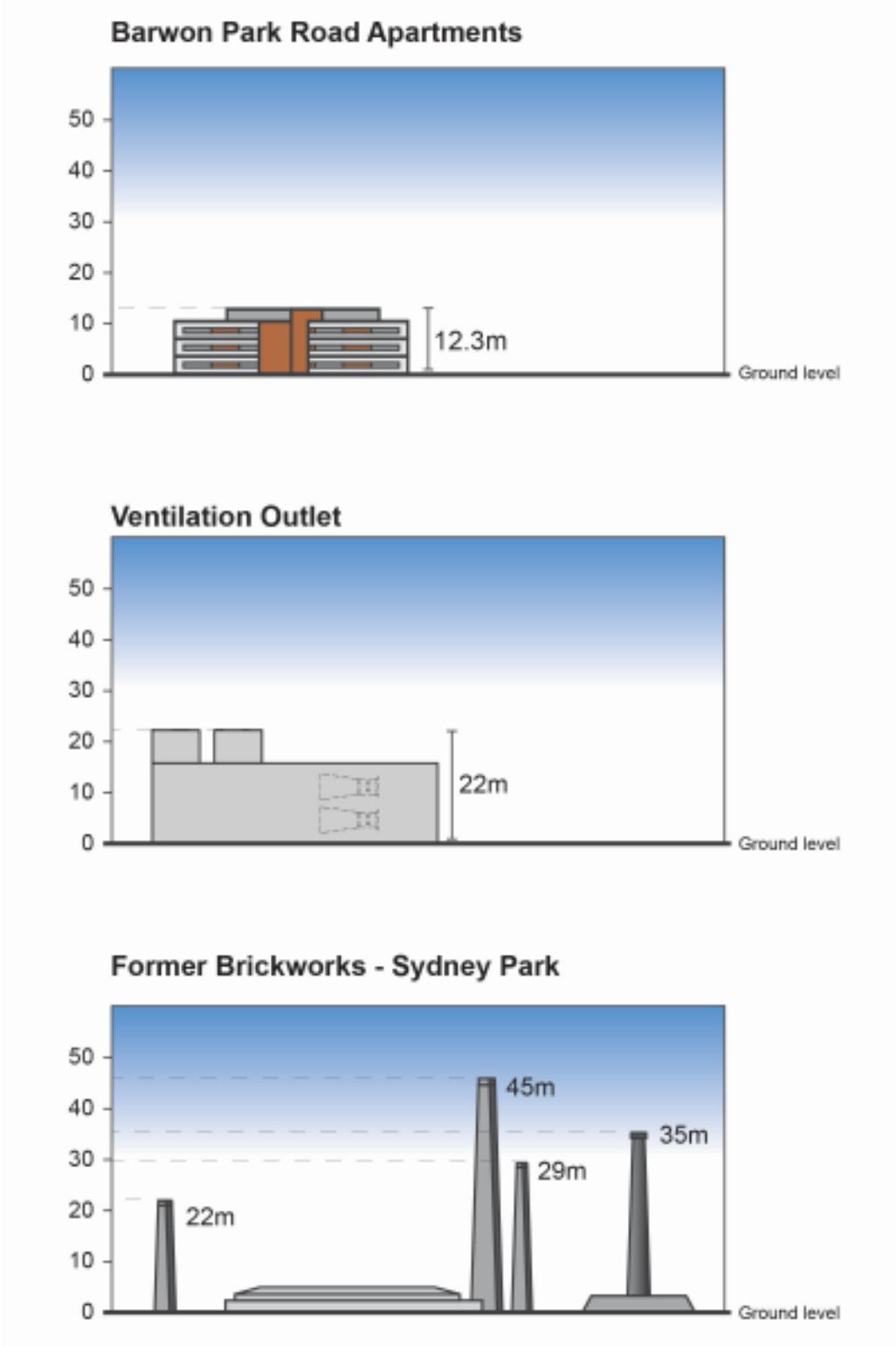


Figure 7-54 Scale comparison of key elements in the vicinity of the project

Visual impact assessment

Table 7-64 Receptor location SP1 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Moderate** Residents within the apartments facing onto Barwon Park Road are located on the edge of a residential area, adjacent to a major busy road (Campbell Street/Campbell Road) with parkland views to both sides of the road, ie Sydney Park and the St Peters interchange recreation area. A moderate number of receptors would have this view, and would consider the parkland component of their views to be of high importance. Notwithstanding, the quality of the view is considered to be moderate within the context of the busy Campbell Street/Campbell Road and adjoining Barwon Park Road. Residents within the housing facing onto Campbell Street would be expected to consider the streetscape setting to be of moderate importance. Notwithstanding the new streetscape setting including improved verge width, the quality of the view is considered to be moderate to low within the context of the busy arterial Campbell Street. On balance, the sensitivity of residents to the project is considered to be moderate within the context of their highly urbanised inner city location, including proximity to a major arterial road and the mixed land use and built form character of the wider precinct.	**Magnitude of change: Moderate** The magnitude of change for residents within the apartment block is considered to be moderate given their views are orientated primarily to the east and south-east across Sydney Park and the St Peters recreation area and land bridge. A small portion of the eastern end of the project would be visible from their balconies at a distance of about 100 metres. The duration of viewing would periodically be extended as residents looked out from their balconies. The magnitude of change for residents facing Campbell Street is considered to be moderate given their dwellings face towards the project, but taking into consideration the intervening recent substantial streetscape works to both sides of Campbell Street and Albert Street, which would be expected to provide some moderation of the visual prominence of the structures. Where the project is seen, it would be seen as a structure of large scale and mass above the tree line, in high contrast to surrounding development. However, the duration of viewing would generally be limited to when entering and leaving the premises, although longer viewing periods could occur from upstairs rooms.	**Moderate**

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Moderate** This receptor can be expected to primarily be walking along busy Campbell Street/Campbell Road for functional needs, eg taking the most direct route to a rail station, workplace or retail destination rather than for recreation such as walking within Sydney Park or the St Peters interchange open space. The number of receptors is assumed to be moderate. The quality of the view is considered to be moderate within the context of the maturing and well-considered streetscape with adjoining Sydney Park landscape, the adjacent St Peters interchange recreation area, notwithstanding the busy Campbell Street/Campbell Road carriageway seen within the immediate foreground.	**Magnitude of change: Moderate** The magnitude of change for pedestrians is considered to be moderate taking into consideration the recently intervening substantial streetscape works, which would provide some reduction in the visual prominence of the structures, notwithstanding the restricted, open view to the lower elements of the project through the entry gates. The ventilation buildings would be seen projecting about four metres above the existing streetscape tree line, and be seen at a distance of between about 65 and 100 metres, as a structure of scale and mass in high contrast to proximate low to medium rise residential development.	**Moderate**
Motorists/ cyclists	**Sensitivity to change: Low** Motorists travelling along the busy Campbell Street/Campbell Road, and cyclists travelling for non-recreational, destination focussed purposes would primarily be focused on the traffic. These receptors would have limited opportunity to take in views of the project, which would be partially obscured by the streetscape planting. The view of the project is considered to be of low importance. The number of vehicles is assumed to be high, and the number of cyclists is assumed to be moderate given the new shared path system. Within this context, these receptors are considered to have low sensitivity to the project.	**Magnitude of change: Moderate** The magnitude of change for motorists and cyclists is considered to be moderate taking into consideration the extent of the change, including the contrasting scale and form of the project within the otherwise low-rise development and adjoining open space settings. The project would be seen at a distance of about 70 metres from this location. The duration of viewing would be low.	**Moderate-Low**

Table 7-65 Receptor location SP1 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Residents	**Sensitivity to change: Low** The sensitivity of residents to project lighting is considered to be low within the context of the intervening busy and well illuminated Campbell Street.	**Magnitude of change: Low** The magnitude of change is considered to be low within the context of illumination levels from Campbell Street reducing the visibility of project lighting, and the majority of lighting being located to the lower levels subject to light spill cut-off measures and screening from streetscape planting.	**Low**
Pedestrians	**Sensitivity to change: Low** The sensitivity of residents to project lighting is considered to be low within the context of the intervening busy and well illuminated Campbell Street.	**Magnitude of change: Low** The magnitude of change is considered to be low within the context of illumination levels from Campbell Street reducing the visibility of project lighting, and the majority of lighting being located to the lower levels subject to light spill cut-off measures and screening from streetscape planting.	**Low**
Motorists/ cyclists	**Sensitivity to change: Negligible** The sensitivity of motorists and cyclists to project lighting is considered to be negligible within the context of the busy and well illuminated Campbell Street and Campbell Road, where the focus of these receptors would be primarily on the road.	**Magnitude of change: Negligible** The magnitude of change is considered to be negligible within the context of: illumination levels from Campbell Street reducing the visibility of project lighting; the majority of lighting being located to the lower levels subject to light spill cut-off measures and screening from streetscape planting and limited duration that these receptors would have to view the project.	**Negligible**

Receptor Location SP2 – View from Campbell Road verge looking west

Existing situation

This receptor location is situated on the northern verge of Campbell Road just west of the land bridge crossing to the St Peters interchange recreation area, and is representative for: pedestrians walking west along Campbell Road; and motorists/cyclists travelling west along Campbell Road. A recent view looking towards the project site (ie prior to completion of the New M5 project) from this receptor is shown in **Figure 7-55.**

The existing view would comprise the landscape batter edge treatment of Sydney Park to right of frame, and widened Campbell Road, with broad verges and street tree planting to both sides of the road. The tree planting would increase in width along most of the frontage to the project site. The newly established planting to Campbell Road would still be relatively small with about five years growth. The M4-M5 Link construction site would be visible beyond this planting.

Active transport routes would run both sides of Campbell Street and Campbell Road as described above. Some of the two storey industrial buildings west of the project site would be visible from this location.

Project effects

The change in view from this receptor location is shown in **Figure 7-56** and **Figure 7-57**. The key project effects that would be visible from this receptor location are:

- The ventilation facility and outlets, which would be seen above the existing street verge planting and vegetated setting, at a viewing distance of between about 150 and 220 metres
- Early to intermediate stage planting along Campbell Street and Campbell Road.

Lighting

Additional lighting would be introduced to this area during operation, commensurate with safety and security requirements and as per crime prevention through environmental design (CPTED) considerations. The lighting would not be expected to be visually prominent from this location due to the intensity of the Campbell Road street lighting within the immediate foreground of the view. Visibility of lit areas would be expected to further diminish with the maturing of the avenue and planting along the southern edge of Campbell Street and Campbell Road.

Figure 7-55 Receptor location SP1 – Recent view from Campbell Road verge looking west

Figure 7-56 Receptor location SP2: artist's impression at 12–18 months of operation of view from Campbell Road verge looking west

Figure 7-57 Receptor location SP2: artist's impression at 10 years of operation from Campbell Road verge looking west

Visual impact assessment

Table 7-66 Receptor location SP2 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** This receptor can be expected to primarily be walking along the busy road for functional needs, eg taking the most direct route to a rail station, workplace or similar destination, rather than for recreation. The number of receptors is considered to be moderate. The quality of the view is considered to be moderate within the context of the still young but well-considered streetscape, St Peters interchange recreation area and adjoining Sydney Park landscape, notwithstanding the busy arterial road. The importance of the view is considered to be low given the arterial road.	**Magnitude of change: Moderate** The view is seen through a closely adjacent avenue planting of intermediate age Broad-leaved Paperbarks between six and seven metres high, and planted about eight metres apart. This would provide opportunity to view the project between each centre median tree. The ventilation buildings and outlets would be seen projecting above this tree line. They would be seen at a distance of between about 150 and 220 metres, along both its short and long edges, as a structure that is highly contrasting to adjoining low rise industrial development. The planted trees in the foreground of the view would minimise the visual prominence of these structures in the context of the wider view.	**Moderate-Low**
Motorists/ public transport/ cyclists	**Sensitivity to change: Low** These receptors can be expected to primarily be travelling along the busy road for destination focussed purposes, rather than for recreation for example. The number of motorist and public transport receptors is considered to be high, and number of cyclists to be moderate. The quality of the view is considered to be moderate within the context of the still young but well-considered streetscape, and adjoining St Peters interchange recreation area and Sydney Park landscape settings, notwithstanding the busy arterial road. The importance of the view is considered to be low given the arterial road, and the nature of the journey that receptors are undertaking. Overall, the sensitivity to change is considered to be low.	**Magnitude of change: Moderate** The magnitude of change for motorists and cyclists is considered to be Moderate taking into consideration the contrasting scale and form of the project within the context of the avenue planting and adjoining open space settings. The project would be visible for both cyclists (who travel on the kerb side of the northern avenue planting), and motorists within the broad open carriageway, notwithstanding both forms of transport would often be travelling at a relatively high speed and have their attention primarily on the road.	**Moderate-Low**

Table 7-67 Receptor location SP2 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be low within the context of the project being part of a longer walk through a diverse range of settings and lighting levels.	**Magnitude of change: Low** The magnitude of change is considered to be low given the well-lit share pathway running past the project and the relatively low lighting levels associated with the facility.	**Low**
Motorists/ public transport/ cyclists	**Sensitivity to change: Negligible** The sensitivity of motorists, public transport users and cyclists to project lighting is considered to be negligible within the context of the busy and well illuminated Campbell Street and Campbell Road, where the focus of motorists and cyclists would be primarily on the road, and public transport users on factors within the vehicle (eg reading, listening to music) rather than the predominantly darkened landscape beyond the road verge.	**Magnitude of change: Negligible** The magnitude of change is considered to be negligible within the context of: illumination levels from Campbell Street reducing the visibility of project lighting; the majority of lighting being located to the lower levels subject to light spill cut-off measures, screening from streetscape planting, and limited capacity to view the project given it is night-time.	**Negligible**

Receptor Location SP3 – View looking north from St Peters interchange share pathway

Existing situation

This receptor location is situated about 130 metres south of the project on the share pathway that runs alongside the western edge of the St Peters interchange. This parkland corridor ranges between about 10 and 40 metres wide, located between existing industrial and commercial development to the west, and a large retaining wall to the east, at the base of which is situated the M4-M5 Link carriageways and portals, set within the extensive well wooded landscape.

The existing view would comprise[6]:

- Adjoining industrial development
- A fenced leachate treatment plant, fire pumps building and water tanks, and a gas flare adjoining the west side of the corridor
- A relatively even grade open space setting comprising share pathway, within an open grassed area with early stage plantings of trees up to a height of 1.5-2.0 metres and generally low shrubs up to a height of about 0.3-0.5 metres along corridor edges
- A security fence situated close to the retaining wall that separates this elevated area from the operational portion of the St Peters interchange below.

This location would also provide broad views east to the project construction site concrete deck atop the M4-M5 Link portals/tunnel stubs, and the adjoining, grassed construction site compound area retained from the New M5 project. These would be set against the early stage avenue planting to Campbell Street/Campbell Road, behind which would be seen the mature wooded backdrop of elevated land within Sydney Park.

Project effects

The change in view from this receptor location is shown in **Figure 7-58** and **Figure 7-59**.

The ventilation facility comprises a concentrated grouping of large, architecturally well-considered buildings (refer to General arrangement/landscape setting), with no vegetative treatments proposed within the secure perimeter. The scale, form, utilitarian character and proximate location of the auxiliary buildings/large tanks delivered by the New M5 project is visually congruent with the ventilation outlet building provided by the M4-M5 Link project, notwithstanding its significantly increased scale.

The two portals upon which the ventilation facility sits are each about 18 metres wide and 15 metres high, and although not seen from this location, these may be visible further north through the parkland corridor boundary fence/landscape planting edge where the corridor narrows.

Lighting

Additional lighting would be introduced to this area during operation, commensurate with safety and security requirements. Visibility of lit areas would be expected to further diminish with the maturing of the parkland planting within the share pathway corridor.

[6] No 'recent view' shown for this receptor location as it was inaccessible for photography at the time of report preparation.

Figure 7-58 Artist's impression at 12–18 months of operation looking north from St Peters interchange share pathway

Figure 7-59 Artist's impression at 10 years of operation looking north from St Peters interchange share pathway

Visual impact assessment

Table 7-68 Receptor location SP3 visual impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians/ recreational cyclists	**Sensitivity to change: Low** This receptor is assumed to primarily be walking for recreational purposes. The view is seen within the context of the broader, major interchange landscape (created by the New M5 project) alongside which this share pathway runs, including extensive sections of elevated carriageway, the New M5 ventilation facility, and the proposed New M5 viewing hill on Canal Road. The view to the west is of low rise commercial and industrial development. The number of receptors is considered likely to be moderate to high. The quality of the view is considered to be moderate within the context of the architecturally well-considered project buildings. The importance of the view is considered to be low given the focus on motorway service facilities.	**Magnitude of change: Moderate** The project would comprise a building of large bulk and scale. It would be highly visible, particularly given it being viewed against the skyline. However, it would also comprise an element of moderate to low contrast within the context of the broader interchange landscape.	**Moderate–Low**

Table 7-69 Receptor location SP3 lighting impact assessment

Receptor	Sensitivity	Magnitude	Rating
Pedestrians/ recreational cyclists	**Sensitivity to change: Low** The sensitivity of pedestrians to additional lighting is considered to be low within the context of the project being part of a longer walk through a diverse range of settings and lighting levels.	**Magnitude of change: Low** The magnitude of change is considered to be low given the well-lit share pathway running past the project and the relatively low lighting levels associated with the facility.	**Low**

7.3.3 View Loss

View loss across each of the projects areas has been considered as part of the operational impact assessment. The following locations have been identified as potentially being impacted. There was no assessed view loss at Darley Road and St Peters interchange.

Rozelle Rail Yards

General arrangement

The new parkland landscape would be in the order of one kilometre long, and vary between about 100 metres and 200 metres wide. Major infrastructure buildings within the parkland would comprise a consolidated group of buildings including the air intake building, substation, and water treatment plant, and the ventilation facility and associated ventilation outlets which are 35 metres in height.

Free-standing dwellings located on Foucart Street near the corner of Lilyfield Road

Existing situation

This receptor location is located on the corner of Foucart Street and Lilyfield Road looking west across the project site towards the city skyline (receptor location R4 as shown on **Figure 7-21)**. Due to the north–south orientation of the streets which run up the hill from Lilyfield Road, most dwellings would look out either onto these residential streets, or towards the back yards of adjoining housing. However, a substantial number of these dwellings have upper floors, or are located within high point of the street from which views to the city skyline are intermittently available.

Project effects

The ventilation facility would be located between about 300 metres from these dwellings. A low and potentially moderate number of these visual receptors would have various degrees of views to the CBD skyline, which would have the potential for the skyline view to be interrupted by the ventilation facility. The ventilation outlets would be seen at angle that would tend to create a relatively short 'wall' of development, which has the potential remove a portion of the skyline view in addition to interrupting the extent of the view as shown on **Figure 7-22**. As the ventilation facility would have a total height of about 35 metres above the existing ground level, and the top of the hill at Foucart Street is at a level of about 22 metres above existing ground level, the ventilation outlets have the potential to interrupt the skyline view from houses in the street.

The view loss assessment for these dwellings is provided in **Table 7-70**.

Table 7-70 View loss assessment – Foucart Street dwellings

Receptor	Sensitivity	Magnitude	Rating
Foucart Street near corner of Lilyfield ventilation facility	**Sensitivity to change: High** The sensitivity of residents to view loss arising from the proposed ventilation facility is considered likely to be High within the context of: • An elevated residential setting • A likely low to potentially moderate number of affected properties • The quality of the CBD skyline view which is high.	**Magnitude of change: High** The magnitude of view loss arising from the proposed ventilation outlet is considered to be High given: • The potential for a possibly moderate portion of the view being lost, in addition to interruption of the broader view • The scale, form and mass of the facility that would comprise a highly contrasting, and therefore visually disruptive element within the view.	**High**

Residences within the vicinity of Hutcheson Street and Denison Street near Lilyfield Road

Existing situation

This corner location comprises a locally steep hillside that facilitates views along and across steep streets, and from residences across lower rooftops towards the CBD skyline. The height of this area above the parkland ground level ranges from about seven metres along Denison Street, to 18 metres at Hutcheson Street, to about 21 metres at the top of Albert Street.

Residences located alongside Lilyfield Road between Hutcheson Street and Denison Street sit atop a raised sandstone outcrop, perched in the order of three to four metres above street level, which provides them with a sweeping view across the Rozelle Rail Yards to the City.

Project effects

The ventilation facility would be located between about 150 and 300 metres from these dwellings. The removal of the industrial development alongside Lilyfield Road has the potential to open up further views to the city skyline, including potentially from dwellings on Denison Street. A low and potentially moderate number of these visual receptors would have various degrees of views to the CBD skyline, which would have the potential for the skyline view to be interrupted by the ventilation facility.

The view loss assessment for these dwellings is provided in **Table 7-71**.

Table 7-71 View loss assessment – Hutcheson Street and Denison Street residences

Receptor	Sensitivity	Magnitude	Rating
Vicinity of Hutcheson Street and Denison Street near Lilyfield Road	**Sensitivity to change: High** The sensitivity of residents to view loss arising from the proposed ventilation facility is considered likely to be High within the context of: • An elevated residential setting • A likely low to potentially moderate number of affected properties • The quality of the CBD skyline view which is high.	**Magnitude of change: High** The magnitude of view loss arising from the proposed ventilation outlet is considered to be High given: • The potential for a possibly moderate portion of the view being lost, in addition to interruption of the broader view • The scale, form and mass of the facility that would comprise a highly contrasting, and therefore visually disruptive element within the view.	**High**

Iron Cove Link

General arrangement

The ventilation outlet would be 20 metres high and would be set towards the middle of the upgraded Victoria Road carriageway east of the corner of Terry Street. The structure would have trees planted to provide some visual screening. Planting would also be present within a pedestrianised median adjoining the Iron Cove Link portals. These trees would be expected to attain a height of about 12 to15 metres, and provide a 'soft', visual setting for the structure.

Medium rise residential apartments ('Union Balmain'), Nagurra Place

Existing situation

Located along Nagurra Place, these apartment blocks comprise a first apartment block on the south side of the road about 40 metres from the intersection with Terry Street, and a second building offset from the first, at a distance of about 60 metres from the intersection with Terry Street. These southwest facing apartments are afforded views across Victoria Road towards Callan Park and Iron Cove, with the extent of the view increasing with height in the building. The elevated, heritage listed Sydney School of the Arts building complex comprises a primary feature view from this location. Both buildings are also afforded views to Iron Cove. The view is seen within the context of a foreground

comprising industrial and commercial development adjoining Victoria Road, which is shown in **Figure 7-41**.

Project effects

The ventilation outlet would be located between about 100 and 200 metres away from the apartments. The outlet would partially interrupt the more oblique view towards King George Park, Callan Park foreshore and to Iron Cove beyond that, with the extent of interruption diminishing in response to increasing height within the buildings. The outlet would have tall trees planted to either end of it, with a long 'tail; running up the middle of Victoria Road, in addition to being seen against a well vegetated backdrop planting incorporating tall trees, located above the portals.

The view loss assessment for these apartments is provided in **Table 7-72**.

Table 7-72 View loss assessment – Nagurra Place

Receptor	Sensitivity	Magnitude	Rating
'Union Balmain', Nagurra Place	**Sensitivity to change: Moderate** The sensitivity of residents to view loss arising from the proposed ventilation outlet is considered to be Moderate within the context of: • Their being a moderate to high number of affected residents who currently enjoy to vary degrees substantially unimpeded views across Callan Park and Iron Cove • The view is one of high quality which would be considered to be of primary importance to these receptors.	**Magnitude of change: Low** The magnitude of view loss caused by the ventilation outlet is considered to be Low given that: • The extent of the change in visibility is relatively minor, with the view to The Sydney School of the Arts heritage building complex being uninterrupted, and interruption to the water view in particular considered likely to comprise a small part of the total view.	**Moderate–Low**

Low rise residential apartments 'Balmain Shores'

Existing situation

Low rise residential apartments within the 'Balmain Shores' development on the corner of Terry Street. The corner three storey apartments each have an angled, protruding room with balcony orientated southeast orientated to the towards Darling Street along the Victoria Road corridor, with associated commercial development, and is therefore an unattractive one. Balconies are also present on the protruding north-east facing wall from which the above view can also be obtained. Substantial tree planting on the Terry Street frontage is located in front of the east facing end wall of the building, which would be expected to reduce the seen extent of the above view from most of the windows within it.

Project effects

The ventilation outlet would be located about 50 metres from the facing balconies, presenting its short face and long edge to these visual receptors. The outlet would comprise the primary feature within the view. It would have tall trees planted in front of and behind it, in addition to being seen within the context of a larger nearby centre median planting adjoining the portals, as described above. The structure would be visually prominent given the 12 to18 months period into operation and associated tree growth at which it is being assessed.

The view loss assessment for these apartments is provided in **Table 7-73**.

Table 7-73 View loss assessment – Balmain Shores

Receptor	Sensitivity	Magnitude	Rating
'Balmain Shores', Terry Street	**Sensitivity to change: Moderate** The sensitivity of residents to view loss arising from the proposed ventilation outlet is considered to be Moderate within the context of: • The outlet would be located within the Victoria Road corridor • There being a moderate to high number of affected residents who currently enjoy substantially unimpeded views across Callan Park and Iron Cove • The existing view is one of moderate to high quality, notwithstanding the context of the foreground view across industrial/commercial development and Victoria Road • The view would be of high importance to these receptors.	**Magnitude of change: Low** The magnitude of view loss arising from the proposed ventilation outlet is considered to be Low given that: • The extent of the change in visibility is considered likely to be relatively minor • The view to The Sydney School of the Arts building complex remains uninterrupted • Interruption to the view of King George Park, the Callan Park Foreshore and Iron Cove is considered likely to comprise a small part of the total view • The extent of the view disruption would decrease with the height of the visual receptor within the building.	**Moderate–Low**

Over time, the visual effect would be increasingly softened as the tree planting matured, while also minimising the seen area of the Victoria Road carriageway from this location.

Low rise residential apartments '43 Terry Street'

Existing situation

Apartments facing onto Terry Street adjoining the Balmain Shores development. These three storey apartments are located about 30 metres from the corner with Victoria Road, stepping up a moderate incline over a distance of about 100 metres to the intersection with Nagurra Place. All of the apartments have either balconies or ground floor front garden areas facing the street.

Project effects

A moderate to potentially high number of these visual receptors would have views to the ventilation outlet, which would be seen projecting above low rise development on the opposite side of the street. However, these views would become increasingly oblique with distance from the project. The ventilation outlet would present its long face to the view. The view from the upper storey apartments would be likely to comprise partial district views across Rozelle, seen above the roofline of adjacent buildings, with lower units viewing the ventilation outlet against the skyline, ie with no 'view' behind. The first three to six apartments would be most directly affected given their proximity to the structure, comprising a low to moderate number of sensitive receptors.

The view loss assessment for these apartments is provided in **Table 7-74**.

Table 7-74 View loss assessment – Terry Street apartments

Receptor	Sensitivity	Magnitude	Rating
Low rise apartments – 43 Terry Street	**Sensitivity to change: Moderate** The sensitivity of residents to view loss arising from the proposed ventilation outlet is considered to be Moderate within the context of: • There being a potentially low to moderate number residents affected by view loss of the Rozelle ridgeline and hillslope • The existing partial district view, seen across a line of rooftops would be considered to be a relatively common view of low to moderate quality, eg as compared with the full view of the Sydney School of the Arts building complex seen from apartments in Nagurra Place.	**Magnitude of change: Moderate** The magnitude of view loss arising from the proposed ventilation outlet is considered to be Moderate given: • The proximity of the ventilation outlet to the closest three to six apartment blocks, that would have its long face presented in this view, and in conjunction with increasing proximity to the structure, result in an increasing portion of the view being lost.	**Moderate**

7.3.4 Overshadowing

An overshadowing assessment of permanent buildings and structures which have the potential to result in overshadowing on neighbouring residential properties and open space has been undertaken as part of **Chapter 12** (Land use and property) of the EIS. Shadow diagrams indicating the extent of overshadowing on properties that is currently expected as a result of permanent operational infrastructure are provided in **Appendix M** (Shadow diagrams and overshadowing) of the EIS. The assessment of the potential overshadowing impacts in mid-winter (21 June) expected as a result of permanent operational infrastructure concluded:

- There would be no impacts on nearby residential properties as a result of the Darley Road motorway operations complex (MOC1), Rozelle West motorway operations complex (MOC2) and pedestrian and cyclist facilities, Rozelle East motorway operations complex (MOC3) and pedestrian and cyclist facilities, and at Campbell Road motorway operations complex (MOC5)
- A small number of residential properties at Callan Street and Springside Street south of the Iron Cove Link ventilation facility may be affected by overshadowing based on the concept design.

Detailed design of the ventilation facility building at the Iron Cove Link motorway operations complex (MOC4) will include consideration of treatments to minimise overshadowing on properties south of Victoria Road. This may include reducing the height of the building and/or increasing building setbacks or recessing the building.

7.3.5 Summary of visual impacts

A summary of the impact assessments for representative visual receptor locations impacted by the project during operation is provided below in **Table 7-75**, and night lighting impacts provided in **Table 7-76.** A summary of assessed view loss is provided in **Table 7-77**. Mitigation measures and design recommendations are provided in **Chapter 9** to minimise visual impacts, particularly where impacts are predicted to be high.

Table 7-75 Summary of operation impacts – general

	Receptor	Sensitivity to change	Magnitude of change	Overall rating
Receptor location D1 – View looking east from Darley Road near corner of Charles Street				
1	Residents	Low	Moderate	Moderate–Low
2	Pedestrians	Low	Low	Low
Receptor location D2 – View looking west from Darley Road at entry to lane between James Street and Francis Street				
1	Residents	Low	Low	Low
2	Pedestrians	Low	Low	Low
Receptor location R1 – View looking east from Catherine Street entry to Lilyfield light rail stop				
1	Light rail users	Low	Moderate	Moderate–Low
2	Residents	Low	Low	Low
Receptor location R2 – View looking west along City West Link to M5 portals				
1	Motorists	Low	Moderate	Moderate–Low
Receptor location R3 – View looking west along City West Link to The Crescent				
1	Pedestrians/cyclists	Low	Moderate	Moderate–Low
2	Motorists	Low	Moderate	Moderate–Low
Receptor location R4 – View looking east along Lilyfield Road at corner of Foucart Street				
1	Residents	Moderate	Moderate	Moderate
2	Motorists	Negligible	Moderate	Negligible
Receptor location R5 – View looking south from Easton Park to the project				
1	Residents	High	High	High
2	Active recreational users	Low	Moderate	Moderate-Low
3	Passive recreational users	Moderate	High	High–Moderate
Receptor location R6 – View looking north from Glebe Foreshore Parklands to the project				
1	Passive recreational users	High	Moderate	High–Moderate
2	Active recreational users	Low	Moderate	Moderate–Low
Receptor location R7 – View looking north from Rozelle Bay light rail stop to the project				
1	Light rail patrons	Moderate	High	High–Moderate
2	Residents	High	Moderate	High–Moderate
3	Pedestrians	High	High	High
Receptor location IC1 – View looking east along Victoria Road near Iron Cove Bridge				
1	Residents	Moderate	Moderate	Moderate
2	Pedestrians	Low	Moderate	Moderate–Low
3	Recreation	Moderate	Moderate	Moderate
4	Motorists/public transport/cyclists	Low	Moderate	Moderate–Low
Receptor location IC2 – View looking west from Manning Street towards bioretention facility				
1	Residents	Moderate	Low	Moderate–Low

	Receptor	Sensitivity to change	Magnitude of change	Overall rating
2	Recreation	Moderate	Low	Moderate–Low
3	Pedestrians	Moderate	Low	Moderate–Low
Receptor location IC3 – View looking east along Victoria Road near Terry Street				
1	Pedestrians	Low	Moderate	Moderate–Low
2	Motorists/public transport/cyclists	Low	Moderate	Moderate–Low
Receptor location IC4 – View looking south along Terry Street towards Victoria Road				
1	Residents – Balmain Shores corner of Terry Street	Low	Moderate	Moderate–Low
2	Residents – Nagurra Place: north side	Low	Low	Low
3	Residents – Nagurra Place: south side	Moderate	High	High–Moderate
4	Residents – Terry Street: west side	High	High	High
5	Residents – Terry Street: east side	Moderate	Low	Moderate–Low
6	Pedestrians	Low	Low	Low
7	Motorists/cyclists	Low	Low	Low
Receptor location IC5 – View looking north along Springside Street towards Victoria Road				
1	Residents	Moderate	Moderate	Moderate
2	Pedestrians	Moderate	Moderate	Moderate
Receptor location IC6 – View looking west along Victoria Road at corner of Crystal Street t				
1	Pedestrians	Low	Moderate	Moderate–Low
2	Cyclists	Low	Moderate	Moderate–Low
Receptor Location SP1 - View looking south from corner of Barwon Park Road and Campbell Road				
1	Residents	Moderate	Moderate	Moderate
2	Pedestrians	Moderate	Moderate	Moderate
3	Motorists/cyclists	Low	Moderate	Moderate–Low
Receptor Location SP2 – View from Campbell Road verge looking west				
1	Pedestrians	Low	Moderate	Moderate-Low
2	Motorists/public transport/cyclists	Low	Moderate	Moderate-Low
Receptor Location SP3 - View looking north from St Peters Interchange share pathway				
1	Pedestrians/recreational cyclists	Low	Moderate	Moderate–Low

Table 7-76 Summary of operational impacts – night lighting

	Receptor	Sensitivity to change	Magnitude of change	Overall rating
Receptor location D1 – View looking east from Darley Road near corner of Charles Street				
1	Residents	Low	Low	Low
2	Pedestrians	Low	Low	Low
Receptor location D2 – View looking east from Darley Road near corner of Charles Street				
1	Residents	Low	Negligible	Negligible
2	Pedestrians	Negligible	Low	Negligible
Receptor location R1 – View looking east from Catherine Street entry to Lilyfield Light Rail Stop				
1	Light rail users	Low	Low	Low
2	Residents	Low	Low	Low
Receptor location R2 – View looking west along City West Link to M5 portals				
1	Motorists	Low	Moderate	Moderate-Low
Receptor location R3 – View looking west along City West Link to The Crescent				
1	Pedestrians/cyclists	Low	Moderate	Moderate–Low
2	Motorists	Low	High	Moderate
Receptor location R4 – View looking east along Lilyfield Road at corner of Foucart Street				
1	Residents	Negligible	Low	Negligible
2	Motorists	Low	Low	Low
Receptor location R5 – View looking south from Easton Park to the project				
1	Residents	Negligible	Low	Negligible
2	Passive recreational users	Negligible	Low	Negligible
3	Active recreational users	Negligible	Low	Negligible
Receptor location R6 – View looking north from Glebe Foreshore Parklands to the project				
1	Passive recreational users	Low	Moderate	Moderate–Low
2	Active recreational users	Negligible	Moderate	Negligible
Receptor location R7 – View looking north from Rozelle Bay light rail stop to the project				
1	Light rail patrons	Low	High	Moderate
2	Residents	High	High	High
3	Pedestrians	Moderate	High	High-Moderate
Receptor location IC1 – View looking east along Victoria Road near Iron Cove Bridge				
1	Residents	Moderate	Moderate	Moderate
2	Pedestrians	Low	Moderate	Moderate-Low
3	Recreation	Low	Moderate	Moderate–Low
4	Motorists/public transport/cyclists	Low	Moderate	Moderate–Low
Receptor location IC2 – View looking west from Manning Street towards bioretention facility				
	N/A	N/A	N/A	N/A

	Receptor	Sensitivity to change	Magnitude of change	Overall rating
Receptor location IC3 – View looking east along Victoria Road near Terry Street				
1	Pedestrians	Low	Low	Low
2	Motorists/public transport/cyclists	Low	Low	Low
Receptor location IC4 – View looking south along Terry Street towards Victoria Road				
1	Residents	Low	Low	Low
2	Pedestrians	Low	Low	Low
3	Motorists/cyclists	Low	Low	Low
Receptor location IC5 – View looking north along Springside Street towards Victoria Road				
1	Residents	Low	Low	Low
2	Pedestrians	Low	Low	Low
Receptor location IC6 – View looking west along Victoria Road at corner of Crystal Street				
1	Pedestrians	Low	Moderate	Moderate–Low
2	Cyclists	Low	Low	Low
Receptor Location SP1 – view looking south from corner of Barwon Park Road and Campbell Road				
1	Residents	Low	Low	Low
2	Pedestrians	Low	Low	Low
3	Motorists/cyclists	Negligible	Negligible	Negligible
Receptor Location SP2 – View from Campbell Road verge looking west				
1	Pedestrians	Low	Low	Low
2	Motorists/public transport/cyclists	Negligible	Negligible	Negligible
Receptor Location SP3 – View looking north from St Peters Interchange share pathway				
1	Pedestrians/recreational cyclists	Low	Low	Low

Table 7-77 Summary of operational impacts – view loss

	Receptor	Sensitivity to change	Magnitude of change	Overall rating
Rozelle Rail Yards				
1	Free-standing dwellings located on Foucart Street near the corner of Lilyfield Road	High	High	High
2	Residences within the vicinity of Hutcheson Street and Denison Street near Lilyfield Road	High	High	High
Iron Cove Link				
1	Medium rise residential apartments (‘Union Balmain’), Nagurra Place	Moderate	Low	Moderate–Low
2	Low rise residential apartments ‘Balmain Shores’	Moderate	Low	Moderate–Low
3	Low rise residential apartments ‘43 Terry Street’	Moderate	Moderate	Moderate

7.4 Long-term visual and landscape outcomes

Although elements of the project will have a range of landscape and visual impacts on a number of receptors (ranging from low to high impacts), the overall impacts of the project have been minimised through urban design, as outlined in **section 2.4** and further detailed in **Appendix L** (Urban Design Report) of the EIS. This includes the provision of landscape planting along and around key visible infrastructure such as ventilation facilities and MOCs. The assessments provided in **section 7.3** consider these plantings at a young age (12 to 18 month growth). Over time and as these trees mature, the benefits provided by landscape planting will improve. These benefits include providing additional visual screening from some receptors, reducing contrast with the existing landscape setting, and improving streetscapes and amenity.

Urban Design and Landscape Plans have been prepared for the M4 East and New M5 projects, including land around the Wattle Street interchange at Haberfield and the St Peters interchange at St Peters. Similar plans will be prepared for the M4-M5 Link project. It is anticipated these plans will provide further guidance for specific project elements, and allow for additional architectural treatments and landscape works to further minimise project impacts. These would be developed with consideration to the recommended mitigation measures provided at **section 9.1**.

8 Assessment of cumulative impacts

8.1 Other WestConnex projects

As outlined in **section 1.1**, this project (M4-M5 Link) is part of WestConnex program of works. The potential for cumulative impacts with these other WestConnex projects are described in **Table 8-1**.

Table 8-1 Cumulative impacts – WestConnex projects

Sub-project	Assessment
M4 Widening (Parramatta to Homebush)	The M4 Widening project involved widening the existing M4 Motorway from three to four lanes in each direction for approximately 7.5 kilometres between Pitt Street, Parramatta and Homebush Bay Drive, Homebush. The M4 Widening project would not be expected to cause cumulative visual amenity impacts for the M4-M5 Link project, given the geographical separation of the projects which would not result in any overlap of landscape character zones or visual receptors. The M4 Widening is complete and open to traffic.
M4 East (Homebush to Haberfield)	The M4 East project involves upgrade and extension of the M4 Motorway from Homebush Bay Drive at Homebush to Parramatta Road and City West Link (Wattle Street) at Haberfield. This includes twin tunnels about 5.5 kilometres long and associated surface works to connect to the existing road network. The overlapping construction footprints of the M4 East and M4-M5 Link projects would result in nearby residents in Haberfield and Ashfield being subject to further motorway construction work within their neighbourhood. This would similarly affect motorists who regularly travel through the area. The M4-M5 Link project would result in a high cumulative visual amenity impact on affected Haberfield and Ashfield residents due to the continued presence of visible construction facilities and construction activities occurring over this period. Compensatory mitigation could be considered for residents, subject to sustained cumulative impacts, eg provision of streetscape treatments to be undertaken in conjunction with the M4-M5 Link project.
New M5 (Beverly Hills to St Peters)	The New M5 project involves construction and operation of a new, tolled multi-lane road link between the existing M5 East Motorway, east of King Georges Road, and St Peters. The project also includes an interchange at St Peters and connections to the existing road network. At Campbell Road, St Peters part of the New M5 project overlaps with the construction site for the M4-M5 Link project. The construction footprint of the M4-M5 Link project would be small in comparison with the New M5 project. The number of sensitive residential receptors affected by the project is likely to be relatively small. However, for this small group of residents, the project will result in a further prolonged period of construction, also impacting on motorists who regularly drive through this area. Once both projects are completed, substantial levels of amenity for local residents will be provided, notwithstanding the early stage of landscape development.
King Georges Road Interchange Upgrade (Beverly Hills)	The King Georges Road Interchange Upgrade involves construction works to increase capacity on the King Georges Road on and off ramps to the M5 Motorway. This work is now completed. No further cumulative visual impacts are therefore anticipated with the M4-M5 Link project, in particular given the geographic separation of the projects.

Large parts of WestConnex have low to negligible landscape and visual impacts during operation due to the subterranean nature of the majority of the project. However, ventilation buildings/outlets, substations and other above ground elements such as dive structures with associated retaining walls, portals, and wide expanses of motorway, have the potential to be visually intrusive unless well-considered within an architectural, urban design framework.

The overall cumulative impacts of the WestConnex project can be described as high and irreversible given the scale of and time required for construction, and the impacts on communities where the project connects to the surface road network and other discrete locations such as ventilation facilities, substations and water treatment plants. It comprises one of the most comprehensive program of changes to the road network that the city has experienced in recent years.

However, the cumulative impacts of WestConnex have been reduced as far as practicable by tunnelling and through the site selection process for construction and surface operation locations. WestConnex is also providing beneficial landscape character and visual amenity outcomes, including extensive landscaping at the St Peters interchange setting with direct linkage created to Sydney Park, and the provision of new open space at the Rozelle Rail Yards site. Active transport connections would also be provided at Rozelle, Iron Cove and St Peters and landscaping works would be delivered across the project, to provide positive urban design outcomes.

8.2 Other transport projects

8.2.1 Rozelle Rail Yards site management works

NSW Roads and Maritime Services has determined the site management works project under Part 5 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). The Rozelle Rail Yards have remained largely disused for a number of years and had accumulated redundant rail infrastructure, waste and contamination. Various fast growing and noxious weeds also grew over a large part of the site. The site management works would manage the existing environmental and safety issues at the site and improve access to surface conditions.

The works comprise:

- Site establishment – including fencing, installing temporary site offices, arranging site access, erosion, sediment and drainage controls and defining lay down, stockpile and transfer areas
- Utility location and site investigations
- Removal of waste, existing stockpiles and vegetation
- Removal of existing above ground rail infrastructure, including gantries, railway lines, ballast, sleepers and buildings (but excluding the southern penstock, the switching station, the transformer and rail infrastructure to the east of Victoria Road bridge) and redundant services where intercepted when removing infrastructure (eg gantries and ballast) generally to a depth of 500 millimetres below ground level, except where drainage channels and sediment basins are required
- Site stabilisation comprising reshaping of the ground surface as a result of the site management works and installation of stormwater controls including the construction of drainage channels and sediment basins
- Site completion and handover – demobilise all temporary construction materials, plant and equipment installed for the works and leave the site secure.

The site management works are expected to be completed prior to construction of the M4-M5 Link project commencing.

Operation landscape character and visual impacts were assessed as part of the site management works review of environmental factors (REF) and found:

- After the site management works are completed, the landscape character of the site would be altered through the removal of vegetation, structures and redundant rail infrastructure, and subsequent increase in the extent of open land and a largely vacant site. This largely vacant use is unlikely to have an impact on the landscape character of the local area, as it would neither add nor detract from the area's inner city urban character. However, the change would be noticeable to some receptors
- Once the works are complete the site will be managed but the level of activity would be minor. Views to the site would have changed (eg the site may be slightly lower and would contain sediment basins) but no views would be blocked or obstructed. Certain views to City West Link

may change but the trees to the north of the site and within the City West Link road corridor screen the road

- The potential impacts on landscape character and visual amenity range from negligible to low. Overall it is therefore considered that the finished site of the proposal is not considered to have a significant impact on landscape character and visual amenity.

While the site management works are unlikely to result in a significant impact, there is a potential for cumulative visual impacts when considered in conjunction with the M4-M5 Link project. This is due to the removal of vegetation, which would result in more prominent views of the M4-M5 Link project both during its construction and operation.

The site management works are scheduled to be completed in mid-2018 prior to the start of construction for the M4-M5 Link project. As a result, cumulative construction impacts have not been assessed here.

8.2.2 Central Business District (CBD) and South East Light Rail Project (CSELR) – Rozelle maintenance depot

The CBD and South East Light Rail project involves the construction of about 13 kilometres of new light rail track from Circular Quay to Central, Kingsford and Randwick via Surry Hills and Moore Park and maintenance and stabling facilities.

Of relevance to the M4-M5 Link project, the Rozelle maintenance depot would be located next to the existing Lilyfield light rail stop, west of the site within the western portion of the Rozelle Rail Yards. Construction works have begun for the Rozelle maintenance depot and are expected to be completed in 2018 (operational in 2019). The construction of the depot would therefore potentially coincide with the M4-M5 Link project for a limited period of time in late 2018.

Construction landscape character and visual impacts were assessed as part of the CSELR EIS with the following relevant findings:

- There would be moderate adverse landscape impact during construction due to removal of trees from the southern boundary adjacent to City West Link. These works have already taken place and, as anticipated, have resulted in a considerable break in the continuity of the roadside vegetation at this location
- Moderate adverse visual impacts would result from lighting for night works
- There would be a neutral impact on the Catherine Street Railway Bridge (heritage-listed).

Operation landscape and visual impacts were also assessed with the following relevant findings:

- Minor adverse landscape impact during operation as a result of the removal of trees from the southern boundary
- Moderate adverse visual impacts are anticipated from Lilyfield Road and Catherine Street, primarily associated with the erection of larger structures on the site and removal of vegetative screening which would result in more prominent views of the site
- Views of the city and Harbour Bridge from the west may also be partially obscured.

Both the construction and operational impacts of the CSELR project may result in cumulative impacts when considered in conjunction with the M4-M5 Link project. Removal of vegetation which has recently been undertaken as part of the CSELR project has provided unfiltered views at some locations to the construction of the project. The removal of this vegetative screening could additionally lead to more prominent views to parts of the M4-M5 Link project both during its construction and operation for sensitive receptors such as the residences along Lilyfield Road.

There is also potential for community construction fatigue to occur as a result of the combination of these two projects, resulting from extended duration of views to construction works. Construction programs for each estimate the completion of one at the same time as the commencement of the other which would lead to continuity of construction works over a prolonged period. This is particularly the case for residential receptors surrounding the site.

Relevant mitigation proposed for the CSELR comprises:

- Provision of tree and shrub planting to the northern side of the site, adjacent to Lilyfield Road, to restore the green edge and filter views.
- Investigation of opportunities to provide screen planting along the southern edge of the site to filter views from the Lilyfield light rail stop.

8.2.3 Sydney Gateway

Sydney Gateway would provide for a new connection between the new St Peters interchange and Sydney Airport and Port Botany. No design information is available at this time that would enable a cumulative assessment of landscape and visual impacts. It is anticipated the Sydney Gateway project would consider the landscape and visual assessment outcomes of interfacing stages of WestConnex as part of a cumulative impact assessment which would be undertaken during the project's planning and assessment stage.

8.3 Urban renewal strategies

8.3.1 The Bays Precinct Transformation Strategy

As outlined in **section 4.3**, a strategic planning process is currently being led by UrbanGrowth NSW for an area of land and harbour known as The Bays Precinct.

A Transformation Plan has been developed by UrbanGrowth NSW which represents a blueprint to transform The Bays Precinct into a hub of enterprise, activity and public spaces. The Plan also sets out immediate, medium term and long term priorities for the sub-precincts. Immediate Priority Destinations (works commencing 2015 – 2019) include the Bays Waterfront Promenade (Stage 1 Pyrmont to Blackwattle Bay and future stages consistent with medium and longer-term priorities) and the White Bay Power Station (including surround). Medium-term Priority Destination (works commencing 2019 – 2022) includes Rozelle Bay and Bays Waterways (Blackwattle and Johnston Bays). Longer-term Priority Destinations (works commencing 2022 and beyond) include the Rozelle Rail Yards.

The cumulative impacts of the M4-M5 Link and The Bays Precinct project could result in a considerable shift in land use, built form and landscape character as disused and under-utilised land areas are developed. Better public access to the waterfront and waterways and the introduction of community facilities such as the proposed waterfront promenade and on-water recreation facilities would also potentially lead to a greater numbers of receptors utilising the general area for recreation.

There is opportunity for integration between the sites to ensure a balanced outcome from a visual amenity, active transport and heritage interpretation perspective. Roads and Maritime has been working with UrbanGrowth NSW to ensure their early plans for The Bays Precinct have been considered in relation to the design of the Rozelle interchange.

8.3.2 Parramatta Road Corridor Urban Transformation Strategy

The Parramatta Road Urban Transformation Strategy (approved in November 2016) is the NSW Government's 30-year plan, setting out how the Parramatta Road Corridor will grow and bring new life to local communities living and working along the corridor. The vision and principles of the Strategy are designed to optimise the benefits of the NSW Government's investment in WestConnex. The Strategy is enabled by removing significant volumes of traffic from Parramatta Road as a result of the M4-M5 Link project and other WestConnex stages.

The corridor spans 20 kilometres and includes eight identified urban renewal precincts. The Pyrmont Bridge Road tunnel site (C8) is located within the Camperdown precinct, the eastern most of the urban renewal precincts.

The strategy for the Camperdown precinct identifies the 'Camperdown Triangle' at the intersection of Parramatta Road, Pyrmont Bridge Road and Mallett Street as a potential biomedical hub. One of the key actions for the Camperdown precinct is to prioritise land use for biotechnology and employment uses that support the growth of the nearby institutions, such as RPA Hospital and Sydney University. Plans for the Camperdown precinct also include reinforcing active transport over private vehicle

movements and improving high capacity public transport connections along Parramatta Road to the Sydney CBD.

Development of the precinct is expected to occur over a longer timeframe (the next 20 years) and as a result, is unlikely to overlap with the construction period of the project, thereby avoiding potential simultaneous and cumulative construction impacts. Following construction, the Pyrmont Bridge Road tunnel site (C8) site would be remaining project land and subject to the Residual Land Management Plan. There is opportunity for this remaining project land to be developed in consideration of the objectives of the Parramatta Road Urban Transformation Strategy however this is beyond the scope of the project. Future development and/or use of this site would be detailed in the Residual Land Management Plan. This generally lends to the likelihood of positive cumulative visual impacts.

9 Management of impacts

The detailed design and construction of the M4-M5 Link project would be managed to ensure that, as far as possible, the identified landscape and visual impacts are minimised by implementation of a range of general and specific measures.

9.1 Landscape character and visual impact mitigation strategy

The landscape and visual impact mitigation strategy for the project is to:

- Avoid, reduce and manage identified potential landscape and visual impacts during construction and operation
- Provide substantial mature and semi-mature street-tree planting for screening and shade, and mixed sizing of planting where stratification of the canopy is desired
- Provide high quality finishes to buildings and ventilation facilities to facilitate long term durability of the design for effect with minimal maintenance, eg use of hard rock rather that concrete with a pigment which may fade over time
- Improve open space to offset additional infrastructure, eg provision of street trees to adjoining local streets affected by the project
- Improve active transport links to reduce reliance on motorway and local roads for short journeys.

An Urban Design and Landscape Plan (UDLP) would be prepared based on the detailed design of the project. The UDLP would be prepared with consideration of the recommendations made in this LVIA. The UDLP is to be prepared in consultation with relevant councils, the community and affected landowners and businesses.

9.1.1 General recommendations

A series of general recommendations are provided to mitigate construction and operational impacts, and are presented in **Table 9-1**.

Table 9-1 Landscape and visual impact mitigation strategy – general recommendations

Impact	No.	Mitigation strategy	Timing
General impacts to landscape and visual amenity	LV1	Ancillary facilities, including the locations of visible structures and plant and perimeter fencing and treatments, will be developed to minimise visual impacts for adjacent receivers where feasible and reasonable.	Construction
	LV2	Site lighting will be designed to minimise glare issues and light spillage in adjoining properties and would be generally consistent with the requirements of *Australian Standard 4282-1997 Control of the obtrusive effects of outdoor lighting*.	Construction
	LV3	Regular maintenance of site hoarding and perimeter site areas should be undertaken, including the prompt removal of graffiti.	Construction
	LV4	Construction worksites and construction ancillary facilities will be established to minimise the need to remove screening vegetation wherever practicable.	Construction
	LV5	Hoardings and temporary noise walls will be erected as early as possible within the site establishment phase to provide visual screening.	Construction

Impact	No.	Mitigation strategy	Timing
	LV6	Acoustic sheds will be designed to be visually recessive and minimise potential overshadowing impacts where possible.	Construction
	LV7	Where necessary, construction lighting will comply with the requirements of the Civil Aviation Safety Authority and Sydney Airport at all times.	Construction
	LV8	Visible elements of operational facilities will be designed to satisfy functional requirements and adopt the design principles detailed in the M4-M5 Link Urban Design Report. The proposed designs will be documented in the UDLP for the project.	Construction
	LV9	The slopes of vegetated batters that form part of the final urban design and landscaping solution will be limited to no more than 1:4 where possible in order to maximise the impact of vegetation on these batters and minimise maintenance.	Construction
	LV10	Where construction ancillary facilities are located in close proximity to sensitive residential receivers such as residents and users of recreational space, high quality fencing suitable for parks and public spaces should be considered.	Construction

9.1.2 Design recommendations

A series of recommendations are provided in **Table 9-1** and have been developed to inform the detailed design of specific project elements. They have been developed to ensure the project would reduce and manage specific landscape and visual impacts during operation, previously identified in **Chapter 7** of this report.

Table 9-2 Landscape and visual impact mitigation strategy – design recommendations

Impacts	No.	Mitigation strategy	Timing
Impacts to visual amenity as a result of the Darley Road motorway operations complex	LV11	Investigate options for planting of vegetation to screen residents on the southern side of Darley Road from the Darley Road motorway operations complex. Include feasible and reasonable measures in the relevant UDLP.	Construction
	LV12	Architectural design and detailing of the water treatment facility, substation and front fencing should achieve articulation, visual interest, and integrate with the streetscape.	Construction
Impacts to visual amenity at the Rozelle interchange	LV13	Integrate the new open space at Rozelle with the Lilyfield Road streetscape through considered street tree planting and associated landscape works.	Construction
	LV14	Implement urban design and landscape measures that allow permeable views between the City West Link carriageway and the new open space to provide a sense of openness and connection with the open space for motorists and the community.	Construction

Impacts	No.	Mitigation strategy	Timing
	LV15	Investigate measures to minimise view impacts of the project to sensitive residential receptors in the vicinity of the Rozelle Rail Yards as described in this assessment and include in the UDLP where reasonable and feasible.	Construction
	LV16	Develop a design that aims to incorporate the ventilation outlets at the Rozelle Rail Yards as an integral component of the larger open space composition, with reference and consideration to the Ventilation Facility Design Review (Annexure 2 of **Appendix L** (Technical working paper: Urban design)).	Construction
	LV17	Consult with UrbanGrowth NSW regarding the interface between the project footprint and the White Bay Power Station precinct. Design the interface to ensure compatibility between the two areas from a landscaping, visual, heritage and active transport connectivity perspective.	Construction
	LV18	Investigate measures to retain the mature trees of high retention value adjacent to the light rail corridor at the corner of The Crescent and City West Link, or provide screen planting alongside the retaining wall edge of the light rail corridor, to minimise landscape and visual impacts.	Construction
Impacts to visual amenity at Iron Cove Link	LV19	Investigate vegetative and other screening measures along Victoria Road to improve the visual amenity of the streetscape and reduce impacts associated with the ventilation outlet and increased glare from the portals to residential dwellings to the north of Victoria Road.	Construction
	LV20	Provide a well-articulated, integrated car parking and landscape design for the bioretention facility in Manning Street that is place sensitive, and enhances the interface between the project and both King George Park and adjacent residences.	Construction
Impacts to visual amenity at St Peters interchange	LV21	The UDLP for the area adjoining Campbell Road motorway operations complex is to be consistent with the New M5 UDLP at St Peters.	Construction
Visual amenity impacts associated with design of ventilation outlets at Rozelle, Iron Cove Link and St Peters	LV22	Investigate measures during detailed design to reduce the height, bulk, scale and enhance the landscape setting of the ventilation outlets, subject to achieving desired ventilation outcomes, and in accordance with the design principles detailed in the M4-M5 Link Urban Design Report.	Construction

10 Conclusion

The project generally provides a moderate to low level of landscape character and visual impacts. This is due in large measure to the following elements which have been incorporated into the concept design through a process of design development which involved gradual refinement to avoid or minimise impacts where possible:

- Undergrounding of the majority of the road infrastructure at Rozelle Rail Yards, and provision of extensive and well-considered open space above including two major north south pedestrian/cycle connections over City West Link, linking Lilyfield with Rozelle, and one east west pedestrian/cycle connection under Victoria Road, with potential for future connection to Bays Precinct
- The integration of the Iron Cove Link within a well-considered streetscape setting, and locating of the ventilation outlet within the centre median rather than abutting existing residential development
- Integration of the Campbell Road ventilation facility within the New M5 portals and separated from nearby residences.

Key visual impacts of the project during construction primarily relate to residential receptors and result from building and tree removal, visibility and overshadowing of residences from acoustic sheds, noise walls and hoardings, and visibility of constructional activities such as spoil haulage. The magnitude of these impacts vary are due to the proximity of receptors, duration of the view and the scale and visibility of construction works. These impacts are temporary in nature and would be mitigated where possible through appropriate siting of infrastructure, materials and finishes of sheds and hoarding, and management of light spill.

The key landscape character impacts of the project relate to sensitive landscape character zones that are likely to experience a noticeable change in outlook as a result of new operational infrastructure or landscape elements. These areas include the Easton Park residential precinct, White Bay Power Station precinct, Callan Park residential precinct and Barwon Park precinct.

Visual impacts arising from the project primarily relate to new permanent operational infrastructure and landscape elements impacting on existing views. In particular, ventilation facilities at the Rozelle interchange, Iron Cove Link and St Peters interchange are of contrasting bulk, scale and form when compared to other built form elements within existing views. Key visual receptors subject to high visual impacts include:

- Residential and recreational receptors surrounding Easton Park at Rozelle, which would have open views of the Rozelle ventilation facility and outlets. Vegetation within the new open space created by the Rozelle interchange would eventually screen some of this view
- Recreational receptors at Glebe Foreshore Parklands, which, as a result of the clearing of vegetation at the south western corner of City West Link and The Crescent, opening views across Rozelle Bay and to the Rozelle ventilation facility and outlets. This view is in the context of other infrastructure visible in the skyline such as the Anzac Bridge and Glebe Island silos
- Residential, pedestrian and light rail patron receptors near the Rozelle Bay light rail stop, which would have new, open views toward the Rozelle interchange including ventilation outlets, new open space and associated active transport infrastructure. However, new views towards the city skyline would also be created
- Residential receptors along Terry Street at Rozelle, which would experience a change in view associated with the Iron Cove Link ventilation outlet encroaching into the existing view to Callan Park.

Other key visual impacts comprise assessed high view loss at two locations: free-standing dwellings located on Foucart Street near the corner of Lilyfield Road and residences within the vicinity of Hutcheson Street and Denison Street near Lilyfield Road. These dwellings look east across part of the Rozelle Rail Yards, and south across the western part of the Rozelle Rail Yards respectively with views to the city skyline to the city skyline. While these locations would experience a change in skyline view, there would also be an enhancement of foreground view associated with the new open space and active transport connections through the Rozelle interchange, providing additional community benefits to these areas.

Mitigation and design measures that have been recommended for the project to minimise identified visual impacts include:

- Integrating the new open space at Rozelle with the Lilyfield Road streetscape through considered tree planting and associated landscape works
- Investigating measures during detailed design to reduce the height, bulk and scale of ventilation outlets at Rozelle, Iron Cove and St Peters, and provide materials/finishes that reduce impacts to sensitive visual receiver locations
- Consultation with UrbanGrowth NSW to ensure that in the area where the project interfaces with the White Bay Power Station precinct, the design achieves appropriate integration from a landscaping/ visual, heritage and active transport connectivity perspective
- At the St Peters interchange, making provision for soft landscape works within the motorway operations complex, which has substantial areas of hardstand visible from the public domain.

Although elements of the project will have a range of landscape and visual impacts on a number of different receptors (ranging from low to high impacts), the overall impacts of the project have been minimised through urban design. This includes the provision of landscape planting along and around key visible infrastructure such as ventilation facilities and motorway operations complexes. Over time and as these trees mature, the benefits provided by landscape planting will improve.

UDLPs have been prepared for the M4 East and New M5 projects. Similar plans will be prepared for the M4-M5 Link project. It is anticipated these plans will provide further guidance for specific project elements, and allow for additional architectural treatments and landscape works to further minimise impacts.

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Annexures

Annexure A - Aboriginal and Non-Aboriginal heritage items

Figure ID reference	Name	Significance / Site Type	Description
I658	Former general store, including interiors	Local (Leichhardt LEP 2013)	2 Hubert Street.
I819	Corner shop and residence, including interiors	Local (Leichhardt LEP 2013)	79 Allen Street.
4805738	Leichhardt (Charles St) Underbridge	Local (RailCorp S 170 Register)	The Charles Street Underbridge is part of the original infrastructure for the Metropolitan Goods Line. It is a highly visible landmark structure over Charles Street.
C34	Toxteth Heritage Conservation Area	Local (Sydney LEP 2012)	Jubilee Park forms part of the Toxteth conservation area which demonstrates the first period of European development in Glebe.
I648	Jubilee Park and Oval including cricket pavilion, oval with picket fence and landscaping	Local (Sydney LEP 2012)	Once part of Federal Park, Jubilee Park was excised and named to mark the celebrations of fifty years of local government on 2 August 1909. It features Moreton Bay figs, Canary Islands palms and some rainforest trees planted between 1906 and 1910. A cricket pavilion was constructed in 1910. In 1923 a rotunda was built in the park to accommodate the Glebe Brass Band.
I647	Pope Paul VI Reserve including trees	Local (Sydney LEP 2012)	Named to commemorate the first Papal visit to Australia in December 1970, the Reserve previously featured a wharf but reclamations created a marine reserve. Pope Paul alighted from a launch at this site. It includes two mature Moreton Bay Figs (Ficus macrophylla), located on a gently sloping open lawn area. The trees visually dominate the reserve and create a dramatic sense of place.
I630	Johnstons Creek including canal and bridge	Local (Sydney LEP 2012)	Johnston's Creek was converted from a natural watercourse into a brick and concrete channel in the 1890s.

Figure ID reference	Name	Significance / Site Type	Description
I815	Allan truss bridge, former Federal Road Bridge	Local (Sydney LEP 2012)	This bridge was constructed in the 1890s and is a rare remaining timber road bridge within a City context. It crosses Johnston's Creek and connects Jubilee Park to Federal Park. It was reconstructed in 1998-2000 and converted into a footbridge.
I30	Federal Park including landscaping	Local (Sydney LEP 2012)	The Park consists of open space, grassed surface and tree plantings. Park Land around Johnston's Creek including mature trees. Trees include Moreton Bay Figs, Weeping Willows, Willow Canary Island Palms, Brush Box. The Park and its landscaping is considered to have townscape, social and cultural significance.
C1	Annandale Heritage Conservation Area	Local (Leichhardt LEP 2013)	One of a number of conservation areas that collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891, with pockets of infill up to the end of the 1930s. Displays a fine collection of large detached Victorian Italianate boom period villas with most decorative details still intact, set in gardens. Demonstrates the most extensive example of the planning and architectural skills of Ferdinand Reuss.
I83	Sandstone retaining wall	Local (Leichhardt LEP 2013)	Johnston Street, intersection with Rose Street (road reserve).
I65	House 'The Abbey' including interiors	Local (Leichhardt LEP 2013)	272 Johnston Street. Part of a group of eight (260-272) heritage houses known as the 'Johnston Street group' A complex mansion in the Gothic style incorporating an earlier residence now screened with a cloister. built in 1881-1882, The building steps down the site building up in mass toward the front centering on the tower, the whole being strengthened by numerous flanking chimneys, turrets and a ballroom. Walls are of rock faced coursed ashlar with chisel draughted edges and dressed copings. The roof is patterned terra cotta tiles with copper to the tower. Reinforced concrete is used extensively including the first known cantilever.

Figure ID reference	Name	Significance / Site Type	Description
I64	House 'Oybin' including interiors	Local (Leichhardt LEP 2013)	270 Johnston Street. Part of the 'Johnston Street group' of houses. An example of a single storey Victorian Italianate villa constructed in 1880. The distinct central square tower, centre front porch with central archway, pilasters, entablature and balcony above with colonnade balustrade are significant and make a positive contribution to the streetscape.
I66	Street trees Brush Box	Local (Leichhardt LEP 2013)	A row of Brush Box that line much of Johnston Street.
I59	Large sandstone wall and gateways to homes	Local (Leichhardt LEP 2013)	258-272 Johnston Street. Wall and gateways adjoining the 'Johnston Street group' of houses.
I63	House 'Greba' including interiors	Local (Leichhardt LEP 2013)	266 Johnston Street. Part of the 'Johnston Street group' of houses. Good example of a 19th century Italianate villa.
I62	House 'Hockingdon' including interiors	Local (Leichhardt LEP 2013)	264 Johnston Street. Part of the 'Johnston Street group' of houses. One of three of a group known as the 'Witches Houses'.
I61	House 'Highroyd' including interiors	Local (Leichhardt LEP 2013)	262 Johnston Street. Part of the 'Johnston Street group' of houses. One of three of a group known as the 'Witches Houses'.
I60	House 'Kenilworth' including interiors	Local (Leichhardt LEP 2013)	260 Johnston Street. Part of the 'Johnston Street group' of houses. One of three of a group known as the 'Witches Houses'.
I58	Sandstone retaining wall and Winkworth steps	Local (Leichhardt LEP 2013)	The Johnston Street 'Winkworth Steps'' are of local historic, aesthetic and technological significance as a late Victorian structure. The wall and stairs retain their original form but the palisade fence has been replaced. Overall the wall and fence make a positive visual contribution to this section of Johnston Street and the lower part of Rose Street.
I57	North Annandale Public School including interiors	Local (Leichhardt LEP 2013)	196 -212 Johnston Street.
I56	House including interiors	Local (Leichhardt LEP 2013)	191 Johnston Street.

Figure ID reference	Name	Significance / Site Type	Description
I77	War memorial	Local (Leichhardt LEP 2013)	Piper Street.
I76	Hinsby Reserve	Local (Leichhardt LEP 2013)	Piper Street.
I55	Substation including interiors	Local (Leichhardt LEP 2013)	182 Johnston Street.
I54	House including interiors	Local (Leichhardt LEP 2013)	134 Johnston Street.
I53	House including interiors	Local (Leichhardt LEP 2013)	132 Johnston Street.
C1	Annandale Heritage Conservation Area	Local (Leichhardt LEP 2013)	One of a number of conservation areas that collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891, with pockets of infill up to the end of the 1930s. Displays a fine collection of large detached Victorian Italianate boom period villas with most decorative details still intact, set in gardens. Demonstrates the most extensive example of the planning and architectural skills of Ferdinand Reuss.
I79	Avenue of Phoenix canariensis	Local (Leichhardt LEP 2013)	Row of mature Phoenix canariensis palms defining open space and associated with Inter War Period plantings located within the road reserve along Railway Parade.
I78	Street Trees – row of palms	Local (Leichhardt LEP 2013)	Row of mature palms along Railway Parade located within the road reserve.
I10	Street Trees row of brush box	Local (Leichhardt LEP 2013)	Row of brush box planted along the road way at Bayview Crescent.
I11	Iron/sandstone palisade fence	Local (Leichhardt LEP 2013)	Fence located along the north western side of Bayview Crescent within the road reserve.
I7	Semi-detached house, 'Pen Dinas', including interiors	Local (Leichhardt LEP 2013)	342 Annandale Street, Annandale.
I8	Shop and residence including interiors	Local (Leichhardt LEP 2013)	349 Annandale Street, Annandale.
I4	Former shop and residence, ' Craiglea' including interiors	Local (Leichhardt LEP 2013)	291 Annandale Street, Annandale.

Figure ID reference	Name	Significance / Site Type	Description
I9	Street Trees	Local (Leichhardt LEP 2013)	Annandale Street, road reserve between Piper Street and Booth Street.
I6	Terrace including interiors	Local (Leichhardt LEP 2013)	302 Annandale Street.
I74	White's Creek Aqueduct	State (SHR ,Leichhardt LEP 2013)	Completed in 1897, the Whites Creek Sewage Aqueduct is a major and highly visible component of the Northern Main Sewer extension of the Bondi Ocean Outfall Sewer. The arches and carrier of the aqueduct are one of the first major constructions undertaken using reinforced concrete in NSW and one of the first in Australia and the slender proportions of the supporting arches and sewage carrier make it not only functional, but also a major landmark for Sydney.
I26	Substation, Sydney Water (SP:5), including interiors	Leichhardt LEP 2013 – Local I26	1B Hutchinson Streets, at the corner of Railway Parade near Whites Creek park.
#8	Arched Bridge (at Whites Creek)	Local (SREP 26)	No information available and inaccessible to make a description.
I360	House, “Tilba Tilba”, including interiors	Local (Leichhardt LEP 2013)	18 White Street.
I675	Former factory, including interiors	Local (Leichhardt LEP 2013)	111 Moore Street.
I705	House, 'Rutherford', including interiors	Local (Leichhardt LEP 2013)	243 Balmain Road.
I704	'Grenfell Cottage', including interiors	Local (Leichhardt LEP 2013)	23 Ainsworth Street.
I674	Former corner shop and residence, including interiors	Local (Leichhardt LEP 2013)	77 Moore Street.
C16	Brennan’s Estate Heritage Conservation Area	Local (Leichhardt LEP 2013)	This conservation area is sited on the southeast slopes of the main Lilyfield Road/Darling Street ridge. It overlooks Whites Creek and across to Annandale. This area comprises workers’ housing built to serve the industries along Whites Creek and Rozelle Bay. It covers much of John Ryan Brennan’s subdivision of the land.

Figure ID reference	Name	Significance / Site Type	Description
I722	Former shop and residence, including interiors	Local (Leichhardt LEP 2013)	60 Ryan Street, Lilyfield.
I723	Former shop and residence, including interiors	Local (Leichhardt LEP 2013)	62 Ryan Street, Lilyfield.
I714	Timber Cottage, including interiors	Local (Leichhardt LEP 2013)	8 Fred Street, Lilyfield.
45-6-2278	Lilyfield Cave	Rock shelter with midden	Situated in the cliff face of 81 Lilyfield Road facing south-west is a rock shelter with primarily bare sandstone flooring and a slight midden deposit.
4571704	Sewage Pumping Station No.6	Local (Sydney Water S170 Register)	168 Lilyfield Road, Rozelle. SP0006 is of historic, aesthetic and technical/research significance forming part of an original network of 20 low level sewage pumping stations constructed at the end of the 19th century to serve Sydney.
C18	Easton Park Heritage Conservation Area	Local (Leichhardt LEP 2013)	The Easton Park Conservation Area occupies a small knoll of land above Whites Creek, and the small valley to its north, now largely occupied by Easton Park (reclaimed from Rozelle Bay). One of a number of conservation areas which collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891, with pockets of infill up to the end of the 1930s (ie prior to World War II).
C19	Hornsey Street Heritage Conservation Area	Local (Leichhardt LEP 2013)	Situated around a small knoll of land above Victoria Road, and just above the Whites Creek estuary and the industrial areas of Rozelle Bay. There are views across to Rozelle Bay and the city skyline. One of a number of conservation areas which collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891, with pockets of infill up to the end of the 1930s (ie prior to World War II).

Figure ID reference	Name	Significance / Site Type	Description
#2	Former Hotel, 78 Lilyfield Road.	Local (SREP 26)	Late 19th Century building, in the Victorian regency style. No official statement of significance in the listing for this item. It is representative of the predominantly Victorian development of the area, which expanded in conjunction with industrialisation of the area.
I765	Cottage and former broom factory, including interiors	Local (Leichhardt LEP 2013)	84 Foucart Street, Lilyfield.
I752	Easton Park	Local (Leichhardt LEP 2013)	Dension Street.
I755	House, 'Rotherhithe Cottage', including interiors	Local (Leichhardt LEP 2013)	73 Denison Street, Rozelle.
I753	Corner shop and residence including interiors	Local (Leichhardt LEP 2013)	67 Denison Street, Rozelle.
I754	Corner shop and residence including interiors	Local (Leichhardt LEP 2013)	69 Denison Street, Rozelle.
I730	Semi-detached house, including interiors	Local (Leichhardt LEP 2013)	15 Burt Street, Rozelle.
I731	Semi-detached house, including interiors	Local (Leichhardt LEP 2013)	17 Burt Street, Rozelle.
I732	Smith's Hall including interiors	Local (Leichhardt LEP 2013)	56 Burt Street, Rozelle.
I764	House including interiors	Local (Leichhardt LEP 2013)	206 Evans Street, Rozelle.
I767	Semi-detached house including interiors	Local (Leichhardt LEP 2013)	120a Foucart Street, Rozelle.
I766	Semi-detached house including interiors	Local (Leichhardt LEP 2013)	122 Foucart Street, Rozelle.
I771	House, 'Hornsey', including interiors	Local (Leichhardt LEP 2013)	42 Hornsey Street, Rozelle.
I768	St Joseph's Catholic Church, Rozelle	Local (Leichhardt LEP 2013)	7 Gordon Street Rozelle.

Figure ID reference	Name	Significance / Site Type	Description
I788	St Joseph's presbytery, including interiors	Local (Leichhardt LEP 2013)	15 Quirk Street, Rozelle.
PL1	Victoria Road Bridge	Potential Local	The Victoria Road bridge dates from the 1920s, the same era as its Catherine Street counterpart which is listed as a local heritage item on the Leichhardt LEP. It is constructed of concrete on brick piers, which carries Victoria Road across the former rail yard, with the brick piers forming bays below. The bridge was likely constructed using bricks from the State Brickworks at Homebush Bay. The bridge has local significance as a representative example of brick overbridges constructed in the 1920s, as part of the roll out of the separate freight line across the Sydney rail network. The bridge is a noticeable landscape feature that provides evidence of the Rozelle Rail Yard's industrial and transport legacy.
5001335	White Bay Power Station	State (SHR, SREP 26, SHFA S170, Pacific Power S170 Register)	White Bay Power Station was the longest serving Sydney power station and is the only one to retain a representative set of machinery and items associated with the generation of electricity in the early and mid-20th century. It is a widely recognised and highly visible landmark, marking the head of White Bay and the southern entry to the Balmain Peninsula and its industrial waterfront. It retains a powerful physical presence and industrial aesthetic and is the most important surviving industrial building in the area.
PL2	Former hotel site	Potential Local	Outside of the White Bay Power Station SHR curtilage, however, is identified as being of Moderate significance, in the 2013 Conservation Management Plan.
PL3	Southern penstock	Potential Local	Outside of the White Bay Power Station SHR curtilage, however, is identified as being of High significance, in the 2013 Conservation Management Plan.
5051118	Glebe Island Bridge	State (SHR,SREP)	The Glebe Island Bridge, across Johnstons Bay, was constructed between1899-1903 and demonstrates one of the earliest examples of an electric-powered swing bridge in Australia.

Figure ID reference	Name	Significance / Site Type	Description
Need ref	Glebe Island Silos	Local (SREP 26)	The silos form part of the original Glebe Island Grain Terminal, one of the earliest terminals in Australia beginning operation in 1921. It utilised technologies that were influential in the development of the industry throughout the country. The silos are the most visible and easily interpreted elements of the former use and form a significant landmark.
4570343	Whites Creek Stormwater Channel No 95	Local (Sydney Water S170)	Constructed progressively during the period 1898 to 1938, this is one of the earliest purpose built stormwater drains constructed. In general, the visual curtilage can be described as follows: 1) The upper reaches of the channel, located south of Booth and Moore streets Annandale, is an underground structure, and holds no cultural landscape value. 2) The open sections of the channel stretches from Booth and Moore streets to the discharge point at Rozelle Bay. 3) At its lower reaches visual curtilage is limited to where the channel can be observed between City West Link and Railway Parade and from within the Whites Creek Valley Park.
4803231	Annandale (Railway Parade) Railway Bridge	Local (SREP 26, Railcorp S170)	The Annandale (Railway Parade) railway bridge has local significance as an integral part of a separate railway network built between 1910 and 1922 for freight trains to traverse the metropolitan area independent of the passenger train network. This type of half-through Pratt truss is comparatively rare in the NSW railway system. The bridge retains its original fabric and structure.
4801104	Glebe Railway Viaduct	State (SHR, Leichhardt LEP 2013)	The Glebe Viaduct across Jubilee Park and Wentworth Park has state significance as an excellent example of large scale brick arch bridge construction. The 28-span Jubilee Park Viaduct is significant as the longest section of brick arch viaduct on the NSW system. It is a major engineering work, built on reclaimed land with the brickwork sitting on timber piles. The viaduct is an elegant structure built on a curve with well detailed arches. It is situated in Federal Park.

Figure ID reference	Name	Significance / Site Type	Description
SREP 26 #9	Annandale (Johnston Street) Underbridge	Local (SREP 26, Railcorp S170)	Johnston Street Annandale. The underbridge has local significance as an integral part of a separate railway network built between 1910 and 1922 for freight trains to traverse the metropolitan area independent of the passenger train network. The riveted steel half-through Pratt truss bridge is significant as an example of a heavy-duty structure in keeping with NSW Railways design policy to allow for anticipated future heavy traffic loads, locomotives and rolling stock. This type of half-through Pratt truss is comparatively rare in the NSW railway system. The bridge retains its original fabric and structure.
4571704	Sewage Pumping Station No.6	Local (Sydney Water S170 Register)	Historically the sewage pumping station formed part of an original network of 20 low level sewage pumping stations constructed at the end of the 19th century to serve Sydney.
#3	“Cadden Le Messurier”, 84 Lilyfield Road	Local (SREP 26)	Modified late 19th century commercial building, with significant changes to the façade and joinery. No official statement of significance in the listing for this item. It is representative of the predominantly Victorian development of the area, which expanded in conjunction with industrialisation of the area.
#6	Lilyfield stormwater canal	Local (SREP 26)	The Lilyfield stormwater canal is exposed and extends under the study area. However, no physical inspection could be undertaken on this portion of the canal to enable an assessment of the elements present on the site and their relative heritage significance.
PL4	Sandstone cutting, Rozelle	Potential Local	The sandstone cutting represents the scale and nature of works undertaken for the construction and alignment of the goods rail line. The height and size of the cutting provides evidence of the early ambitions for the train marshalling yard to be a busy interchange. The cutting is a prominent landscape feature, defining the northern limit of the marshalling yard and more generally the topography of the twentieth-century industrial-maritime landscapes of White Bay and Rozelle Bay. There are potential links to quarrying activities on Glebe Island.

Figure ID reference	Name	Significance / Site Type	Description
4800245	Lilyfield (Catherine St) Overbridge	Local (Railcorp S170 and SREP 26)	This item has significance as a good representative example of a large brick overbridge constructed in the 1920s as part of the NSW railway network. It is an important functioning component of the inner Sydney road and rail network and a tangible link to the former goods line and yards.
17	Iron Cove Bridge	State (SREP SHC, RTA S170)	Iron Cove Bridge is an impressive steel truss bridge. It forms a local landmark that has a "gateway" quality for the suburbs of Balmain and Drummoyne due to its impressive size. The Bridge is comprised of aesthetically distinctive piers and abutments reflecting the Inter-War Art Deco style that was prevalent when it was first designed in 1942. It was the last steel truss bridge to be constructed in NSW using rivets for field connections prior to the introduction of high-strength bolts. The Iron Cove Bridge has been assessed as being of State significance.
C7	The Valley Heritage Conservation Area	Local (Leichhardt LEP 2013)	Comprises a large but tightly formed valley which falls south and east from the Darling Street ridge towards White Bay. It includes the civic buildings and the commercial zone of Rozelle on both sides of Victoria Road. This area is important for illustrating development for workers' and artisan housing particularly from 1871–1891. Through the mixture of shops, pubs and industrial buildings it demonstrates the nature of a Victorian suburb, and the close physical relationship between industry and housing in nineteenth century cities.
I746	York Buildings including interiors	Local (Leichhardt LEP 2013)	678 Darling Street.
I806	Former mechanics Institute, including interiors	Local (Leichhardt LEP 2013)	114 Victoria Road, Rozelle.

Figure ID reference	Name	Significance / Site Type	Description
PL5	House	Potential local	260 Victoria Road, Rozelle As a group of four (260 – 266) these properties may have local significance as representative of a transitional early Federation style typical of their period. The houses have some historical interest as evidence of the late nineteenth century and early twentieth century development and subdivisions which occurred along Victoria Road.
PL6	House	Potential local	262 Victoria Road, Rozelle.
PL7	House	Potential local	264 Victoria Road, Rozelle.
PL8	House	Potential local	266 Victoria Road, Rozelle.
PL9	House	Potential local	248 Victoria Road, Rozelle. As a relatively intact example of a pair (248-250) of early twentieth century residences the properties may have local significance as representative of Federation style. The houses have some historical interest as evidence early twentieth century development.
PL10	House	Potential local	250 Victoria Road, Rozelle.
C6	Iron Cove Heritage Conservation Area	Local (Leichhardt LEP 2013)	The Iron Cove Heritage Conservation Area is a northwest-facing shoreline area, running from Victoria Road along the back of the Darling Street commercial zone and the Darling Street ridge to Rowntree Street and Cove Street. One of a number of conservation areas that collectively illustrate the nature of Sydney's early suburbs and Leichhardt's suburban growth particularly between 1871 and 1891, with pockets of infill up to the end of the 1930s (ie prior to World War II).
I743	Rozelle Public School, including interiors	Local (Leichhardt LEP 2013)	663 Darling Street, Rozelle.
I744	St Paul's Church and neighbourhood centre, including interiors	Local (Leichhardt LEP 2013)	665A Darling Street.

Figure ID reference	Name	Significance / Site Type	Description
I786	Former Balmain Power Station administration building, including interiors	Local (Leichhardt LEP 2013)	Margaret Street, Rozelle.
I787	Former Balmain Power Station pumping station, including interiors	Local (Leichhardt LEP 2013)	Margaret Street, Rozelle.
I810 – I817	Terraces, including interiors	Local (Leichhardt LEP 2013)	2-16 York Place.
I751	Maxwell House, including interiors	Local (Leichhardt LEP 2013)	757 Darling Street, Rozelle.
PL11	House	Potential Local	8 Callan Street, Rozelle. The house at this location has aesthetic and representative significance at the local level as a good example of an interwar house with Arts and Craft Style details.
5051544	Callan Park Conservation Area and Buildings	State (SHR, S 170, SREP 22, Leichhardt LEP 2013)	The Kirkbride Block is the largest remaining mental institution in NSW and the first to be designed as a curative and therapeutic environment. The design and philosophy of 'moral therapy' treatment is evidenced in the intimate design of courtyards through to the long vistas over the hospital grounds and surrounding country. Much of the original fabric, character and setting for this major Victorian period design remain intact. Kirkbride complex's grounds include a number of landscape plantings and elements dating from the site's long involvement with the Director of the Royal Botanic Gardens.
45-6-1481	Midden	Midden	This midden (a collection of shells discarded from meals) is located within fill material on the reclaimed waterfront.
I15	Former Police Station, including interiors	Local (Leichhardt LEP 2013)	707 Darling Street, Rozelle.
I748	Single story shops including interiors	Local	731 – 735 Darling Street, Rozelle.
I749	Single storey commercial building, including interiors	Local (Leichhardt LEP 2013)	736 Darling Street, Rozelle.

Figure ID reference	Name	Significance / Site Type	Description
I750	Former Fire Brigade and Ambulance Training Centre, including interiors	Local (Leichhardt LEP 2013)	747 Darling Street, Rozelle.
I749	Single storey commercial building, including interiors	Local (Leichhardt LEP 2013)	736 Darling Street, Rozelle.
I744	St Paul's Church and neighbourhood centre, including interiors (Chapel Hill Rozelle Presbyterian church)	Local (Leichhardt LEP 2013)	665A Darling Street.
I745	St Thomas' Church group, including interiors	Local (Leichhardt LEP 2013)	668 Darling Street. Designed by Edmund Blacket in 1874 the Church was built, and later extended, in an early English Gothic style. The adjacent rectory, was constructed in 1882, in Victorian filigree style.
I27	Former Bedford Brickworks Group including chimneys, kilns and grounds	Local (Sydney LEP 2012)	Located on the corner of the Princes Highway and Sydney Park Road, the brickworks group includes two Patent kilns (Hardy Patent Kiln and Hoffman Patent Kiln), three downdraught kilns, four chimneys and some building remnants. The site represents an early brickworks that is still reasonably intact and retains good integrity with much of the original built fabric retained. The large chimneys and kilns are a landmark and a focus in the St Peters / Alexandria skyline.
I12	Terrace group including interiors, 2–34 Campbell Road	Local (Marrickville LEP 2011)	Two storey Victorian Regency style terrace house group. Continuous front parapet, and continuous front galvanised iron roof for balconies, face brick front wall (painted over) and timber vertical slat balcony balustrade. The houses represent early housing associated with the nearby brick making and potting works.
4571712	Alexandra Canal	State (SHR, Sydney Water S170,Sydney LEP 2012,)	Alexandra Canal is a rare example of 19th century navigational canal construction in Australia, being one of only two purpose built canals in the State. Intact original sections of the canal, comprising pitched dry packed ashlar sandstone, provides a textured and coloured finish which is aesthetically valuable in the cultural landscape.

Figure ID reference	Name	Significance / Site Type	Description
45-6-0751	Aboriginal site Shea's Creek	Artefact scatter, midden, deposit	This site was identified during construction of the canal in 1896 and comprised dugong bones and axe heads (500 metres apart) located within a layer of unctuous plastic dark bluish grey sandy clay with marine shells approximately five metres below the current ground surface. AHIMS currently lists the site as valid however the site card identifies that artefacts identified at the site were salvaged during construction of the canal.
I283	Remaining brick road and footpath paving and stone guttering, Victoria Street (near 2 Bishop Street)	Local (Marrickville LEP 2011)	The brick road, footpath paving and stone guttering of Victoria Street south of Princes Highway. An early road complex which includes a partially exposed brick road surface in a herringbone pattern. Timber boarding separates the sandstone guttering from the road. The footpaths have also been brick paved.
2030185	St Peters Anglican Church, 187-209 Princes Highway, St. Peters	State (SHR, Marrickville LEP 2011)	The site contains three main buildings (St Peters Church and hall; a former rectory, built in 1906; and the present rectory, built in 1996) and a remnant graveyard. The church's foundation stone was laid in 1838 and it was completed in November 1839, making it one of the oldest churches in Sydney. The church building is unique in that it is built of sun-dried bricks with stuccoed finish forming the walls.
C16	Goodsell Estate Heritage Conservation Area	Local (Marrickville LEP 2011)	Historically significant for demonstrating the principles and patterns of Marrickville's development from Colonial to contemporary eras. Frederick Goodsell's Steam Brick Factory and pit, located in the Heritage Conservation Area, was Sydney's first full steam-powered brickworks and the leading producer of its period (1869 onwards). The footprint of Camdenville Park overlays the site of the brickworks and the surviving terrace facing May Street was built by Goodsell and occupied by brick makers.
I273	Terrace housing, including interiors	Local (Marrickville LEP 2011)	105–119 May Street.
I276	Service garage	Local (Marrickville LEP 2011)	316 Princes Highway.

Annexure B - Assumptions and inputs to assessment

Rozelle interchange assessment assumptions

It is assumed:

- There would be lighting within the project parkland to share pathways and some nodal activity areas within the park.
- Rozelle maintenance depot:
  - The Rozelle maintenance depot is under construction at the time of writing. For the purposes of this assessment, this facility is considered to be operational to avoid confusion when looking at the photomontages, between 'existing' development which has approximated surface render treatments, and built form (eg buildings and pedestrian bridges) within the project site which is shown at white block forms. Architectural design and detailing of these elements would take place in the next phase of the project.

Iron Cove Link assessment assumptions

Noise walls or other noise attenuation measures may be required along or within the vicinity of the southern edge of the project. Given that the design of these walls would be subject to detail design as part of future stages of the project, and potentially noise attenuation requirements could be achieved by other means as part of an integrated design for remaining project land, a preliminary notional noise wall concept has been undertaken for separate assessment. This assumes a worst case scenario of an effectively continuous noise wall being required along the southern edge of the project.

St Peters interchange assessment assumptions

- The project works are broadly limited to the immediate area of the M4-M5 Link portals, and the ventilation and associated facilities above. The remainder of the St Peters interchange has been approved as part of the New M5 EIS process, and is at the time of writing in the early stages of construction.

  For the purposes of this assessment, it is assumed that these approved New M5 works have been completed, with the 'existing situation' soft landscape treatments assumed to be at an early stage of development, at 12–18 months into operation[7], and that these landscape works closely about the M4-M5 Link project site. Therefore, the New M5 works are referred to as the 'existing situation' within this assessment, eg from Receptor Location SP1 below: '*The project is set within the existing recently widened Campbell Street and Campbell Road, with broad verges and street tree planting to both sides ...*.' The 'existing situation' therefore comprises photomontages for this location, with only a limited amount of existing landscape and built form elements within them.

  This M4-M5 Link project is assessed as having been at operation for between 12 and 18 months, (refer Assessment Methodology – **section 2.3.4**), placing it at the end of 2024[8]. No landscape is proposed within the project site, ie all of the landscape associated with the M4-M5 Link project would already be in place as part of the New M5 project

- Street tree species within proximity of the project comprise Sydney Red Gum (*Angophora costata*) along Campbell Street (large trees conservatively estimated to achieve a mature height of 15–18 metres in this setting), and Broad-leaved Paperbark (*Melaleuca quinquenervia*) along

[7] Completion of the New M5 is programmed for the end of 2019. For the purposes of this assessment, the 'existing situation' is set at 12–18 months into operation (say mid-2021), such that there is sufficient landscape in place to clearly define the extent and nature of the landscape works. This is also the period at which this project was assessed within the New M5 EIS.

[8] This project (M4-M5 Link) is scheduled to be completed midway through 2023. If we then add 12–18 months to this date, we will be assessing the landscape at a period between the middle and end of 2024. Therefore, assuming completion of the New M5 project at the end of 2019, soft landscape works will be about five years old at the end of 2024.

Campbell Road (medium size trees conservatively estimated to achieve a mature height of 8–11 metres in this setting). Assumed tree heights were derived for the New M5 works to facilitate the preparation of the required photomontages. Refer below table.

Assumed Tree Heights			
New M5	**M4-M5**	**New M5**	
Project complete end 2019	Project complete mid 2023	Broad-leaved Paperbark	Sydney Red Gum
'Existing situation' Photomontage #1: 12–18 mths @ mid 2021		2.5–3.0 m	3.5–4.0 m
	Photomontage #2: 12-18 mths into operation @ end 2024	4.0–5.0 m	5.0–7.0 m
	Photomontage #3: 10 years into operation @ mid 2033	7.0–9.5 m	12.0–15.0 m
Estimated mature height		8.0–11.0 m	15.0–18.0 m

- All other trees within proximity of the project, ie alongside the eastern and western edges of the project, are conservatively assumed to have a mature height of 10–12 metres given that specific tree species of these areas were not available at the time of writing.

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Appendix P

Technical working paper: Social and economic

WestConnex

Roads and Maritime Services

WestConnex – M4-M5 Link

Technical working paper: Social and economic

August 2017

Prepared for

Roads and Maritime Services

Prepared by

Hill PDA Pty Ltd

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Glossary of terms and abbreviations

Term	Definition
A	
ABS	Australian Bureau of Statistics
AECOM	AECOM Australia Pty Ltd
Arterial roads	The main or trunk roads of the state road network that carry predominantly through traffic between regions
B	
Bioretention facility	Landscaped depression designed to treat stormwater runoff to remove contaminants and sediment
Bus lane	A traffic lane dedicated to buses, but which can also be used by taxis, bicycles and motorcycles
C	
Campbell Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project at St Peters
Campbell Road motorway operations complex	An area where operational ancillary facilities are established. Located within the St Peters interchange, south of Campbell Road at St Peters, on land occupied during construction by the Campbell Road civil and tunnel site
CBD	Central business district
CEMP	Construction Environmental Management Plan
CNVMP	Construction Noise and Vibration Management Plan
Concept design	Initial functional layout of a road/road system or other infrastructure. Used to facilitate understanding of a project, establish feasibility and provide basis for estimating and to determine further investigations needed for detailed design
Construction fatigue	Impact on receivers in the vicinity of concurrent and/or consecutive construction activities
CPI	Consumer price index
CPTED	Crime prevention through environmental design
CSSI	Critical State significant infrastructure
CTAMP	Construction Traffic and Access Management Plan
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own
D	
Darley Road civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Leichhardt
Darley Road motorway operations complex	An area where operational ancillary facilities are established. Located at Leichhardt, south of City West Link and the Inner West Light Rail line on land occupied during construction by the Darley Road civil and tunnel site
dBA	A-weighted decibels A-weighting is applied to instrument-measured sound levels in effort to account for the relative loudness perceived by the human ear, as the ear is less sensitive to low audio frequencies
DCP	Development Control Plan
Do minimum	A model scenario that does not incorporate the proposed project infrastructure
Do something	A model scenario that incorporates the proposed project infrastructure
Do something cumulative	A model scenario that incorporates the proposed project infrastructure and other relevant project infrastructure
DP&E	NSW Department of Planning and Environment
E	
EIA	Economic Impact Assessment
EIS	Environmental impact statement

Term	Definition
Environment	As defined within the *Environmental Planning and Assessment Act 1979* (NSW), all aspects of the surroundings of humans, whether affecting any human as an individual or in his or her social groupings
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
G	
GCCSA	Greater Capital City Statistical Area
GIS	Geographical information systems
GRP	Gross Regional Product
GSC	Greater Sydney Commission
GSP	NSW Gross State Product
Growing Sydney	*A Plan for Growing Sydney* (NSW Government 2014)
GVA	Gross Value Add
H	
Haberfield civil and tunnel site/Haberfield civil site	Construction ancillary facilities for the M4-M5 Link project located at Haberfield
HCA	Heritage Conservation Area
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System
Heritage item	Any place, building or object listed on a statutory heritage register
I	
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment
In situ	In the natural or original position. Applied to a rock, soil, or fossil when occurring in the situation in which it was originally formed or deposited
Inner West Council	The amalgamation of the former local government areas of Ashfield, Leichhardt and Marrickville, proclaimed on 12 May 2016
Inner West subsurface interchange	A subsurface interchange at Leichhardt and Annandale that would link the mainline tunnels with the Rozelle interchange and the Iron Cove Link
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways
Iron Cove Link civil site	A construction ancillary facility for the M4-M5 Link project located at Rozelle
Iron Cove Link motorway operations complex	An area where operational ancillary facilities are established. Located south of the realigned Victoria Road carriageway between Callan Street and Springside Street at Rozelle, on land occupied during construction by the Iron Cove Link civil site
Iron Cove Link ventilation facility	Ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels. Located at Rozelle
IVA	Industry Value Add
J	
Just Terms Act	*Land Acquisition (Just Terms Compensation) Act 1991* (NSW)
L	
LAC	Local Area Command
L_{Aeq}	The 'energy average noise level'
LCZ	Landscape character zones
LEP	Local Environmental Plan
LGA	Local government area
Local road	A road or street used primarily for access to abutting properties
LoS	Level of service
M	
m	Metres
m^2	Square metres
M4 East mainline stub tunnels	Eastbound and westbound extensions of the M4 East mainline tunnel being built as part of the M4 East project (to connect with the M4-M5

Term	Definition
	Link)
M4 East mainline connection	The underground connection between the M4-M5 Link mainline tunnels and the M4 East mainline stub tunnels
M4 East Motorway/project	A component of the WestConnex program of works. Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange
M4 Motorway	The M4 Motorway is a 40 kilometre motorway that extends from Concord in Sydney's inner west to Lapstone at the foothills of the Blue Mountains
M4 Widening	A component of the WestConnex program of works. Widening of the existing M4 Motorway from Parramatta to Homebush
M4-M5 Link	The project which is the subject of this EIS. A component of the WestConnex program of works
M5 East Motorway	Part of the M5 Motorway corridor. Located between Beverly Hills and Sydney Airport (General Holmes Drive)
M5 Motorway corridor	The M5 East Motorway and the M5 South West Motorway
M5 South West Motorway	Part of the M5 Motorway corridor. Located between Prestons and Beverly Hills
Mainline tunnels	The M4-M5 Link mainline tunnels connecting with the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters
MCOA	Minister's Conditions of Approval
MLALC	Metropolitan Local Aboriginal Land Council
Motorway	Fast, high volume controlled access roads. May be tolled or untolled
N	
NCA	Noise catchment area
New M5 mainline stub tunnels	Northbound and southbound extensions of the New M5 mainline tunnel being built as part of the New M5 project (to connect with the M4-M5 Link)
New M5 mainline connection	The underground connection between the M4-M5 Link mainline tunnels and the New M5 mainline stub tunnels
Northcote Street civil site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
NSW	New South Wales
NSW EPA	NSW Environment Protection Authority
P	
PAH	Polycyclic aromatic carbons
Parramatta Road East civil site	A construction ancillary facility for the M4-M5 Link project at Haberfield
Parramatta Road Transformation Strategy	The Parramatta Road Corridor Urban Transformation Strategy (UrbanGrowth NSW 2016)
Parramatta Road ventilation facility	A ventilation facility located on the south-eastern corner of the Parramatta Road / Wattle Street intersection (referred to as the Eastern ventilation facility in the M4 East project EIS). The facility is being built as part of the M4 East project. As part of the M4-M5 Link project, fitout works would be carried out on a section of this facility
Parramatta Road West civil and tunnel site	A construction ancillary facility for the M4-M5 Link project at Ashfield
Portal	The entry and/or exit to a tunnel

Term	Definition
Project	A new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange
Project footprint	The land required to construct and operate the project. This includes permanent operational infrastructure (including the tunnels), and land required temporarily for construction
Property	Based on ownership, with the potential to contain more than one lot and Deposited Plan (DP)
Proponent	The person or organisation that proposes to carry out the project or activity. For the purpose of the project, the proponent is NSW Roads and Maritime Services
Public transport	Includes train, bus (government and private), ferry (government and private) and light rail (government and private) services
Pyrmont Bridge Road tunnel site	A construction ancillary facility for the M4-M5 Link project at Annandale
R	
Roadheader	A commonly used machine for excavation in sandstone using picks mounted on a rotary cutter head attached to a hydraulically operated boom
Roads and Maritime	NSW Roads and Maritime Services
Rozelle civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Lilyfield and Rozelle
Rozelle East motorway operations complex	An area where operational ancillary facilities are established. Located at the western end of the Rozelle Rail Yards on land occupied during construction by the Rozelle civil and tunnel site
Rozelle interchange	A new interchange at Lilyfield and Rozelle that would connect the M4-M5 Link mainline tunnels with City West Link, Anzac Bridge, the Iron Cove Link and the proposed future Western Harbour Tunnel and Beaches Link
Rozelle Rail Yards	The Rozelle Rail Yards is bound by City West Link to the south, Lilyfield Road to the north, Balmain Road to the west, and White Bay to the east. Note that the project only occupies part of the Rozelle Rail Yards site
Rozelle ventilation facility	Ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels. Located at the Rozelle Rail Yards, the ventilation supply facility is located at the Rozelle West motorway operations complex and a ventilation exhaust facility at the Rozelle East motorway operations complex
Rozelle West motorway operations complex	An area where operational ancillary facilities are established. Located at the central/eastern end of the Rozelle Rail Yards, on land occupied during construction by the Rozelle civil and tunnel site
S	
SA1	Statistical Area 1 (ABS)
SA2	Statistical Area 2 (ABS)
SEARs	Secretary's Environmental Assessment Requirements. Requirements and specifications for an environmental assessment prepared by the Secretary of the NSW Department of Planning and Environment under section 115Y of the *Environmental Planning and Assessment Act 1979* (NSW).
SEIA	Socio-economic impact assessment
SEIFA	Socio-Economic Indexes for Areas

Term	Definition
Sensitive receiver/receptor	Includes residences, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching), active recreation areas (including parks and sports grounds), commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, retail spaces and industrial premises)
SEPP	State Environmental Planning Policy
SES	State Emergency Services
SMC	Sydney Motorway Corporation
Socio-economic	Involving combination of social and economic matters
Spoil	Surplus excavated material
State Infrastructure Strategy	*State Infrastructure Strategy 2012–2032* (Infrastructure NSW 2012)
State Infrastructure Strategy Update	*State Infrastructure Strategy – the State Infrastructure Strategy Update 2014* (Infrastructure NSW 2014)
St Peters interchange	A component of the New M5 project, located at the former Alexandria Landfill site at St Peters. Approved and under construction as part of the New M5 project. Additional construction works proposed as part of the M4-M5 Link project
Stub tunnel	Driven tunnels constructed to connect to potential future motorway links
Sydney LEP 2012	*Sydney Local Environmental Plan 2012*
Sydney Gateway	A high-capacity connection between the St Peters interchange (under construction as part of the New M5 project) and the Sydney Airport and Port Botany precinct
Sydney's Bus Future	*Sydney's Bus Future: Simpler, faster, better bus services* (Transport for NSW 2013)
Sydney's Cycling Future	*Sydney's Cycling Future: Cycling for everyday transport* (Transport for NSW 2013)
Sydney's Rail Future	*Sydney's Rail Future: Modernising Sydney's Trains* (Transport for NSW 2012)
T	
The Bays Precinct Transformation Plan	Transformation Plan: The Bays Precinct, Sydney (UrbanGrowth NSW 2015)
The Crescent civil site	A construction ancillary facility for the M4-M5 Link project located at Annandale
Transport for NSW	NSW Government Department Transport for NSW
TPA	Transport Performance Analytics
U	
UDLP	Urban Design and Landscape Plan
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments
V	
Ventilation facility	Facility for the mechanical removal of air from the mainline tunnels, or mechanical introduction of air into the tunnels. May comprise one or more ventilation outlets
Ventilation outlet	The location and structure from which air within a tunnel is expelled
VHT	Vehicle hours travelled
Victoria Road civil site	A construction ancillary facility for the M4-M5 Link project located at Rozelle
VKT	Vehicle kilometres travelled
VOCs	Volatile organic compounds

Term	Definition
W	
Wattle Street civil and tunnel site	A construction ancillary facility for the M4-M5 Link project located at Haberfield
Wattle Street interchange	An interchange to connect Wattle Street (City West Link) with the M4 East and the M4-M5 Link tunnels. Approved and under construction as part of the M4 East project. Additional construction works proposed as part of the M4-M5 Link project
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel component would connect to the M4-M5 Link at the Rozelle interchange, cross underneath Sydney Harbour between the Birchgrove and Waverton areas, and connect with the Warringah Freeway at North Sydney. The Beaches Link component would comprise a tunnel that would connect to the Warringah Freeway, cross underneath Middle Harbour and connect with the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Seaforth. It would also involve the duplication of the Wakehurst Parkway between Seaforth and Frenchs Forest
WestConnex program of works	A program of works that includes the M4 Widening, King Georges Road Interchange Upgrade, M4 East, New M5 and M4-M5 Link projects
WRTM	WestConnex Road Traffic Model

Executive summary

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to construct and operate the WestConnex M4-M5 Link (the project), which would comprise a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange.

Together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities.

The other component projects of WestConnex include the M4 East and New M5 (both with planning approval granted and under construction), M4 Widening and King Georges Road Interchange Upgrade (both with planning approval granted, construction completed and open to traffic).

This report assesses the socio-economic impact of the proposed construction and operation of the M4-M5 Link project. This report has been prepared as a technical working paper to the environmental impact statement (EIS). Information used for this assessment reflects the current available knowledge of the project. If approved, the project would progress to detailed design with further design adjustments and management strategies developed during this phase.

The socio-economic impact assessment identifies and assesses the potential positive and negative social, economic and business impacts that may arise due to the construction and operation of the project. Environmental management measures have been identified to avoid, reduce, mitigate or manage adverse impacts associated with the project. Cumulative impacts associated with successive, incremental, and/or combined effects of a project when added to other existing, planned, and/or reasonably anticipated future project have been analysed.

The socio-economic impact assessment has been undertaken in accordance with the Roads and Maritime *Environmental Impact Assessment Practice Note - Socio-economic assessment* (EIA-N05) and to address the Secretary's Environmental Assessment Requirements (SEARs) for the project. As part of this, the assessment considers a range of policy and strategy objectives at local, state and Commonwealth levels, and how the project complements these.

For the purpose of the report, Australian Bureau of Statistics (ABS) geographic boundaries (referred to as Statistical Area Level 2 (SA2)) were used to define the socio-economic study area. The study area includes:

- Ashfield-Haberfield Precinct including the suburbs of Five Dock, Abbotsford, Ashfield, Haberfield, Summer Hill, Burwood and Croydon
- Leichhardt-Glebe Precinct including the suburbs of Forest Lodge, Balmain, Rozelle, Lilyfield, Annandale, Leichhardt and a portion of Camperdown
- Alexandria-Erskineville Precinct including the suburbs of Erskineville, Alexandria, Newtown, Darlington, Redfern, Chippendale, Eveleigh, Sydenham, Tempe, St Peters, Petersham, Stanmore and a proportion of Enmore and Camperdown,

Although a study area has been defined, it is acknowledged that the spatial extent of potential effects would vary and would not be limited to the study area. For this reason, the impact assessment considers changes to the socio-economic environment both within the study area and further afield.

Design development

Since the inception of the M4-M5 Link project, various design options have been considered with respect to key components of the project. This included the location of interchanges, the alignment of the mainline tunnel and the inclusion and configuration of Iron Cove Link. This development process

has allowed the project to achieve enhanced outcomes in both an operational and environmental sense.

Engagement with the community and design testing has informed the progression of the concept design development. In response to community concern and design constraints, a number of substantial changes have been made to the project design. These amendments have been made to reduce the potential construction effects on the community and improve the overall project outcome.

Project design alterations to reduce potential socio-economic construction impacts include:

- Adjustment of the project footprint to avoid using Easton Park at Rozelle during construction and to minimise impact on Lilyfield Road and the heritage listed Sydney Water sewerage pumping station
- Adjustment of the project footprint to avoid using areas around Blackmore Park, Leichhardt during construction
- Deletion of a construction site in Derbyshire Road, Leichhardt adjacent to Sydney Secondary College (Leichhardt campus) to prevent amenity, traffic and heritage impacts
- As a result of the deletion of the Camperdown interchange, adjustment of the mainline tunnel alignment further to the west which has avoided construction impacts on the Royal Prince Alfred Hospital and the University of Sydney
- The selection of spoil haulage routes to primarily follow the arterial road network and avoid local roads
- The restriction of hours for spoil haulage from the Darley Road construction site to standard construction hours to avoid noise, traffic and amenity impacts on local residents.

In addition, a number of the concept design adjustments have been made to improve the project outcomes, these being:

- Inclusion of Iron Cove Link as part of project
- Adjustments of the Rozelle interchange design option to be located predominantly below ground and within the north of Rozelle Rail Yards. This has enabled the opportunity for the creation of a significant open space area and active transport links (north–south and east–west) as a result of the undergrounding of transport infrastructure
- Removal of Camperdown ramps to reduce traffic impacts along Parramatta Road
- Adjustment of the mainline tunnel from three to four traffic lanes in each direction
- Selection of ventilation facility locations to minimise local air quality impacts on nearby receptors
- Adjustments to construction staging to enable the mainline tunnel to be operational one year ahead of the remainder of the project.

Despite these changes, the construction of the project would still result in impacts upon a range of socio-economic factors across the study area during construction and operation.

Construction and operation

Access and connectivity

During construction and operation, changes to parking, road, public transport and active transport networks would affect access and connectivity for road users, residents, business owners, social infrastructure users and visitors.

During construction, these changes are likely to arise from the establishment and operation of construction sites, portals, interchanges and ancillary infrastructure that trigger alterations or disruptions to traffic and transport connections and access to properties, businesses and social infrastructure. The greatest socio-economic impacts associated with this phase are expected to be those relating to the road network such as connectivity and congestion. Impacts upon pedestrian and cyclist connectivity, parking and public transport are not anticipated to be significant impacts.

Upon operation, the project would deliver an integrated motorway and local road network that would provide substantial benefits to Greater Sydney and would create opportunity for future connections to western and south-western Sydney, Sydney Airport and Port Botany. The overall socio-economic impact of the project during this phase is considered positive, improving transport efficiency, business connectivity and active transport connections.

Road network

Changes in road network connectivity and efficiency would occur across the study area as a result of construction and operation.

Impacts during construction would include traffic disruptions and diversions due to temporary, partial or full closures of roads, increased construction traffic (including heavy vehicles) and changes to speed limits near construction works. Direct and indirect traffic disruptions would be experienced on local and arterial roads in most suburbs that are in close proximity to construction sites. This would include the suburbs of Haberfield, Ashfield, St Peters, Camperdown, Annandale, Lilyfield, Leichhardt, Rozelle and Balmain. For most local roads, these modifications would be temporary with full access reinstated upon completion of construction works.

To reduce the potential impact on local streets and neighbourhoods, spoil haulage would be predominantly restricted to arterial roads. Darley Road is the exception to this where spoil haulage along this route would be restricted standard working hours (7.00 am to 6.00 pm Monday to Friday, 8.00 am to 1.00 pm Saturday and no work on Sundays). Properties along these roads may experience a marginal increase in travel time, however the variance from the existing environment is unlikely to be substantial and as such would only result in a minor negative impact on the socio-economic environment.

During construction, arterial roads are expected to experience more extensive impacts that would affect the efficiency of the regional road network. Increased traffic congestion would affect travel times, reducing the efficiency of freight and commercial vehicle operations, network accessibility and affecting the amount of time people can spend with family and friends or undertaking personal activities. Increased delays can also lead to health and wellbeing concerns such as greater, annoyance, stress and anxiety. The Construction Traffic and Access Management Plan (CTAMP) would provide measures to manage and mitigate major road network impacts. The effective implementation of these measures, including the implementation of a Community Communication Strategy aims to ensure all affected and interested parties are informed, to assist in reducing the extent of impacts on the socio-economic environment. The overall impact on the socio-economic environment would be a moderate negative.

Upon operation, the addition of the M4-M5 Link to the broader WestConnex and transport network would improve intersection performance, reduce travel times and increase average speeds across the network. The traffic modelling indicates that by 2033, there would be an overall increase of 499,000 kilometres travelled and a reduction of 46,000 vehicle hours travelled (VHT) on the network. This increase is largely due to the redirection of vehicles (in particular heavy vehicles) from surface roads to the new, faster M4-M5 Link.

While the overall number of hours spent travelling on the network, as a whole would reduce, the changes at a local level are varied. Adjustments to travel times would result in socio-economic impacts such as changes to the time available for recreation, social interaction and economic activities, all of which contribute to the maintenance of physical wellbeing and mental health.

Positive effects are most likely to be experienced by those travelling to or from western Sydney with the substantial improvements at the Wattle Street interchange during both the AM and PM peak periods. This is considered a major positive socio-economic impact as it would reduce travel time and improve access and connectivity for the large number of people living or working within greater western Sydney. This would also support the long-term economic growth of Sydney through improved motorway access and connections linking Sydney's international gateways to key places of businesses.

Despite overall improvements across the broader network, the project would affect the amenity and accessibility of some residential properties and social infrastructure facilities within the study area. These impacts are expected to be minor.

Once operational the broader WestConnex network would be subject to distance-based tolls. Whilst this has the potential to increase congestion on surrounding local roads (toll avoidance), traffic modelling undertaken for this EIS indicates no major shifts in daily forecast traffic onto alternative, parallel routes.

Despite minor reductions in the performance of localised areas of the road network, the operational project is predicted to improve the overall road network across Greater Sydney. The project is expected to deliver reduced travel times, reduce congestion, and decrease travel costs and traffic-related mental and physical health effects. The improvements to the network are considered a major socio-economic positive.

Parking

Changes to parking availability can affect both businesses and individuals through changes to daily routine, level of activity, and passing trade. Permanent reductions in on-street parking can deter visitors from accessing a business or community facility due to an increase in travel time and lack of convenience. It can also affect convenience and accessibility for residents accessing their properties, particularly those who rely on on-street parking.

During construction, the project would result in alterations to parking availability and an increased demand for parking near construction ancillary facilities and other work areas. This may affect the availability of parking for local residents, commuters, businesses and social infrastructure users. For example, the temporary loss of 20 on-street, unrestricted spaces along the western end of Darley Road may affect commuters that park in this area to access the Leichhardt North light rail stop. This would also increase demand for parking spaces on other nearby local streets.

To reduce the impact on the supply of car parking in the various neighbourhoods, construction compounds have been designed to provide around 700 dedicated car parking spaces for construction staff across the study area.

The extent of parking impacts around particular construction compounds would vary depending on the number of workers expected at each site and the availability of suitable alternative public transport options. In higher density areas, such as surrounding the Pyrmont Bridge Road tunnel site, an increase in construction worker would place additional pressure on parking availability. A reduction in the availability of parking on local streets during construction would mainly affect local residents and social infrastructure users, however some businesses may experience slight changes. A detailed construction car parking strategy would form part of the CTAMP and would be developed in consultation with local councils and affected stakeholders adjacent to project sites. The overall impact of construction on parking availability on the socio-economic environment would be minor negative.

The operation of the project would result in a permanent loss of 26 on-street parking spaces in Rozelle along Byrnes, Clubb, Toelle and Callan streets. These are residential streets in close proximity to King George Park in Rozelle. The majority of the 26 parking spaces are outside properties that would be acquired. The removal of these spaces would reduce the convenience of access, affecting a small number of local residents in Rozelle. Overall, the operational effects of the project on parking would be negligible.

Pedestrian and cyclists

Community consultation revealed that the existing active transport network is highly valued by the community.

Alterations to pedestrian and cycle routes have the potential to affect travel times, travel duration, movement patterns and accessibility. These changes can ultimately affect the people's daily routine or the appeal and enjoyment of the active transport network and other social infrastructure. The majority of diversion would not result in significant changes from the existing pedestrian and cyclist environment. To maintain connectivity, all necessary diversions would be in place prior to the removal of existing linkages (including overpass).

The safety and amenity of the pedestrian and cyclist environment would also be affected during construction. The introduction of construction hoardings and ancillary construction infrastructure has the potential to reduce sightlines, create concealed locations or may encourage anti-social behaviour such as graffiti.

A CTAMP would be prepared to ensure that the impact on pedestrian and cyclist networks are minimised and safe movement paths are provided during construction. Impacts would be relatively localised and would respond to mitigation measures (alternate routes, information provision). The overall impact on the socio-economic environment would be minor negative.

During operation, the project would deliver new active transport connections that would enhance access and connectivity for pedestrians and cyclists, particularly around the Rozelle, Annandale and Lilyfield communities. This would provide further socio-economic benefits through increased opportunities for social interaction and community cohesion, reduced car dependency and reduced cost of travel.

The project would link pedestrians and cyclists to popular waterfront and open space areas, such as the proposed open space at Rozelle Rail Yards, Glebe Foreshore, Easton Park, the Bay Run and King George Park in Rozelle. This has the potential to increase patronage for businesses located on Victoria Road, Annandale Street and Darling Street. Pedestrians and recreational and commuter cyclists would enjoy improved amenity (such as a reduction in noise and pollution) due to the location of routes further away from traffic, particularly through the Rozelle Rail Yards.

It is expected that these improvements would result in a significant, long-term change, at a local level, benefiting the suburbs of Annandale, Leichhardt, Lilyfield, Rozelle and Balmain. In addition, such improvements would contribute positively to the regional active transport network with the potential to affect a wider catchment of people. The provision of these additional links may also act as a catalyst for improvements to other active transport networks further afield. The consequence of impact is major, with a high likelihood. Therefore, the significance of impact is considered a major positive.

Public transport network

During construction, bus services in the project corridor and surrounding areas may be affected by the relocation of stops, increases in construction traffic and/or road alterations and delays. Community, stakeholder and business consultation identified changes to public transport as a concern. The business survey respondents suggested that about 16 per cent of staff and customers rely on public transport to access businesses within the study area.

The construction of the project would not directly affect heavy rail or light rail services. Passenger access to stations within or in proximity to the study area may however be affected by temporary traffic changes and congestion or an increase in competition for parking, arising from the presence of construction works. Access to light rail stops at Leichhardt North, Lilyfield and Rozelle Bay would be maintained during construction.

Impacts upon bus routes would likely be temporary and confined to certain routes only, with impacts managed and mitigated where possible through the CTAMP. Any changes to bus stops and bus services would be undertaken in consultation with Transport for NSW and the bus service provider, with relevant information being communicated to bus users. Overall, construction would have a slight consequence on public transport, with socio-economic effects possible. The overall significance of impact upon the socio-economic environment would be minor negative.

Upon operation, bus stops would be reinstated generally in the same location as existing. The project would complement the delivery of an integrated public transport approach, creating more capacity on the roads, which may facilitate other transport projects such as dedicated bus lanes. Bus services along Parramatta Road would improve, which would contribute to increased convenience for users, particularly commuters.

The travel time savings and time delays across the public transport network generally are considered minor (less than 10 minutes for each) and unlikely to deter a person from using public transport or result in any substantial impact upon a person's quality of life. As such, the proposed operational changes to the public transport network is considered to have a minor positive impact on the socio-economic environment.

Local amenity

Amenity is generally associated with the pleasantness of an area, but also has a physical (or tangible) component. This includes the character and appearance of buildings, proximity to commercial or

recreational facilities, quality infrastructure and absence of noise, unsightliness or offensive odours. It also has a psychological or social component.

The construction and operation of the project have the potential to alter the local amenity and character of residential streets, businesses and social infrastructure. The amenity of an area directly influences where individuals choose to live, recreate, work and shop.

Noise and vibration

Amenity impacts arising from construction noise are anticipated to have a considerable effect on the socio-economic environment. Construction noise, particularly at night, has the capacity to affect human health, cause sleep disturbance, effect the function and operation of businesses and the ability for people to enjoy an environment. In order to mitigate these impacts, measures such as acoustic sheds, architectural treatment and noise walls would be put in place where feasible and reasonable. An independent acoustic advisor would also be employed to ensure rigor in noise assessments and assist with ensuring compliance is achieved as per assessment recommendations.

As the project involves tunnelling, ground-borne noise impacts may also be experienced during construction. Considering the roadheader works would be progressing around 20 to 25 metres per week, it is anticipated that ground-borne noise impacts would be experienced for a short duration at any one location. Tunnelling works would however occur 24 hours a day with worst-case predictions primarily affecting residential receivers.

The presence of construction noise would result in a medium change from the existing environment. The implementation of noise mitigation measures and a Community Communication Strategy that continues to inform and notify residents and businesses about potential noise exceedances and the anticipated duration of these activities is recommended. The severity of impact on individual receivers would vary depending on their proximity from the construction sites. The likelihood and severity of impact would dissipate the further the receiver is from the construction site, minimising noise impacts upon the majority of the study area. As such the overall impact on the socio-economic environment would be moderate negative.

The operation of large rock-breakers has the potential to generate some of the most substantial construction vibration impacts. Generally, the separation distances between the proposed works and the nearest receiver(s) would be sufficient to prevent cosmetic damage. In some circumstances however, there may be instances where vibration-generating construction activities are required to be undertaken within the minimum working distances where cosmetic building damage may occur. Households, businesses and social infrastructure providers that are identified as being within the minimum working distance for potential cosmetic damage may experience heighted levels of stress and anxiety during construction activities due to the uncertainty and concern for their properties.

People can perceive vibration levels well below those likely to cause damage to building contents or affect the structural integrity of buildings. These vibrations would affect human comfort causing annoyance or disturbance, leading to an elevation of a person's stress and anxiety levels. Impacts upon human comfort would be intermittent across the duration of the project and occur over short periods (generally up to one week at any one location) and as such are not expected to result in significant socio-economic impacts.

The implementation of the Community Communication Strategy and the Construction Noise and Vibration Management Plan should effectively manage and reduce the extent of impacts from noise and vibration on households, businesses and social infrastructure and reduce overall levels of uncertainty. The impact would be more severe at a locality level, however would dissipate the further the receiver is from the construction site. With consideration of these factors, the overall impact on the socio-economic environment would be minor negative.

Once operational the project is predicted to result in a reduction in noise levels for around 60 per cent of the receivers within the study area and reduce the number of receivers with an exceedance of the Noise Criteria Guidelines (NCG) criteria within the study area, in both the day and night-time periods. Impacts would be medium-long term and would affect residents, businesses and social infrastructure in the Inner West local government area, and visitors to businesses and social infrastructure from across Greater Sydney Region. The change from the existing baseline environment would be small.

This consequence would be slight and the likelihood high. As such, the impact is considered a moderate positive.

Two hundred buildings have been identified as likely to have exceedances of operational road traffic noise criteria in both daytime and night-time. Some of these buildings currently experience exceedances of acceptable noise levels due to the presence of existing road traffic. Mitigation measures would be implemented to reduce noise levels for these properties. The effect would be medium-long term and likely to affect residents, business, social infrastructure and visitors across Greater Sydney Region. The consequence of change would be moderate with a high likelihood. As such, the significance of impact is considered to be moderate negative.

Operational ground-borne noise and vibration due to the movement of cars and trucks inside the tunnel is not expected to cause any noticeable impact at the surface level properties. Therefore, upon operation, the significance of impact on the existing socio-economic environment would be negligible.

Visual amenity

During construction, visual amenity throughout the study area would be affected by factors such as the removal of established vegetation, the installation of construction hoardings, installation of acoustic sheds, construction equipment and/or the visual appearance of construction sites. These impacts would affect the appeal of external and internal living spaces and reduce the overall amenity of an environment. Visual amenity impacts as a result of construction would be generally restricted to the local scale. The removal of trees and the introduction of construction sites would reduce the privacy of some properties and reduce screening of construction activities. Visual impacts on local amenity would be medium-long term in nature, with the severity of change from the existing environment medium and generally confined to locality level. The overall impact on the socio-economic environment would be moderate negative.

The operation of the project would result in changes to local visual amenity due to the removal and addition of infrastructure, landscaping and other urban design features. Changes to the landscape character or the visual amenity of a street or suburb can affect the sense of belonging and identity of its residents and visitors and consequently the sense of community cohesion.

The built form components of the project would result in alterations to existing views for a number of residential properties. Some of these views would be altered due to the addition of project components to the environment, including ventilation facilities and outlets, water treatment plants, electricity substations, air intake facilities and tunnel portals.

The operation of the project would result in the potential for view loss to the city skyline views and partial loss to Rozelle Bay or Glebe Point. This loss of views may have direct impacts on the amenity of the location and quality of life. However, new transport infrastructure would improve views for numerous properties in Lilyfield who presently overlook the industrial buildings of the Rozelle Rail Yards. The visual character and identity of Rozelle, Lilyfield and St Peters would be permanently altered from the baseline existing conditions. Upon operation, the significance of impact on the socio-economic environment would be minor negative.

Air quality

Construction activities such as demolition, earthworks, construction and track-out activities have the capacity to increase dust, air emissions and odour. This has the potential to affect human health, reduce the amenity of an area and generate nuisance dust impacts due to the increase in dust deposition (dust soiling) potentially deterring people from using spaces, visiting businesses or enjoying residential amenity.

The demolition of buildings has a greater capacity to trigger human health impacts due to the potential release of hazardous fibres, heavy metals, or fungal spoils. This EIS considers a worst-case scenario and deems that significant impacts on human health can generally be avoided or minimised through appropriate and commonly applied mitigation measures.

Air quality from construction activities, including spoil haulage and construction traffic was identified as a significant concern during public consultation. Construction activities are anticipated to produce dust, with the capacity to adversely affect human receptors and the function and operating costs of businesses. Mitigation measures to manage dust would be incorporated into the Construction Air

Quality Management Plan, which would reduce the majority of dust effects. As construction dust impacts can generally be managed through appropriate mitigation measures, the changes in air quality as a result of the project would likely be small. There may be a higher likelihood of nuisance dust at a locality level around construction compounds on dry weather days with the wind blowing towards a receptor. Any effects would be temporary and short-lived, with the significance of impact on the socio-economic environment negligible.

The amenity impacts on residents, social infrastructure and businesses would result in a change to the existing baseline environment, however would respond to management and mitigation measures. Effective and ongoing engagement regarding expected changes in amenity would assist in mitigating any stress and anxiety from uncertainty and potentially increase the tolerance levels of affected communities.

During operation, changes to air quality both inside and outside of the tunnels would result in no discernible positive or negative effects to human health or local amenity. Therefore, the operational socio-economic air quality impacts are considered negligible.

Economy

Large transport infrastructure projects, such as this project, generate significant revenue for local and regional economies and stimulate employment opportunities and investment during both construction and operation.

Construction activity directly benefits the economy, injecting economic stimulus benefits into the local, regional and state economies. The economic benefit of construction is multi-dimensional, including increased expenditure at local and regional businesses through purchases by construction workers, direct employment through on-site construction activities, direct expenditure associated with on-site construction activities and indirect employment and expenditure through the provision of goods and services required for construction.

It is estimated that based on a five-year construction period, around 14,300 direct (onsite) job years would be created between 2018 to 2023, which is equivalent to around 2,800 jobs per annum. Furthermore, about 42,300 indirect (off-site) job years would be generated, equivalent to around 8,400 jobs per annum based on the project period.

The economic multipliers also estimate that construction would generate a further $5.8 billion of activity in production induced effects and $7.7 billion in consumption induced effects. Total economic activity generated by the construction of the proposed development would be about $19.7 billion.

The economic contribution of the project to the local and regional economy is significant, resulting in major positive socio-economic benefits.

Upon operation, the transport and traffic modelling conducted for the project highlighted that there would be substantial benefits for freight and commercial vehicle movements due to the operation of the M4-M5 Link. The subsequent effects of the operation of the M4-M5 Link on business productivity include:

- Reduced cost for commercial and freight movements
- Increased productivity from reduced congestion and travel times for commercial and freight movements
- Increased economic output as a result of increased efficiency in freight and commercial vehicle movements.

For freight road users, the project would deliver important improvements to the existing situation for a large number of businesses within the region. Effects would be long-term, and benefit the Greater Sydney Region. The significance of impact on the socio-economic environment would be major positive.

For commuters, operation of the project would lead to a more reliable road network, reducing commuting time and lowering vehicle operating costs. Effects would be long term, and benefit the Greater Sydney Region, particularly residents and businesses in western Sydney. This would result in a large change in baseline conditions. The consequence of impact would be major and the likelihood

would be near certain. The significance of impact on the socio-economic environment would be major positive.

Although tolling would be a cost to individuals, the benefits of tolling to the broader economy is a greater socio-economic consequence. Effects would be long-term and benefit the Greater Sydney Region. The change from existing baseline environment would be large. The consequence of change would be major and the likelihood of effects is possible. The significance of impact on the socio-economic environment would be moderate positive

Property impacts

The M4-M5 Link project would predominantly be a sub-surface project, with the mainline tunnel running from Haberfield through to St Peters. In order to facilitate the project, however, a number of property acquisitions are required for:

- Construction of new structures, including tunnel portals and ventilation facilities
- Construction compounds for machinery operation and storage, construction activity coordination and construction parking
- Road widening of existing connections or construction of new motorway connections.

The project requires the acquisition of properties that contain residential, business and social infrastructure uses. Twenty-six residential properties would be acquired and 48 businesses would be required to close down or relocate. One park (Buruwan Park in Annandale) would also be permanently acquired and one other temporarily leased (King George Park in Rozelle).

The social risks related to land acquisition for both property owners and tenants may include:

- Inaccessibility of equivalent housing at a comparable cost. If compensation does not allow property owners and tenants to access similar housing in the local area, acquisition may result in resident's relocation to other more affordable areas or incurring increased levels of debt to remain in the area.
- Relocation health risks. Relocation can be emotionally and physically taxing process. Vulnerable members of the community, including the frail, elderly, people with a disability or poor health and those with low English language skills may be most at risk of stress and in need of support when relocation.
- Altered access to social infrastructure. If acquisition results in households needing to move to other areas, this may affect continuing access to social services, family and local social networks.

All acquisition required for the project would be undertaken in accordance with *the Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government 2014) and the land acquisition reforms announced by the NSW Government in 2016. A Business Management Plan would also be developed to support businesses through the change.

Overall, the number of acquisitions proposed to facilitate the project is relatively low for an infrastructure project of this scale. The impact on individuals and businesses would be major, however somewhat mitigated by the implementation of a detailed consultation and advice process, as per the NSW Land Acquisition (Just Terms Compensation) reform. Property acquisitions are generally determined early in the process with property owners and tenants notified. Businesses and households are generally re-established in their new homes or locations within the short-medium term. The overall impact of construction activities on the socio-economic environment is a moderate negative.

Business

Changes in access and amenity are anticipated across the study area and may affect businesses during construction. This may be due to the introduction of construction sites to an environment or modifications and changes to the transport network.

As the sensitivity of business clusters varies dependent on the level of service provision they provide (ie serve a local, district or regional trade catchments) and how sensitive the businesses are to changes in amenity and accessibility, the ability of a business to adapt to an environment can affect

business viability and turnover. The businesses vulnerability to an impact can deteriorate more quickly dependent on the duration and severity of exposure to construction activities.

Businesses repeatedly exposed to construction activities may be more susceptible to construction fatigue, which can have direct social and economic consequences, particularly if the business is already struggling to remain operational. Although numerous business clusters are likely to experience a change to the baseline socio-economic condition, in terms of the spatial extent of business impact across the broader region, construction effects are relatively localised. A number of convenience and food and beverage businesses, in close proximity to the construction sites, may in fact benefit from increased passing trade due to the additional construction workers in the locality.

To minimise the consequence and likelihood of impacts on businesses, a Business Management Plan is recommended to manage, minimise and avoid potential construction effects.

The duration of construction effects on businesses would be for a medium-long term with the severity of change from the existing baseline condition being medium. Effects on businesses are generally localised or limited to a suburb extent. The likelihood of construction affecting business operations is possible, with the consequence minor. Considering this, the overall impact of construction activities on the socio-economic environment is a minor negative.

Social infrastructure

Changes in access and amenity for some social infrastructure facilities are anticipated during construction. These may arise from the introduction of construction sites to an environment or modifications and changes to the transport network.

Changes in amenity can affect how users interact with, or enjoy an environment, or their ability to participate and concentrate. The sensitivity of a social infrastructure user to a construction impact would vary depending on proximity to the construction activity, the individual's sensitivity to the construction impact (ie noise, dust, vibration) and the duration of the activity.

The consequence of changes to access would vary across the spectrum of social infrastructure users, depending on what service or activity is undertaken at the facility. For instance, active sporting facilities, schools and hospitals may require good vehicle access to sustain these facilities. Access to these facilities during construction or operation, may be affected by delays or diversions and a reduction in the availability of car parking. A reduction in the convenience of access to social infrastructure may also deter users and potentially affect community participation levels, which would have an indirect impact on community values.

The assessment identifies a 17 social infrastructure facilities including, childcare and education facilities, places of worship and outdoor recreation areas that are in close proximity to construction compounds, which are more likely to experience a substantial change to the existing environment. Although there are other social infrastructure facilities in the broader study area, it was found that during construction, socio-economic impacts from construction would be less likely on these facilities. To minimise the consequence and likelihood of impacts on social infrastructure, a Social Infrastructure Plan is recommended to manage, minimise and avoid potential construction effects.

Although 17 social infrastructure facilities are likely to experience a change to the baseline socio-economic condition, in terms of the spatial extent of construction impact, effects are relatively localised. The duration of possible effects would be for a medium-long term with the severity of change from the existing baseline condition medium for facilities in close proximity, too small for those further away. There is a high likelihood that construction effects would influence the operation of some social infrastructure facilities and the experience of users. The likelihood and consequence of potential impacts on social infrastructure would reduce the further the facility is from the construction site. Considering this, the overall significance of impact on the socio-economic environment is a moderate negative.

The operation of the project would provide increased access to open space and pedestrian and cyclist connections, which would provide increased opportunities for the community to meet and interact. The Rozelle Rail Yards currently act as a substantial physical barrier between the communities of Annandale, Rozelle and Lilyfield. On operation, the Rozelle Rail Yards would be transformed into

public open space integrated with a network of active and transport links (both north–south and east–west), which would improve community cohesion.

The project would provide pedestrian bridges, which would increase the opportunities for communities to connect and interact, contributing to community and social cohesion. A new pedestrian footpath and separated cycleway would be provided between Springside Street and the Bay Run at Byrnes Street on the western side of Victoria Road. A pedestrian and cycle 'land bridge' at the Rozelle Rail Yards would provide a north-south connection between Bicentennial Park, the Rozelle Rail Yards and beyond to Easton Park benefitting the communities in Annandale/Glebe and Rozelle.

The delivery of a substantial area of open space within the Rozelle Rail Yards would be a significant positive benefit to the socio-economic environment.

Future land use

Land required for the construction of the project that is not required for operation would be identified following detailed design and construction planning and is termed 'remaining project land' and would then be broken down further into:

- Land to be retained for future (separate) road infrastructure projects
- Residual land – land required for the construction of the project that is not required for operation or for future (separate) infrastructure projects.

The uncertainty around this future land use may cause residents and business stress and/or anxiety. This may affect where an individual or business chooses to live or operate. Remaining project land and its management would be identified in the Residual Land Management Plan.

Future use would be decided by Roads and Maritime, and any future development would be subject to separate development assessment and approval. Of note is that the project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning for future development.

Land subject to the Residual Land Management Plan would include the Parramatta Road West civil and tunnel site (C1b), the Parramatta Road East civil site (C3b) and the Pyrmont Bridge Road tunnel site (C9).

Detailed landscape plans would be prepared as part of the Urban Design and Landscape Plan (UDLP) for the project. Land subject to UDLP would include the Darley Road surface works, Rozelle surface works, Iron Cove Link surface works and St Peters interchange surface works. This would include the delivery of new open space at the Rozelle Rail Yards, as well as new and enhanced active transport links, which would enable the site to be used by the community at large.

Cumulative impacts

Several concurrent construction projects in the vicinity of the project have the potential to contribute to a cumulative impact alongside those of the project. These may result in increased instantaneous impacts such as traffic or increased construction fatigue over time, particularly those in close proximity to the construction sites. These projects include the M4 Widening (Parramatta to Homebush), New M5 (Beverly Hills to St Peters), CBD and South East Light Rail, F6 Extension, Sydney Metro City and Southwest, Western Harbour Tunnel and Beaches Link, Parramatta Road Transformation Project and The Bays Precinct redevelopment. In particular, various sections of the Rozelle Rail Yards are proposed to be used for an extended period as construction and management sites for the M4-M5 Link (Rozelle interchange), the CBD and South East Light Rail and the Western Harbour Tunnel and Beaches Link. The neighbourhoods of Ashfield, Haberfield and St Peters, which are located in proximity to the New M4 and M4 East projects would also experience ongoing effects of construction.

An important consideration of cumulative impacts on the socio-economic environment is construction fatigue. This relates to receivers that experience construction impacts from a variety of projects over an extended period of time with few or no breaks between construction periods. Construction fatigue can be brought on through traffic and access disruptions, increased noise and vibration, and reductions in air quality or visual amenity. This may result in health impacts such as increased stress and anxiety due to uncertainty around timing and ongoing use of the sites. It can also cause financial

hardship to businesses and industries as concentrated and ongoing construction effects reduce the efficiency of servicing and deliveries and/or the productivity of employees.

Conversely, businesses and the broader industry would benefit from consecutive construction activities with increased employment opportunities, potentially increased passing trade from construction workers and enhanced demand for construction related industries.

In order to minimise the cumulative impacts on the community from these projects, collaboration and coordination between the various agencies and stakeholders would be key. Consideration should be given to the creation of a project working group, or equivalent to guide key stages of the several projects with the aim of managing socio-economic impacts and disruptions and, importantly, keeping the community informed.

Mitigation measures would be put in place to minimise the impacts and disruptions to affected parties. This would include the implementation of on-going consultation throughout the construction period.

1 Introduction

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to construct and operate the WestConnex M4-M5 Link (the project), which would comprise a new multi-lane road link between the M4 East Motorway at Haberfield and the New M5 Motorway at St Peters. The project would also include an interchange at Lilyfield and Rozelle (the Rozelle interchange) and a tunnel connection between Anzac Bridge and Victoria Road, east of Iron Cove Bridge (Iron Cove Link). In addition, construction of tunnels, ramps and associated infrastructure to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project would be carried out at the Rozelle interchange.

Together with the other components of the WestConnex program of works and the proposed future Sydney Gateway, the project would facilitate improved connections between western Sydney, Sydney Airport and Port Botany and south and south-western Sydney, as well as better connectivity between the important economic centres along Sydney's Global Economic Corridor and local communities.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act) for the project. A request has been made for the NSW Minister for Planning to specifically declare the project to be State significant infrastructure and also critical State significant infrastructure. An environmental impact statement (EIS) is therefore required.

1.1 Overview of WestConnex and related projects

The M4-M5 Link is part of the WestConnex program of works. Separate planning applications and assessments have been completed for each of the approved WestConnex projects. Roads and Maritime has commissioned Sydney Motorway Corporation (SMC) to deliver WestConnex, on behalf of the NSW Government. However, Roads and Maritime is the proponent for the project.

In addition to linking to other WestConnex projects, the M4-M5 Link would provide connections to the proposed future Western Harbour Tunnel and Beaches Link, the Sydney Gateway (via the St Peters interchange) and the F6 Extension (via the New M5).

The WestConnex program of works, as well as related projects, are shown in **Figure 1-1** and described in **Table 1-1**.

Table 1-1 WestConnex and related projects

Project	Description	Status
WestConnex program of works		
M4 Widening	Widening of the existing M4 Motorway from Parramatta to Homebush.	Planning approval under the EP&A Act granted on 21 December 2014. Open to traffic.
M4 East	Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange.	Planning approval under the EP&A Act granted on 11 February 2016. Under construction.
King Georges Road Interchange Upgrade	Upgrade of the King Georges Road interchange between the M5 West and the M5 East at Beverly Hills, in preparation for the New M5 project.	Planning approval under the EP&A Act granted on 3 March 2015. Open to traffic.
New M5	Duplication of the M5 East from King Georges Road in Beverly Hills with tunnels from Kingsgrove to a new interchange at St Peters. The St Peters interchange allows for connections to the proposed future Sydney Gateway project and an underground connection to the M4-M5 Link. The New M5 tunnels also include provision for a future connection to the proposed future F6 Extension.	Planning approval under the EP&A Act granted on 20 April 2016. Commonwealth approval under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) granted on 11 July 2016. Under construction.

Project	Description	Status
M4-M5 Link (the project)	Tunnels connecting to the M4 East at Haberfield (via the Wattle Street interchange) and the New M5 at St Peters (via the St Peters interchange), a new interchange at Rozelle and a link to Victoria Road (the Iron Cove Link). The Rozelle interchange also includes ramps and tunnels for connections to the proposed future Western Harbour Tunnel and Beaches Link project.	The subject of this EIS.
Related projects		
Sydney Gateway	A high-capacity connection between the St Peters interchange (under construction as part of the New M5 project) and the Sydney Airport and Port Botany precinct.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
Western Harbour Tunnel and Beaches Link	The Western Harbour Tunnel component would connect to the M4-M5 Link at the Rozelle interchange, cross underneath Sydney Harbour between the Birchgrove and Waverton areas, and connect with the Warringah Freeway at North Sydney. The Beaches Link component would comprise a tunnel that would connect to the Warringah Freeway, cross underneath Middle Harbour and connect with the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Seaforth. It would also involve the duplication of the Wakehurst Parkway between Seaforth and Frenchs Forest.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.
F6 Extension	A proposed motorway link between the New M5 at Arncliffe and the existing M1 Princes Highway at Loftus, generally along the alignment known as the F6 corridor.	Planning underway by Roads and Maritime and subject to separate environmental assessment and approval.

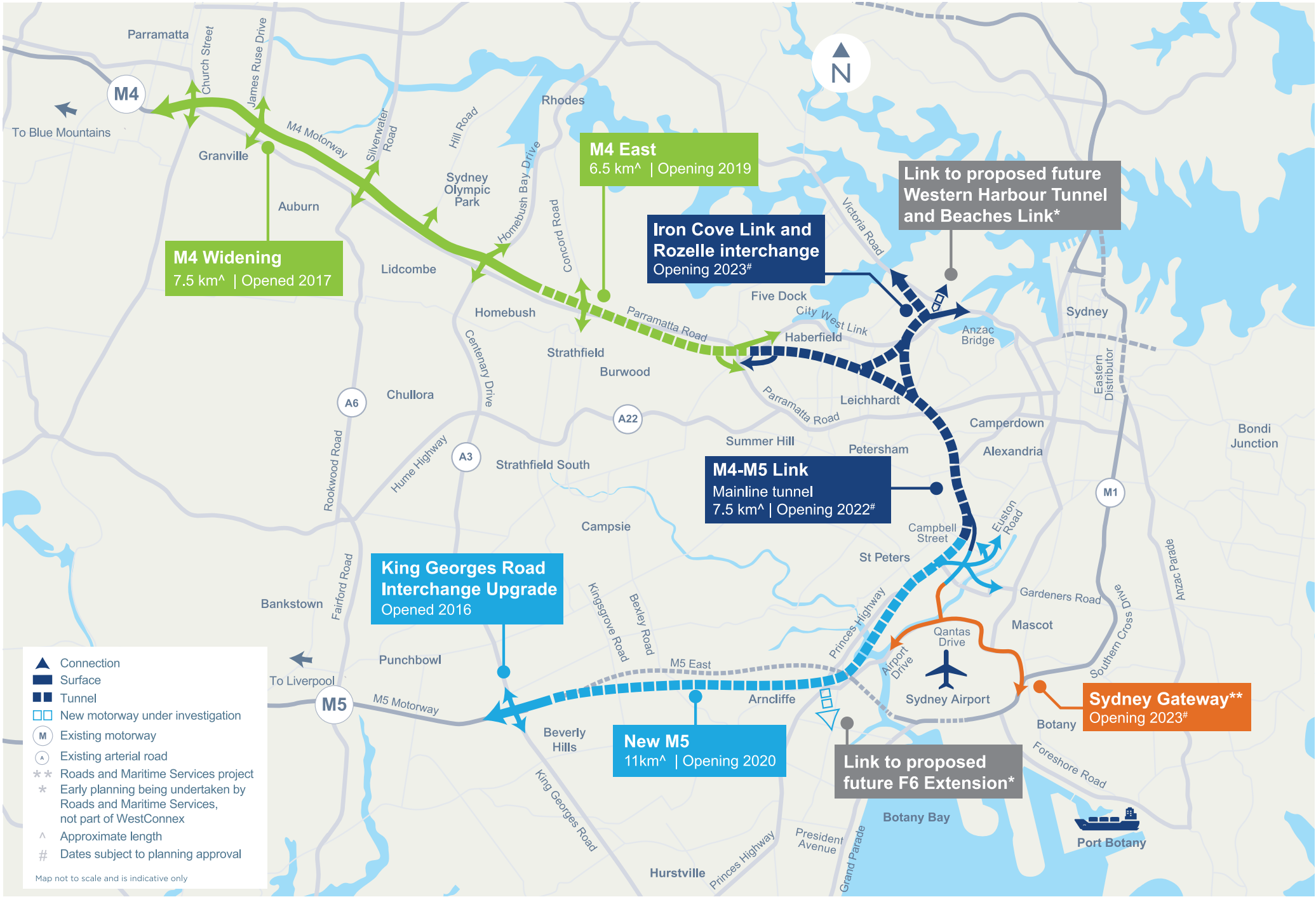

Figure 1-1 Overview of WestConnex and related projects

1.2 Purpose of this report

The purpose of this socio-economic impact assessment (SEIA) is to identify and assess the social, economic and business impacts that may result from the project during construction and operation. This report considers the direct, indirect and cumulative social, economic and business impacts that may affect residential communities (directly and indirectly affected, local and regional), businesses, users of roads, public open space, social infrastructure, and other key stakeholders. This report assesses consequence and likelihood of impacts and identifies mitigation strategies to minimise adverse impacts and maximise benefits of the project. In doing so, it responds directly to the Secretary's Environmental Assessment Requirements (SEARs) as outlined in **section 1.3**. This report is one of a number of technical documents that form part of the WestConnex M4-M5 Link EIS.

1.3 SEARs

Table 1-2 Relevant SEARs addressed in this report

Secretary's Environmental Assessment Requirements		
Socio-economic, Land Use and Property		
Desired performance outcome	**Requirement**	**Where addressed**
2. Environmental Impact Statement The project is described in sufficient detail to enable clear understanding that the project has been developed through an iterative process of impact identification and assessment and project refinement to avoid, minimise or offset impacts so that the project, on balance, has the least adverse environmental, social and economic impact, including cumulative impacts.	1. The EIS must include, but not necessarily be limited to, the following: (h) A concise description of the general biophysical and socio-economic environment that is likely to be impacted by the project (including offsite impacts). Elements of the environment that are not likely to be affected by the project do not need to be described.	The socio-economic environment is described in **Chapter 5**.
3. Assessment of key issues Key issue impacts are assessed objectively and thoroughly to provide confidence that the project would be constructed and operated within acceptable levels of impact.	2. For each key issue the Proponent must: a) Describe the biophysical and socio-economic environment, as far as it is relevant to that issue, including adequate baseline data, in terms of temporal, spatial and parameters monitored.	The socio-economic environment is described in **Chapter 5**.
	b) Describe the legislative and policy context, as far as it is relevant to the issue.	The legislative and policy context is described in **Chapter 4**.

Secretary's Environmental Assessment Requirements		
Socio-economic, Land Use and Property		
Desired performance outcome	**Requirement**	**Where addressed**
	c) Identify, describe and quantify (if possible) the impacts associated with the issue, including the likelihood and consequence of the impact (comprehensive risk assessment), and the cumulative impacts of: (i) concurrent project construction activities; and (ii) proposed and approved projects (where information is available at the time of writing).	The impacts associated with the project have been identified, described as quantified (if possible), including assessing the likelihood and consequence of the impact, in **Chapter 7**, **Chapter 8** and **Chapter 9**.
	d) Demonstrate how potential impacts have been avoided (through design, or construction or operation methodologies).	Potential impacts that have been avoided through design have been outlined at the beginning of **Chapter 7** and **Chapter 8**.
	e) Detail how likely impacts that have not been avoided through design would be minimised, and the predicted effectiveness of these measures (against performance criteria where relevant).	The assessment of the impacts and how they may be avoided, minimised, managed or mitigated is provided in **Chapter 7** (Construction), **Chapter 8** (Operation).
	f) Detail how any residual impacts would be managed or offset, and the approach and effectiveness of these measures.	Detail regarding management measures and residual impact management is provided in **Chapter 10**.
9. Socio-economic, Land Use and Property The project minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities. The project minimises impacts on property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	1. The Proponent must assess social and economic impacts (of all phases of the project) in accordance with the current guidelines (including cumulative ongoing impacts of the proposal).	Construction impacts are assessed in accordance with the current guideline in **Chapter 7**, operational impacts in **Chapter 8** and cumulative impacts are assessed in **Chapter 9**.
	2. The Proponent must assess impacts from construction and operation on potentially affected property (including Crown lands), businesses, recreational users and land and water users, including property acquisitions/adjustments, access amenity, relevant statutory rights, and community severance and barrier impacts resulting from the project.	**Chapter 12** (Land use and property) of the EIS identifies direct impacts on properties. **Chapter 7** and **Chapter 8** assess impacts from construction and operation on potentially affected property (including Crown lands), businesses, recreational users and land and water users, including property acquisitions/adjustments, access amenity, relevant statutory rights, and community severance

Secretary's Environmental Assessment Requirements		
Socio-economic, Land Use and Property		
Desired performance outcome	**Requirement**	**Where addressed**
		and barrier impacts resulting from the project.
	3. The Proponent must identify opportunities for local centre street revitalisation improvements, pedestrian and cyclist access and connectivity and provision of community and social facilities.	Local centre street revitalisation improvements are identified in **Appendix L** (Technical working paper: Urban Design) of the EIS Pedestrian and cyclist access and connectivity and provision of community and social facilities are identified in **Appendix N** (Technical working paper: Active transport strategy) of the EIS and **Chapter 12** (Land use and property) of the EIS.
	4. The design and siting of project elements should be located in such a way that functional, contiguous areas of residual land are maximised. The design and siting must consider appropriate land use interfaces (i.e. White Bay) and the social and economic impacts of proposed land uses against alternate land uses.	An assessment of the social and economic impacts of proposed land uses is included in **Chapter 8**.
	5. Where air quality allows, residual land must be designed to positively contribute to additional community uses, public recreation uses and/or affordable or social housing. Passively landscaped areas should not be the default use for residual land.	Provided in **Chapter 12** (Land use and property) of the EIS.
	6. The Proponent must assess potential impacts on utilities (including	An assessment of utility impacts is provided in

Secretary's Environmental Assessment Requirements		
Socio-economic, Land Use and Property		
Desired performance outcome	**Requirement**	**Where addressed**
	communications, electricity, gas, and water and sewerage) and the relocation of these utilities.	**section 7.7**.
	7. Where the project is predicted to affect trunk utilities, the Proponent must undertake a utilities management strategy. The strategy must identify proposed management strategies, including relocations or adjustment of the utilities, and their estimated timing and duration. This strategy must be developed in consultation with the relevant utility owners or providers.	Refer to the Utility Management Strategy (**Appendix F**) of the EIS.

1.4 Structure of this report

This report is structured as follows:

Chapter 1: Introduction – outlines the project and presents the purpose of the report

Chapter 2: The project – describes the key features of the project and the associated construction activities

Chapter 3: Assessment methodology – describes the methodology employed for the SEIA

Chapter 4: Relevant guidelines and policies – overviews the strategic and statutory policies and strategies relevant to the social and economic assessment of the project

Chapter 5: Existing environment – presents the current social, business and economic characteristics of the study area

Chapter 6: Consultation and community values – outlines the key socio-economic issues and community values identified through consultation with key stakeholders, businesses and the community and identifies where these issues are addressed in the report

Chapter 7: Assessment of construction impacts – describes the potential socio-economic impacts resulting from the construction of the project

Chapter 8: Assessment of operational impacts – describes the potential socio-economic impacts resulting from the operation of the project

Chapter 9: Assessment of cumulative impacts – describes the potential cumulative impacts resulting from the operation of the project

Chapter 10: Mitigation and management – provides a summary of recommended environmental mitigation, management and monitoring responsibilities in relation to the socio-economic impacts of the project

Chapter 11: Conclusion

Annexure A: Business survey report

2 The project

2.1 Project location

The project would be generally located within the City of Sydney and Inner West local government areas (LGAs). The project is located about two to seven kilometres south, southwest and west of the Sydney central business district (CBD) and would cross the suburbs of Ashfield, Haberfield, Leichhardt, Lilyfield, Rozelle, Annandale, Stanmore, Camperdown, Newtown and St Peters. The local context of the project is shown in **Figure 2-1**.

2.2 Overview of the project

Key components of the project are shown in **Figure 2-1** and would include:

- Twin mainline motorway tunnels between the M4 East at Haberfield and the New M5 at St Peters. Each tunnel would be around 7.5 kilometres long and would generally accommodate up to four lanes of traffic in each direction
- Connections of the mainline tunnels to the M4 East project, comprising:
  - A tunnel-to-tunnel connection to the M4 East mainline stub tunnels east of Parramatta Road near Alt Street at Haberfield
  - Entry and exit ramp connections between the mainline tunnels and the Wattle Street interchange at Haberfield (which is currently being constructed as part of the M4 East project)
  - Minor physical integration works with the surface road network at the Wattle Street interchange including road pavement and line marking
- Connections of the mainline tunnels to the New M5 project, comprising:
  - A tunnel-to-tunnel connection to the New M5 mainline stub tunnels north of the Princes Highway near the intersection of Mary Street and Bakers Lane at St Peters
  - Entry and exit ramp connections between the mainline tunnels and the St Peters interchange at St Peters (which is currently being constructed as part of the New M5 project)
  - Minor physical integration works with the surface road network at the St Peters interchange including road pavement and line marking
- An underground interchange at Leichhardt and Annandale (the Inner West subsurface interchange) that would link the mainline tunnels with the Rozelle interchange and the Iron Cove Link (see below)
- A new interchange at Lilyfield and Rozelle (the Rozelle interchange) that would connect the M4-M5 Link mainline tunnels with:
  - City West Link
  - Anzac Bridge
  - The Iron Cove Link (see below)
  - The proposed future Western Harbour Tunnel and Beaches Link
- Construction of connections to the proposed future Western Harbour Tunnel and Beaches Link project as part of the Rozelle interchange, including:
  - Tunnels that would allow for underground mainline connections between the M4 East and New M5 motorways and the proposed future Western Harbour Tunnel and Beaches Link (via the M4-M5 Link mainline tunnels)
  - A dive structure and tunnel portals within the Rozelle Rail Yards, north of the City West Link / The Crescent intersection
  - Entry and exit ramps that would extend north underground from the tunnel portals in the Rozelle Rail Yards to join the mainline connections to the proposed future Western Harbour

Tunnel and Beaches Link

- A ventilation outlet and ancillary facilities as part of the Rozelle ventilation facility (see below)

· Twin tunnels that would connect Victoria Road near the eastern abutment of Iron Cove Bridge and Anzac Bridge (the Iron Cove Link). Underground entry and exit ramps would also provide a tunnel connection between the Iron Cove Link and the New M5 / St Peters interchange (via the M4-M5 Link mainline tunnels)

· The Rozelle surface works, including:

- Realigning The Crescent at Annandale, including a new bridge over Whites Creek and modifications to the intersection with City West Link

- A new intersection on City West Link around 300 metres west of the realigned position of The Crescent, which would provide a connection to and from the New M5/St Peters interchange (via the M4-M5 Link mainline tunnels)

- Widening and improvement works to the channel and bank of Whites Creek between the light rail bridge and Rozelle Bay at Annandale, to manage flooding and drainage for the surface road network

- Reconstructing the intersection of The Crescent and Victoria Road at Rozelle, including construction of a new bridge at Victoria Road

- New and upgraded pedestrian and cyclist infrastructure

- Landscaping, including the provision of new open space within the Rozelle Rail Yards

· The Iron Cove Link surface works, including:

- Dive structures and tunnel portals between the westbound and eastbound Victoria Road carriageways, to connect Victoria Road east of Iron Cove Bridge with the Iron Cove Link

- Realignment of the westbound (southern) carriageway of Victoria Road between Springside Street and the eastern abutment of Iron Cove Bridge

- Modifications to the existing intersections between Victoria Road and Terry, Clubb, Toelle and Callan streets

- Landscaping and the establishment of pedestrian and cycle infrastructure

· Five motorway operations complexes; one at Leichhardt (MOC1), three at Rozelle (Rozelle West (MOC2), Rozelle East (MOC3) and Iron Cove Link (MOC4)), and one at St Peters (MOC5). The types of facilities that would be contained within the motorway operations complexes would include substations, water treatment plants, ventilation facilities and outlets, offices, on-site storage and parking for employees

· Tunnel ventilation systems, including ventilation supply and exhaust facilities, axial fans, ventilation outlets and ventilation tunnels

· Three new ventilation facilities, including:

- The Rozelle ventilation facility at Rozelle

- The Iron Cove Link ventilation facility at Rozelle

- The Campbell Road ventilation facility at St Peters

· Fitout (mechanical and electrical) of part of the Parramatta Road ventilation facility at Haberfield (which is currently being constructed as part of M4 East project) for use by the M4-M5 Link project

· Drainage infrastructure to collect surface and groundwater for treatment at dedicated facilities. Water treatment would occur at

- Two operational water treatment facilities (at Leichhardt and Rozelle)

- The constructed wetland within the Rozelle Rail Yards

- A bioretention facility for stormwater runoff within the informal car park at King George Park at Rozelle (adjacent to Manning Street). A section of the existing informal car park would also be

upgraded, including sealing the car park surface and landscaping

- Treated water would flow back to existing watercourses via new, upgraded and existing infrastructure
- Ancillary infrastructure and operational facilities for electronic tolling and traffic control and signage (including electronic signage)
- Emergency access and evacuation facilities, including pedestrian and vehicular cross and long passages and fire and life safety systems
- Utility works, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities. A Utilities Management Strategy has been prepared for the project that identifies management options for utilities, including relocation or adjustment. Refer to **Appendix F** (Utilities Management Strategy) of the EIS.

The project does not include:

- Site management works at the Rozelle Rail Yards. These works were separately assessed and determined by Roads and Maritime through a Review of Environmental Factors under Part 5 of the EP&A Act (refer to **Chapter 2** (Assessment process) of the EIS)
- Ongoing motorway maintenance activities during operation
- Operation of the components of the Rozelle interchange which are the tunnels, ramps and associated infrastructure being constructed to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project.

Temporary construction ancillary facilities and temporary works to facilitate the construction of the project would also be required.

2.2.1 Staged construction and opening of the project

It is anticipated the project would be constructed and opened to traffic in two stages (as shown in **Figure 2-1**).

Stage 1 would include:

- Construction of the mainline tunnels between the M4 East at Haberfield and the New M5 at St Peters, stub tunnels to the Rozelle interchange (at the Inner West subsurface interchange) and ancillary infrastructure at the Darley Road motorway operations complex (MOC1) and Campbell Road motorway operations complex (MOC5)
- These works are anticipated to commence in 2018 with the mainline tunnels open to traffic in 2022. At the completion of Stage 1, the mainline tunnels would operate with two traffic lanes in each direction. This would increase to generally four lanes at the completion of Stage 2, when the full project is operational.

Stage 2 would include:

- Construction of the Rozelle interchange and Iron Cove Link including:
  - Connections to the stub tunnels at the Inner West subsurface interchange (built during Stage 1)
  - Ancillary infrastructure at the Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3) and Iron Cove Link motorway operations complex (MOC4)
  - Connections to the surface road network at Lilyfield and Rozelle
  - Construction of tunnels, ramps and associated infrastructure as part of the Rozelle interchange to provide connections to the proposed future Western Harbour Tunnel and Beaches Link project
- Stage 2 works are expected to commence in 2019 with these components of the project open to traffic in 2023.

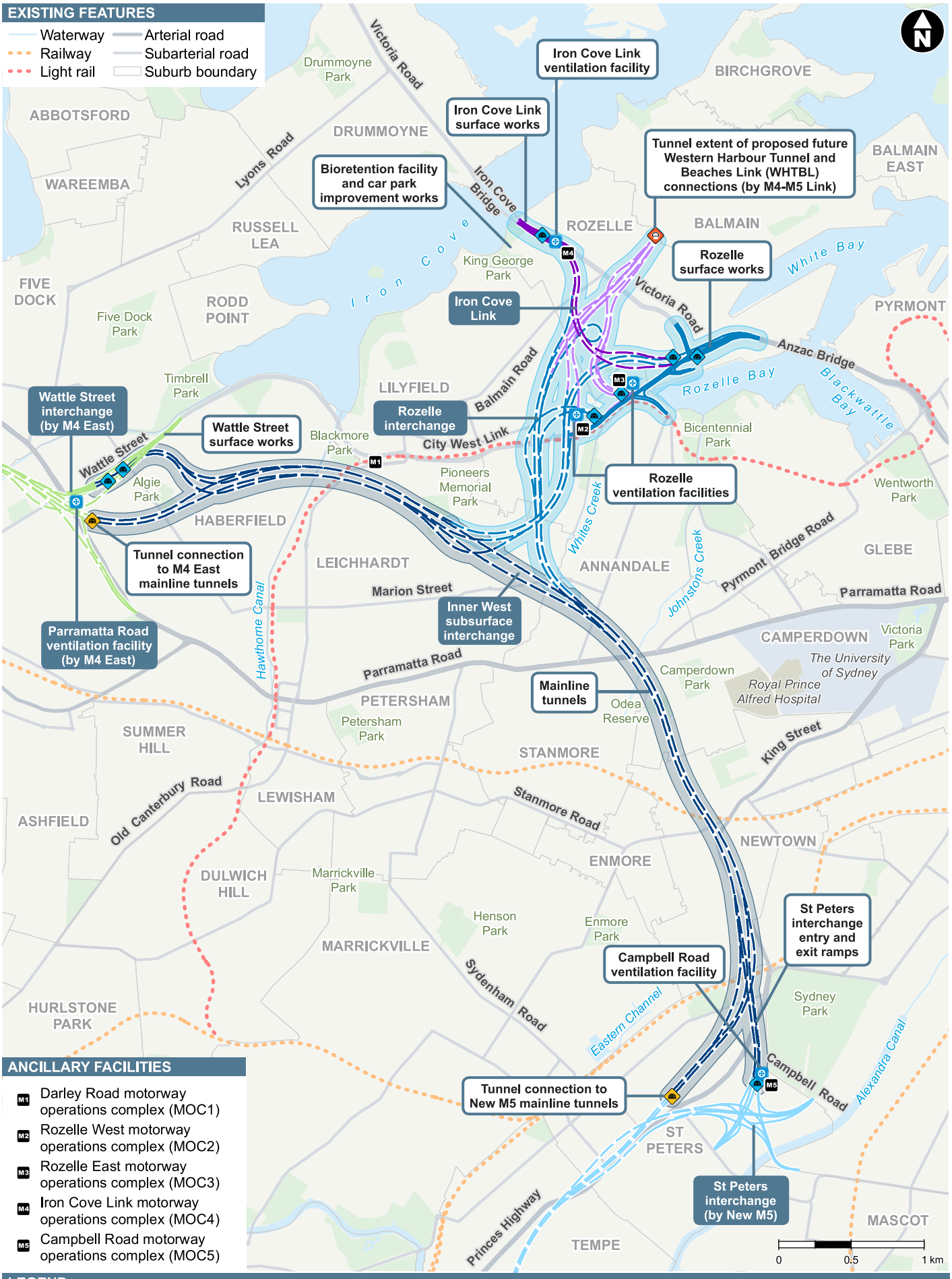

Figure 2-1 Overview of the project

2.3 Construction activities

An overview of the key construction features of the project is shown in **Figure 2-2** and would generally include:

- Enabling and temporary works, including provision of construction power and water supply, ancillary site establishment including establishment of acoustic sheds and construction hoarding, demolition works, property adjustments and public and active transport modifications (if required)
- Construction of the road tunnels, interchanges, intersections and roadside infrastructure
- Haulage of spoil generated during tunnelling and excavation activities
- Fitout of the road tunnels and support infrastructure, including ventilation and emergency response systems
- Construction and fitout of the motorway operations complexes and other ancillary operations buildings
- Realignment, modification or replacement of surface roads, bridges and underpasses
- Implementation of environmental management and pollution control facilities for the project.

A more detailed overview of construction activities is provided in **Table 2-1**.

Table 2-1 Overview of construction activities

Component	Typical activities
Site establishment and enabling works	· Vegetation clearing and removal · Utility works · Traffic management measures · Install safety and environmental controls · Install site fencing and hoarding · Establish temporary noise attenuation measures · Demolish buildings and structures · Carry out site clearing · Heritage salvage or conservation works (if required) · Establish construction ancillary facilities and access · Establish acoustic sheds · Supply utilities (including construction power) to construction facilities · Establish temporary pedestrian and cyclist diversions
Tunnelling	· Construct temporary access tunnels · Excavation of mainline tunnels, entry and exit ramps and associated tunnelled infrastructure and install ground support · Spoil management and haulage · Finishing works in tunnel and provision of permanent tunnel services · Test plant and equipment
Surface earthworks and structures	· Vegetation clearing and removal · Topsoil stripping · Excavate new cut and fill areas · Construct dive and cut-and-cover tunnel structures · Install stabilisation and excavation support (retention systems) such as sheet pile walls, diaphragm walls and secant pile walls (where required) · Construct required retaining structures · Excavate new road levels
Bridge works	· Construct piers and abutments · Construct headstock · Construct bridge deck, slabs and girders · Demolish and remove redundant bridges
Drainage	· Construct new pits and pipes · Construct new groundwater drainage system

Component	Typical activities
	· Connect drainage to existing network · Construct sumps in tunnels as required · Construct water quality basins, constructed wetland and bioretention facility and basin · Construct drainage channels · Construct spill containment basin · Construct onsite detention tanks · Adjustments to existing drainage infrastructure where impacted · Carry out widening and naturalisation of a section of Whites Creek · Demolish and remove redundant drainage
Pavement	· Lay select layers and base · Lay road pavement surfacing · Construct pavement drainage
Operational ancillary facilities	· Install ventilation systems and facilities · Construct water treatment facilities · Construct fire pump rooms and install water tanks · Test and commission plant and equipment · Construct electrical substations to supply permanent power to the project
Finishing works	· Line mark to new road surfaces · Erect directional and other signage and other roadside furniture such as street lighting · Erect toll gantries and other control systems · Construct pedestrian and cycle paths · Carry out earthworks at disturbed areas to establish the finished landform · Carry out landscaping · Closure and backfill of temporary access tunnels (except where these are to be used for inspection and/or maintenance purposes) · Site demobilisation and preparation of the site for a future use

Twelve construction ancillary facilities are described in this EIS (as listed below). To assist in informing the development of a construction methodology that would manage constructability constraints and the need for construction to occur in a safe and efficient manner, while minimising impacts on local communities, the environment, and users of the surrounding road and other transport networks, two possible combinations of construction ancillary facilities at Haberfield and Ashfield have been assessed in this EIS. The construction ancillary facilities that comprise these options have been grouped together in this EIS and are denoted by the suffix a (for Option A) or b (for Option B).

The construction ancillary facilities required to support construction of the project include:

- Construction ancillary facilities at Haberfield (Option A), comprising:
  - Wattle Street civil and tunnel site (C1a)
  - Haberfield civil and tunnel site (C2a)
  - Northcote Street civil site (C3a)
- Construction ancillary facilities at Ashfield and Haberfield (Option B), comprising:
  - Parramatta Road West civil and tunnel site (C1b)
  - Haberfield civil site (C2b)
  - Parramatta Road East civil site (C3b)
- Darley Road civil and tunnel site (C4)
- Rozelle civil and tunnel site (C5)

- The Crescent civil site (C6)
- Victoria Road civil site (C7)
- Iron Cove Link civil site (C8)
- Pyrmont Bridge Road tunnel site (C9)
- Campbell Road civil and tunnel site (C10).

The number, location and layout of construction ancillary facilities would be finalised as part of detailed construction planning during detailed design and would meet the environmental performance outcomes stated in the EIS and the Submissions and Preferred Infrastructure Report and satisfy criteria identified in any relevant conditions of approval.

The construction ancillary facilities would be used for a mix of civil surface works, tunnelling support, construction workforce parking and administrative purposes. Wherever possible, construction sites would be co-located with the project footprint to minimise property acquisition and temporary disruption. The layout and access arrangements for the construction ancillary facilities are based on the concept design only and would be confirmed and refined in response to submissions received during the exhibition of this EIS and during detailed design.

2.3.1 Construction program

The total period of construction works for the project is expected to be around five years, with commissioning occurring concurrently with the final stages of construction. An indicative construction program is shown in **Table 2-2**.

Table 2-2 Indicative construction program

Construction activity	Indicative construction timeframe																							
	2018				2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Mainline tunnels																								
Site establishment and establishment of construction ancillary facilities			■	■	■	■	■	■	■	■														
Utility treatments and connections			■	■	■	■	■	■																
Tunnel construction				■	■	■	■	■	■	■	■	■	■											
Portal construction				■	■	■	■	■																
Construction of permanent operational facilities												■	■	■	■	■								
Mechanical and electrical fitout works														■	■	■								
Establishment of tolling facilities															■	■								
Site rehabilitation and landscaping																■	■	■	■					
Surface road works																	■	■	■					
Demobilisation and rehabilitation																			■	■				
Testing and commissioning																■	■	■	■	■				
Rozelle interchange and Iron Cove Link																								
Site establishment and establishment of construction ancillary facilities				■	■	■	■	■																

Construction activity	Indicative construction timeframe																							
	2018				2019				2020				2021				2022				2023			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Utility treatments and connections and site remediation																								
Tunnel construction																								
Portal construction																								
Construction of surface road works																								
Construction of permanent operational facilities																								
Mechanical and electrical fitout works																								
Establishment of tolling facilities																								
Site rehabilitation and landscaping																								
Demobilisation and rehabilitation																								
Testing and commissioning																								

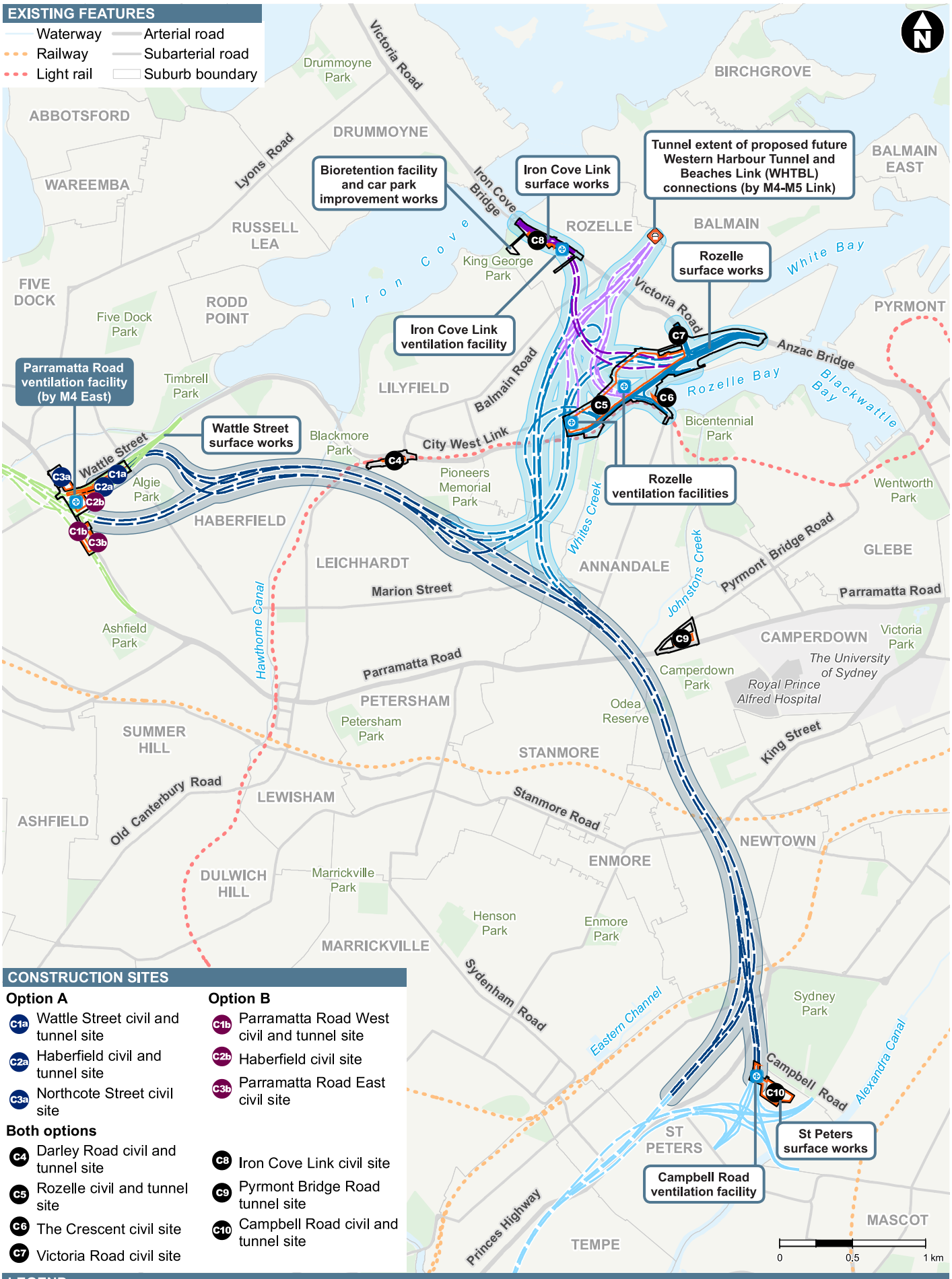

Figure 2-2 Overview of project footprint and ancillary facilities

3 Assessment methodology

3.1 Methodology overview

This SEIA methodology has been developed according to the SEARs and the Roads and Maritime Socio-economic Assessment Guideline EOA-N05 (Roads and Maritime 2013).

The SEIA is informed by the outcomes of the various technical working papers that have been prepared for the project. This includes the air quality, urban design, traffic and transport, noise and vibration, landscape and visual impacts, non-Aboriginal and Aboriginal heritage, arboricultural impacts and human health technical working papers. In consideration of the results of the technical working papers and the outcomes of consultation, a comprehensive assessment of construction and operational socio-economic impacts has been prepared in accordance with the Roads and Maritime guideline.

In preparing the SEIA, the following process was implemented:

1. Review of assessments undertaken for previous stages of the WestConnex program of works to scope issues and identify the potential scale and magnitude of impacts
2. Definition of the study area and precincts (see **Figure 3-1**)
3. Development of a profile of existing geographic areas, social infrastructure and businesses that may be influenced by the project (using Australian Bureau of Statistics (ABS) Census 2011 and Transport Performance and Analytics (TPA))
4. Consultation with communities, businesses and stakeholders within the study area and surrounds to determine community, stakeholder and business values and concerns. Review of council community strategic plans to further inform the types of values held by the communities
5. Review of issues and comments raised through the consultation and communication activities undertaken for the project
6. Identification of likely changes/impacts that may occur as a result of the project, including specific effects on stakeholders, general community, businesses, social infrastructure and other receivers
7. Assessment of the significance of social, economic and business impacts during construction and operation
8. Assessment of the cumulative social, economic and business impacts
9. Identified mitigation, plans and strategies for monitoring and managing the impacts during both construction and operation.

3.2 Defining the study area

ABS geographic boundaries (referred to as Statistical Area Level 2 (SA2)) were used to define the socio-economic study area (see **Figure 3-1**). The SA2's that either overlapped with or were in close proximity to the project footprint defined the study area. The study area extends across three precincts, each of which is described in further detail in **Chapter 5**. Although a study area has been defined, it is acknowledged that the spatial extent of potential effects would vary and would not be limited to the study area. For this reason, the impact assessment does consider changes to the socio-economic environment both within the study area and further afield.

When considering direct construction and operational effects, the scoping of issues determined that social infrastructure or businesses that were within close proximity to the construction sites or portals were more likely to be exposed to potential impacts. In most instances, direct effects were generally confined to within a 400 metre radius of the site. The existing environment section of the report identifies the businesses and social infrastructure located within this 400 metre parameter.

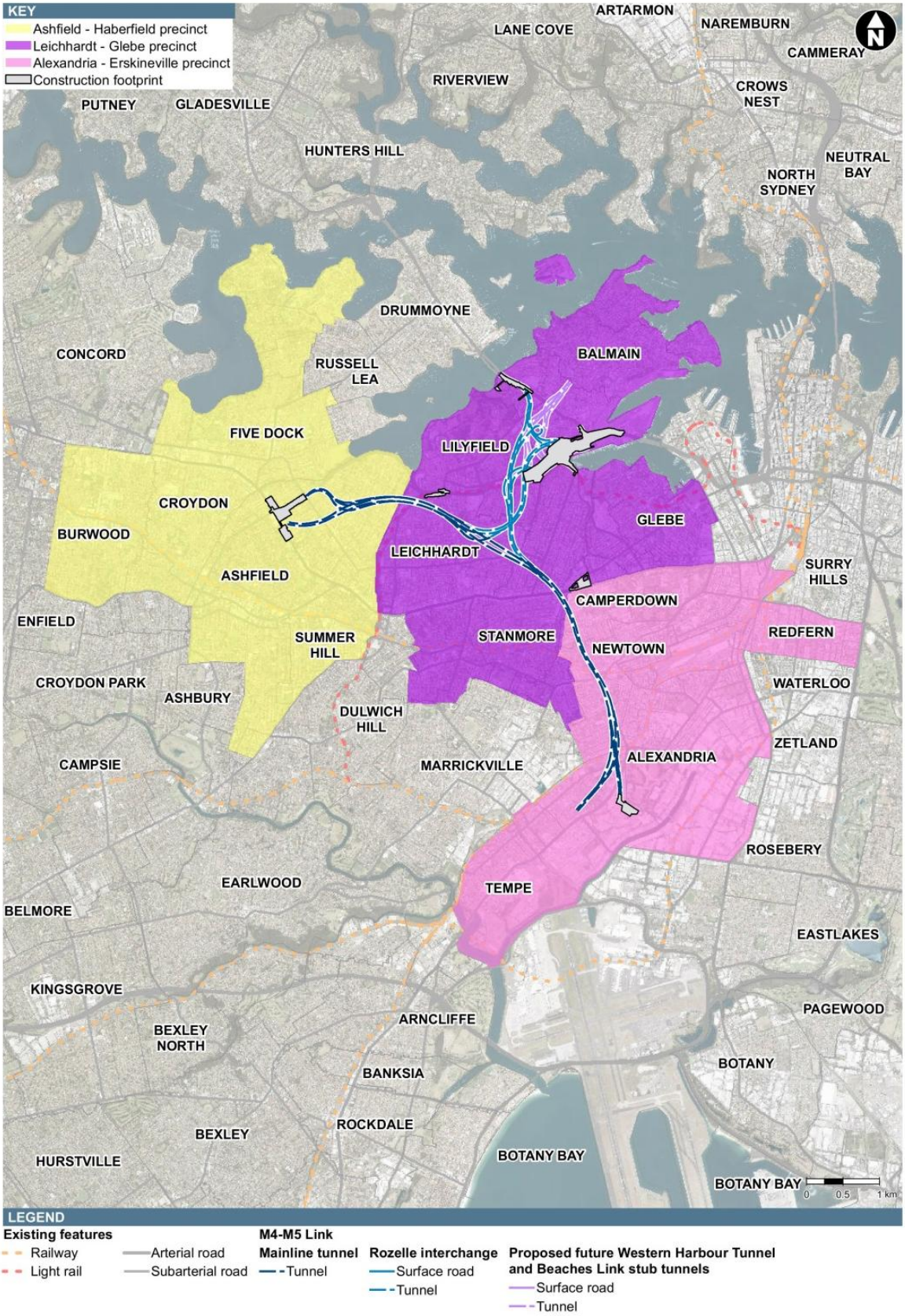

Figure 3-1 Study area

3.3 Data sources used to inform the study

In preparing this report, HillPDA has relied primarily upon the project information provided by AECOM. Additional data in this report has been derived from:

- ABS (Census 2011)[1]
- ABS (8165.0 Counts of Australian Businesses 2016)
- ABS (5220.0 Australian National Accounts 2016)
- NSW Department of Planning and Environment Population and Dwelling Forecasts 2017
- Transport Performance and Analytics, 2017
- Relevant State, local government and agency policies and guidelines (**Chapter 4**)
- Outcomes of community, business and stakeholder consultation (**section 6.1**)
- Geographic information system (GIS) information on land uses as informed by relevant Local Environmental Plans.

3.4 Business survey approach

A business impact survey was used to gain a better understanding of the main issues, perceptions and concerns of businesses in regard to the project during construction and operation. The business surveys were conducted within 400 metres of the proposed construction compounds at Rozelle, Annandale and Lilyfield. The survey was conducted over a two-week period in November 2016. Businesses were approached at random with around 100 businesses participating in the survey.

The business impact survey was undertaken across a wide variety and representative sample of business types including businesses such as retail shops, real estate agencies, cafes, pubs, restaurants, auto service centres and professional service businesses.

The survey did not involve businesses located on properties that would be directly acquired on behalf of the project[2]. Businesses around the construction sites at Haberfield and St Peters were not included within the survey as perceptions and concerns were collected during the M4 East and New M5 projects. Despite this, the business impacts that were previously identified at and around these locations were considered in the overall assessment of impacts for the M4-M5 Link project. This included the consideration of the cumulative impact of extended construction periods.

All information gathered as part of the business surveys was collated into a database. Findings from this survey have been analysed and summarised in **Table 6-1**. The survey report is provided as **Annexure A** to this assessment.

3.5 Stakeholder and community consultation approach

Stakeholder and community consultation has been undertaken for the project. Outcomes from consultation (see **Chapter 6**) have underpinned the SEIA. This assessment has analysed the findings from:

- Comments provided through the project information phone line and project email address
- Information provided through the online interactive mapping tool established to encourage the community to provide location-specific ideas and feedback
- Five community idea sessions, held between August and September 2016, which provided an opportunity for the local community to express their ideas and feedback on the concept design and construction of the project

[1] 2016 Census data was not available at the time of writing of this SEIA.

[2] Although not participants in the survey, businesses located on properties that are proposed to be acquired are still considered during the assessment in section 7.

- Various one-on-one meetings with community members and residents between late 2016 and mid-2017 to provide specific feedback and raise concerns
- Five community information sessions held between May and June 2017 to provide the community an update on the M4-M5 Link concept design and to provide further opportunities for the local community to express feedback and raise key issues.

3.6 Impact assessment framework

The impact assessment presented in this report identifies and evaluates changes to existing socio-economic conditions arising from the construction and/or operation of the project. This includes the assessment of direct and indirect impacts and benefits, as well as consideration of cumulative impacts.

The following impact assessment considers:

- Property impacts, including the socio-economic consequences of both direct and indirect impacts associated with property acquisition and potential changes to property access, values, amenity, power and utility changes and plans for residual land use
- Social impacts arising from construction and operation relating to population and demography, amenity, community health, community values, social infrastructure, local access and connectivity, heritage, and visual character
- Business impacts and benefits relating to passing trade, vehicle parking, servicing and deliveries, employment and recruitment, business access and connectivity, and business amenity
- Economic impacts to local and regional industries associated with construction expenditure and employment, economic value add, freight and efficiency costs, and road tolling.

These issues have been assessed in **Chapter 7** and **Chapter 8.**

Figure 3-2 outlines the assessment framework that was employed to determine the overall significance of socio-economic impacts. The following sections outline the criteria that underpin each of the components of the assessment framework. Project data and knowledge and professional judgement has been applied on a case-by-case basis to identify the duration, spatial extent, severity, consequence, likelihood and ultimately the significance of impact on the socio-economic environment for each identified impact.

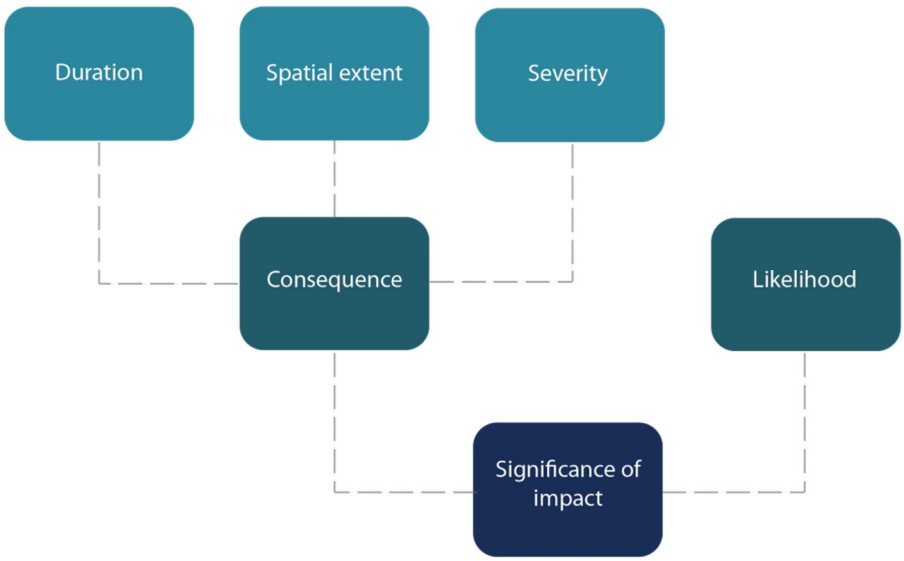

Figure 3-2 Socio-economic assessment framework

3.6.1 Consequence

Consequence refers to the degree of benefit or detriment associated with the impact. Duration, spatial extent and severity of change (**Table 3-1**, **Table 3-2**, **Table 3-3** respectively) are the underlying criteria that contribute to the determination of the overall consequence level. The definition of the various levels of consequence is included in **Table 3-4**.

Duration

Table 3-1 categorises the potential duration that an impact or impacts may affect a household, business or community.

Table 3-1 Duration of impact

Category	Description
Short term	Less than six months
Short-medium term	Between six months and two years
Medium term	Between two and five years
Medium-long term	Between five and ten years
Long term	More than ten years (effect likely to be irreversible)

Spatial extent

Table 3-2 categorises the geographic extent of an impact with consideration of the number of people within the geographic extents.

Table 3-2 Spatial extent of impact

Spatial extent	Description
Locality	Street, multiple streets or neighbourhood level
Suburb	Suburb as defined by ABS
LGA	Inner West LGA and City of Sydney LGA
Region	Greater Sydney

Severity of impact

Table 3-3 defines the severity of impact based on the intensity of potential effect and the potential change to the existing socio-economic environment (baseline condition). Severity effects could be acute or chronic.

Table 3-3 Severity of change

Severity	Description
Neutral	No discernible change to baseline condition
Small	Small change to baseline condition
Medium	Medium change to baseline condition
Large	Large changes to baseline condition

Level of consequence

Table 3-4 identifies the consequence of the impact, based on the extent, duration and severity of the impact.

Table 3-4 Consequence of impact

Category	
Negligible	No discernible positive or negative changes to baseline condition.
Slight	Small change to baseline condition, generally short or short-medium term, confined to a locality or suburb and are able to be mitigated or enhanced.
Moderate	Medium change to baseline condition that may be short, medium, or long term. The spatial extent may vary; however impacts would usually respond to mitigation or enhancement.
Major	Large change to baseline condition usually resulting in medium to long-term effects. Spatial extent is generally at an LGA or regional level with the potential for substantial effects on the social or economic environment. Negative impacts would require extensive mitigation.

3.6.2 Likelihood

Table 3-5 categorises the likelihood criteria used for the assessment.

Table 3-5 Likelihood of impact

Likelihood	Description	Probability
Near certain	Expected to occur, almost frequently	~ 90 per cent
High	Could occur in many instances	~ 70 per cent
Possible	Just as likely to happen as not	~ 50 per cent
Low	Very limited occurrence	~ 30 per cent
Rare	Occurrence in exceptional circumstances	~ 10 per cent

3.6.3 Significance of impact

The significance of the impact is determined with consideration of the:

- Consequence of the impact, based on the extent, duration and severity of the impact.
- Likelihood of the impact occurring

The nature of the impacts may be:

- Positive – the impact benefits the socio-economic environment or community values
- Negative – the impact adversely effects the socio-economic environment or community values
- Neutral – the impact is neither positive or negative.

The following assessment matrix (**Table 3-6**) determines the significance of the impact on the socio-economic environment.

Table 3-6 Significance of socio-economic effect

		Consequence			
		Neutral	**Slight**	**Moderate**	**Major**
Likelihood	**Rare**	Negligible	Negligible	Minor	Moderate
	Low	Negligible	Negligible	Minor	Moderate
	Possible	Negligible	Minor	Moderate	Moderate
	High likelihood	Minor	Minor	Moderate	Major
	Near certain	Minor	Moderate	Major	Major

4 Socio-economic policy framework

This section provides an overview of strategic and policy documents relevant to the SEIA. This includes planning guidelines and policies from various local and state government agencies.

4.1 Assessment guidelines

4.1.1 Environmental Impact Assessment Practice Note – Socio-economic assessment (EIA-N05)

Roads and Maritime Practice Note EIA-N05 applies when assessing the socio-economic impacts of medium to large road projects. The practice note provides guidance on the steps to be undertaken when completing a SEIA, including the relevant reporting requirements. This includes identification of the level of assessment appropriate for a particular project.

For a project at the scale of the project, the practice note requires a comprehensive assessment. **Table 4-1** outlines the rationale for the level of assessment (scale and magnitude of impact) and the expectations around a comprehensive SEIA.

Table 4-1 Triggers to undertake a comprehensive level of SEIA

Scale of impacts	Magnitude of impacts	Information expectations	Socio-economic baseline content
· Many impacts; or · Impacts affecting a broad section of the community; or · Impacts likely to cause broad community concern.	· Impacts of a major nature · Impacts of long duration · Impacts that require specific mitigation measures · Impacts that may have residual affect after mitigation	· Desktop research · Quantitative information from secondary sources · Extensive primary research required · Community and stakeholder consultation to define community values, impacts and mitigation measures.	· ABS Census data, fully describing population and demographic characteristics · Community structure and patterns · Community values · Economic environment · Outcomes of consultation with community and government.

Source: Roads and Maritime Services, 2012 'Environmental Impact Assessment Practice Note: Socio-economic assessment – EIA-N05 – Table 1', Transport for NSW

The practice note further outlines the requirements for establishing the socio-economic baseline. A comprehensive assessment is required to consider the full range of qualitative and quantitative aspects of a socio-economic profile.

In addition, the practice note provides a range of matters to be considered in assessing the socio-economic benefits and impacts of a road project. These include issues such as property impacts, changes to population and demography, business and industry, social infrastructure, community values, local amenity, and access and connectivity. In scoping impacts, the practice note states that consideration should be given as to whether:

- Changes would be negative or positive
- Quality of life, community identity, safety, health or economic viability would be affected
- Impacts would be acceptable or tolerated by most people, that is, would not cause concern or discomfort
- The area affected is limited to people for whom individual arrangements can be made, or extends to an area which requires more detailed strategies to be implemented

- Impacts would affect social equity, such as access to housing, employment, services or customers
- Negative impacts would be temporary or permanent
- The impacts would compromise wider planning goals or community values.

This SEIA has been prepared in accordance with the practice note. Specific socio-economic issues raised by the practice note have been separately assessed within **Chapter 7** and **Chapter 8.** The above points have been integrated into the SEIA methodology as outlined in **Chapter 3**.

4.2 Australian Government

4.2.1 Infrastructure Australia

At the Australian Government level, the Australian Infrastructure Audit 2015 projected that, in the absence of interventions to address the problem, the cost of congestion in the Sydney/Wollongong/Newcastle area would more than double from $5.6 billion in 2011 to $14.8 billion in 2031.

In light of the above, both the NSW and Australian Governments have undertaken comprehensive planning and investigations to inform their investment in WestConnex. The NSW Government released an updated Strategic Business Case for WestConnex in November 2015 for consideration and approval by Infrastructure Australia. In April 2016, Infrastructure Australia rated WestConnex a High Priority Project[3]. In the Project Business Case presented to the Australian Infrastructure Board for evaluation, was confident that the benefits of WestConnex, as a whole would exceed the costs of the project.

To date the Australian Government has provided:

- A $1.5 billion grant for Stage 1 of WestConnex (comprising the M4 Widening and M4 East projects)
- A $2 billion loan for Stage 2 of WestConnex (to accelerate delivery of the New M5 project).

Infrastructure Australia has highlighted that WestConnex would increase capacity of the Sydney road network, extend the motorway network and directly connect the M4 and M5 motorways, as well as improving connectivity to Sydney Airport and Port Botany through the St Peters interchange.

4.3 NSW Government

4.3.1 NSW Premier's Priorities

In 2015, the NSW Premier announced a new set of 'State Priorities' in support of the NSW Government's aim deliver projects that create a stronger, healthier and safer NSW. These priorities included several with direct relevance to the socio-economic status of the State[4]:

- Creating jobs
- Building infrastructure
- Encouraging business investment
- Boosting apprenticeships
- Improving road travel reliability
- Increasing housing supply

[3] High Priority Projects are potential infrastructure solutions for which a full business case has been completed and been positively assessed by the Infrastructure Australia Board. A High Priority Project addresses a major problem or opportunity of national significance

[4] NSW Government 2015, State Priorities, view at: www.nsw.gov.au/premiers-priorities on 10th October 2016.

- Ensuring on time running of public transport.

The project directly addresses a number of these priorities through the creation of jobs, building of infrastructure and enhancement of road travel reliability. The operation of the project would also improve business connectivity, enhancing freight and commercial movement networks, making it easier for businesses to operate in Sydney.

4.3.2 Infrastructure NSW

WestConnex was the major priority project highlighted in Infrastructure NSW's 2012 *State Infrastructure Strategy*[5] because:

- Investment in Sydney's road networks was viewed as being best able to service diverse trips
- Demands on the M4 and M5 corridors were leading to high levels of congestion and low speeds
- The M4 and M5 corridors are important road routes for freight, business transports and for the connection to the 'gateways' at Port Botany and Sydney Airport.

WestConnex also aligns with NSW Government priorities identified in the State Plan – *NSW 2021, A Plan to Make NSW Number One*[6], including increasing the competitiveness of doing business in Australia (Goal 4), reducing travel times (Goal 7) and improving road safety.

4.3.3 NSW Long Term Transport Master Plan

The *NSW Long Term Transport Master Plan*[7] was released in 2012 and sets out funding priorities over the next 20 years which would deliver public transport, roads and freight network links across the State.

Specifically, the Plan endorses WestConnex as completing the missing motorway links in Sydney and is identified as an immediate priority. The construction of WestConnex would:

- Support Sydney's long-term economic growth through improved motorway access and connections linking Sydney's international gateways and Western Sydney and places of business across the city
- Relieve road congestion so as to improve the speed, reliability and safety of travel in the M4 and M5 corridors, including parallel arterial roads
- Cater for the diverse travel demands along these corridors that are best met by road infrastructure
- Create opportunities for urban renewal, improved liveability, public and active transport improvements along and around Parramatta Road
- Enhance the productivity of commercial and freight generating land uses strategically located near transport infrastructure
- Optimise user pays contributions to support funding in a way that is affordable and equitable
- Improve economic productivity through reduced freight operating costs and increased freight productivity
- Have the potential to deliver travel time savings in the order of 15 minutes to 35 minutes by 2021 on the M4 and M5 corridors
- Improve urban amenity.

The Plan provides a strategic evidence base for the project, detailing the need to remove freight and heavy vehicles off surface roads to relieve congestion, improve business amenity and support

[5] Infrastructure NSW 2012, *State Infrastructure Strategy 2012 – 2023*, NSW Government

[6] Department of Premier and Cabinet 2011, *NSW 2021 A Plan to Make NSW Number One*, NSW Government

[7] Transport for NSW 2012, *NSW Long Term Transport Master Plan*, NSW Government

productivity and cost efficiency. These economic improvements would have a clear regional benefit and would be expected to filter down to local businesses and economies.

4.3.4 NSW Freight and Ports Strategy

The *NSW Freight and Ports Strategy*[8], released in November 2013, provides actions and goals that plan for the growth of the State's economy over the next 20 years. The Strategy focuses on strategic policy, infrastructure and land use planning initiatives to deliver an efficient freight network in NSW to support economic growth and employment. This includes the NSW Government's priority to manage congestion by encouraging a shift in freight movements to rail, particularly in the context of an expected increase in container movements from Port Botany.

In relation to WestConnex project the Strategy identifies that the:

> *'WestConnex project will reduce freight costs through increased travel speeds and reliability and reduce the distances travelled by freight vehicles. The WestConnex has the potential to deliver time savings on the M4/M5 corridors in the order of 15 minutes to 35 minutes by 2021'*[9]*.*

4.3.5 A Plan for Growing Sydney

NSW Department of Planning and Environment (DP&E) published *A Plan for Growing Sydney*[10] in December 2014. This document provides a framework for strengthening the global competitiveness of the city. To achieve this, the government aims for Sydney to be:

- A competitive economy with world-class services and transport
- A city of housing choice with homes that meet our needs and lifestyles
- A great place to live with communities that are strong, healthy and well connected
- A sustainable and resilient city that protects the natural environment and has a balanced approach to the use of land and resources[11].

By 2031, Sydney's economic output would almost double to $565 billion a year, with this growth being fuelled partly by an additional 689,000 new jobs over the period. Sydney would also experience a population growth of about 1.6 million people. To meet this population growth, an additional 664,000 new dwellings would need to be constructed.

Relevant to this study is Direction 1.5 of the Plan, which aims to enhance the capacity of Sydney's gateways and freight networks. The project has the potential to improve business productivity on a macro and micro-economic scale through increased transport efficiency and job creation during construction and upon operation. This includes both direct job growth arising from construction-related activities as well as indirect job growth from secondary construction and operational service demand (eg consultants). The transport efficiencies the project creates for commercial and freight movement would also enhance the capacity of freight networks and connections to the regions, producing a greater economic benefit to businesses and the state economy.

4.3.6 Draft Central District Plan

The Greater Sydney Commission (GSC) is tasked with coordinating and aligning the planning that would shape the future of Greater Sydney, taking a collaborative, 'one government' approach to lead and guide the planning for development, transport and housing. This includes the preparation of District Plans supporting the actions and outcomes of *A Plan for Growing Sydney* while also identifying an emerging new vision for Greater Sydney's future.

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[8] Transport for NSW 2013, *NSW Freight and Ports Strategy*, NSW Government

[9] Transport for NSW 2013, *NSW Freight and Ports Strategy*, NSW Government, page 104.

[10] NSW Department of Planning and Environment 2014, *A Plan For Growing Sydney*, NSW Government.

[11] NSW Department of Planning and Environment 2014, *A Plan For Growing Sydney*, NSW Government.

In November 2016, the GSC released the six draft District Plans for Sydney, which were placed on public exhibition until the end of March 2017. The project is predominantly located within the Central District, which covers the LGAs of Bayside, Burwood, Canada Bay, Inner West, Randwick, Strathfield, the City of Sydney, Waverley and Woollahra.

The snapshot of the Central District identifies that there would be an estimated 16,250 more people moving into the District every year, with over half the population likely to live in apartments. Key growth age groups would include 5–19 years, 65–84 years and 85+ years. This suggests that there would be a higher percentage of dependent people living in the District in the future.

The draft Central District Plan identifies that the district is currently experiencing significant transformation as a result of major urban renewal projects, major transport infrastructure projects (including WestConnex), investment in major arts and cultural facilities, ongoing investment in education and health, and investment in business, entertainment and recreational attractions[12]. This transformation is suggested to benefit businesses from enhanced local and global connections and highlights the extent of change already occurring across the study area.

One of the core objectives of the draft Plan is for the Central District to be a global sustainability leader, enhancing the District's liveability, productivity and attractiveness for residents and visitors. Committed and planned infrastructure projects are expected to support the efficient movement of goods and services into and across the District in the future.

The Plan identifies specific economic opportunities that would influence the socio-economic environment of the project. These include supporting the transport gateways of Sydney Airport and Port Botany; seeing the project as a strategic transport route for business, employment and urban services; leveraging the economic opportunity of Parramatta Road, and planning for a Central District that is highly productive and well-connected. Improving the efficiency of the freight network and supporting the '30-minute access to jobs and services' initiative are seen as key strategic priorities relevant to the project.

Knowledge intensive jobs relating to major hospitals, tertiary education and the innovative and creative industries are suggested to see a high level of growth. The presence of existing or proposed major transport gateways are defined as being the critical link in supporting these strategic employment growth areas and the Sydney CBD. The delivery of the project is central to the delivery of these objectives.

4.3.7 Parramatta Road Corridor Urban Transformation Strategy

The NSW Government released the *Parramatta Road Corridor Urban Transformation Strategy* developed by UrbanGrowth NSW, in partnership with local government, in November 2016[13]. The Strategy and supporting Implementation Tool Kit (Program), is the NSW Government's 30-year plan for how the Corridor would grow and develop. The Program is enabled by the removal of significant volumes of traffic from Parramatta Road arising from the construction the M4 East and the M4-M5 Link project. This reduction in traffic has the potential to provide an improved environment for living and working within the Parramatta Road corridor, stimulating housing and employment growth and generating additional economic activity.

4.3.8 Transformation Plan: The Bays Precinct, Sydney

The *Transformation Plan: The Bays Precinct* was released by UrbanGrowth NSW in October 2015 to establish a strategy for how future development would progress within The Bays Precinct.

[12] Greater Sydney Commission 2016, *draft Central District Plan*, NSW Government.

[13] UrbanGrowth NSW 2016, *Parramatta Road Corridor Urban Transformation Strategy*, NSW Government.

The stated ambition of the Transformation Plan is to *'to drive an internationally competitive economy, through the creation of great destinations on Sydney Harbour that will transform Sydney*, *New South Wales and Australia'*[14]*.*

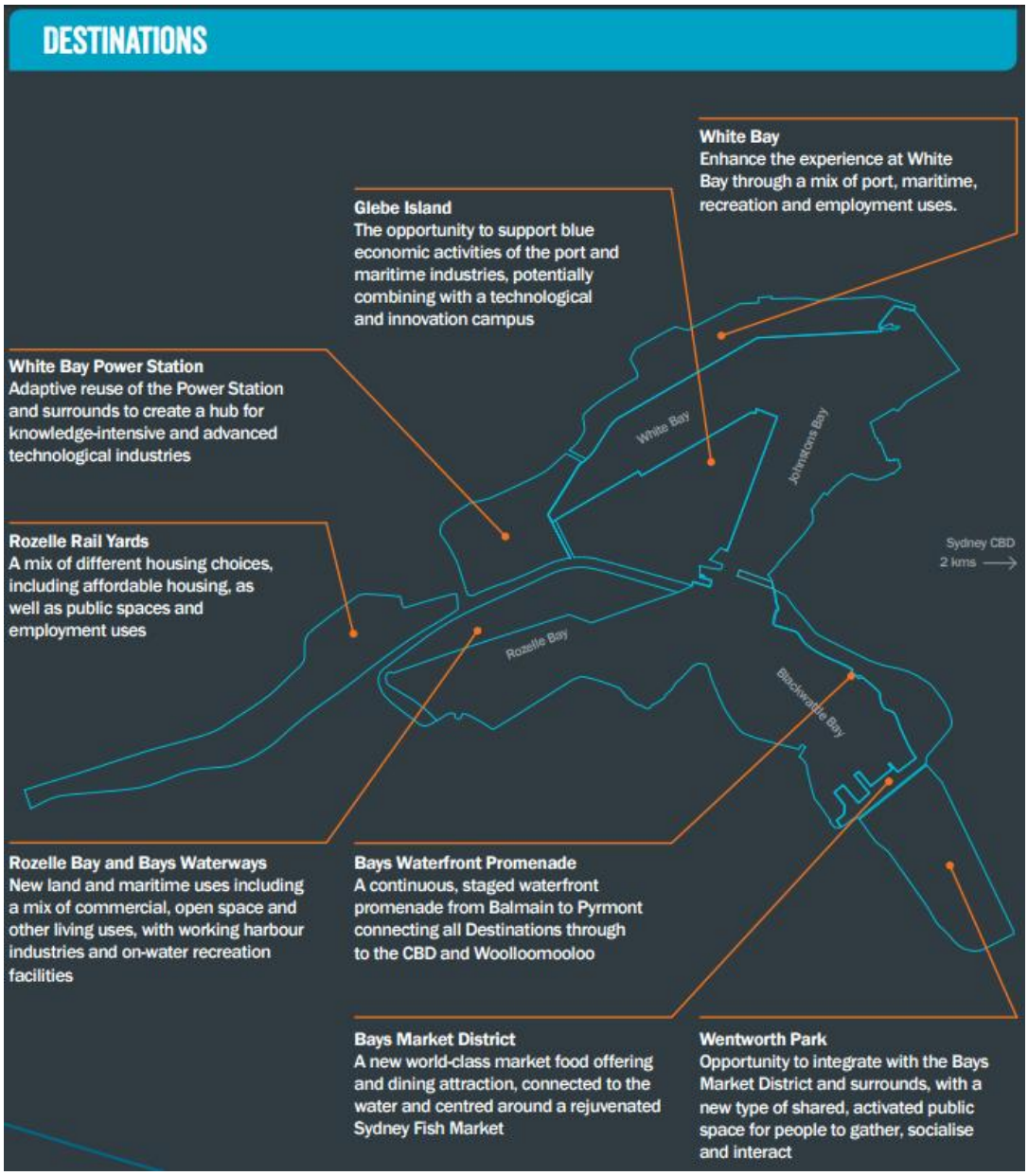


Figure 4-1 Extent of the Transformation Plan: The Bays Precinct, Sydney

Source: The Bays Precinct Transformation Plan 2015

Figure 4-1 identifies the eight sub-precincts to be the focus of the transformation, these include:

- White Bay: Enhance the experience at White Bay through a mix of port, maritime, recreation and employment uses
- Glebe Island: The opportunity to support blue economic activities of the port and maritime industries, potentially combining with a technological and innovation campus

[14] UrbanGrowth NSW 2015, *The Bays Precinct Transformation Plan, Sydney*, NSW Government.

- White Bay Power Station: Adaptive reuse of the Power Station and surrounds to create a hub for knowledge-intensive and advanced technological industries
- Rozelle Rail Yards: A mix of different housing choices, including affordable housing as well as public spaces and employment uses
- Rozelle Bay and Bays Waterways: New land and maritime uses including a mix of commercial, open space and other living uses, with working harbour industries and on-water recreation facilities
- Bays Waterfront Promenade: A continuous, staged waterfront promenade from Balmain to Pyrmont connecting all destinations through to the CBD and Woolloomooloo
- Bays Market District: A new world-class market food offering and dining attraction, connected to the water and centred around a rejuvenated Sydney Fish Market
- Wentworth Park: Opportunity to integrate with The Bays Market District and surrounds, with a new type of shared, activated public space for people to gather, socialise and interact[15].

The Bays Precinct Transformation Plan overlaps with areas relevant to the M4-M5 Link project. The Plan itself identifies that the Rozelle Rail Yards would sit next to major road infrastructure and that part of the area would be subject to development by WestConnex, as well as the CBD and South East Light Rail maintenance depot (currently under construction). Planning for WestConnex has considered the planned impact that the transformation of The Bays Precinct would have on the road network. This includes anticipated changes in the volume of vehicle trips to and from The Bays Precinct.

Since the release of the Transformation Plan in 2015, the (then) Premier in July 2016 announced key features of the Rozelle interchange, including up to 10 hectares of open space and an underground road link between Rozelle and Iron Cove Bridge.

Engagement with UrbanGrowth NSW, as an important project stakeholder, is ongoing due to the overlap of planning for the two projects and the Premier's announcement for the Rozelle interchange, which would influence the Transformation Plan for the Rozelle Rail Yards. The M4-M5 Link project design would provide valuable open space and active transport routes that would connect to The Bays Precinct.

It would be important to ensure that the Rozelle interchange is properly integrated into the future plans for The Bays Precinct and that consultation between the relevant agencies continue.

4.4 Local Government

4.4.1 Inner West Council

The Inner West Council was formed in 2016 by the merger of the former Ashfield, Leichhardt and Marrickville councils. The former Councils' strategic community plans are still applicable until a new Inner West community strategic plan is created.

Ashfield 2023 – Our Place, Our Future

The *Ashfield 2023 – Our Place, Our Future*[16] outlines the vision for the former Ashfield LGA, prepared in collaboration with the community. **Table 4-2** outlines the consultation results as described in the Strategy and the key service areas and goals.

[15] Ibid.

[16] Ashfield Council 2015, *Ashfield 2023 – Our Place, Our Future,* former Ashfield Council.

Table 4-2 Our Place, Our Future – Ashfield Community Strategic Plan – summary of community values and the community vision and strategic directions where relevant to the SEIA

Community values (informed by community engagement)
· Ashfield to become a location full of places and events that connect people of all ages and cultural backgrounds · Opportunities for lifelong learning · Our rich multicultural history protected and celebrated · A range of cultural facilities, opportunities for artistic expression, and an exciting range of events and entertainment opportunities · More facilities, green spaces and public places for community groups to meet and share culture · Assistance for vulnerable, disabled and isolated people · Local schools, preschools and centres of adult learning to be a key community focus with access to new technology · A caring and welcoming environment for new community members · Integration of public art to create a distinct sense of place.
Vision
In 2023, Ashfield is a place where everyone matters and community life is enriched by generations of migrants from many parts of the world. Ashfield is a place of unique, culturally enriched neighbourhoods, each with its own distinct character. The people of Ashfield are proud of their community. They think about the future with hope and want to improve the quality of life of present and future generations.
Seven key themes
· Creative and inclusive community · Safe, connected and accessible places · Attractive and lively town centre · Engaging and innovative local democracy · Thriving local economy · Unique and distinctive neighbourhoods.

Source: Ashfield Council 2014, Ashfield 2023 – Our Place, Our Future

The project would deliver outcomes that respond to a number of the key themes identified in this Plan, including the creation of safe, connected and accessible places and a thriving local economy. The project would create job opportunities within the local area and, through increased workers, potentially stimulate expenditure at local businesses. The new infrastructure, particularly the active transport infrastructure and open space proposed by the project, would enhance the number of quality and safe spaces and connections available for the community.

Leichhardt 2025+ Community Strategic Plan

The *Leichhardt 2025+ Community Strategic Plan* was published in 2013 by Leichhardt Council. The Plan was developed in consultation with the community, with community values incorporated into the vision, key outcomes and strategies. **Table 4-3** below outlines community values as described in the Plan and the key service areas and goals.

Table 4-3 Leichhardt 2025+ – Community Strategic Plan – summary of community values and the community vision and strategic directions where relevant to the SEIA

Community values
· **Our local community** – making it the place where we want to live, work, play and visit. · **Democratic responsible government** – open, participative and proactive Council leading the community · **Sustainability** – shared passion and commitment to consistently do all the things required to enhance and preserve the social, environmental, economic and civic leadership factors that are important to the lives of future generations and life on our planet.
Key service areas and goal
· **Community well-being** – A Leichhardt community that is equitable, cohesive, connected, caring, diverse, healthy, safe, culturally active, creative and innovative, and has a strong sense of belonging and place · **Accessibility** – Easy access for people, services, information and facilities that promotes the amenity, health and safety of the community and that reduces private car dependency for all travel · **Place where we live and work** – A liveable place – socially, environmentally and economically · **A sustainable environment** – A sustainable environment created by inspiring, leading and guiding our social, environmental and economic activities · **Business in the community** – Thriving businesses and a vibrant community working together to improve the local economy · **Sustainable services and assets** – Accountable civic leadership that delivers services and assets to support the community now and in the future.

Source: Leichhardt Council 2013, *Leichhardt 2025+*

The project would deliver outcomes that respond to a number of the key themes identified in this Plan. This would be facilitated by reduced traffic congestion for local roads and improved public transport opportunities, provision of new open space and active transport links, particularly along Parramatta and Victoria roads.

Our Place, Our Vision – Marrickville Community Strategic Plan

The *Our Place, Our Vision – Marrickville Community Strategic Plan* was published in 2013 by Marrickville Council. The Plan was developed in consultation with the community and community values and objectives were incorporated into the plans vision, key outcomes and strategies,

Table 4-4 outlines the key community values arising from consultation and key service areas and goals developed by Marrickville Council that are relevant to the SEIA.

Table 4-4 Our Place, Our Vision – Marrickville Community Strategic Plan

Community values (from consultation)
· Keeping streets clean and tackling illegal dumping · Improving the condition of roads and footpaths · Maintaining and improving parks · Addressing graffiti · Creating more accessible and efficient public transport · Maintaining cultural diversity · Greening the area · Cleaning up the Cooks River.
Key service areas and goals
A diverse community that is socially just, educated, safe and healthy · A creative and cultural Marrickville · A vibrant economy and well planned, sustainable urban environment and infrastructure · An innovative, effective, consultative and representative council.

Source: Marrickville Council 2013, *Our Place, Our Vision*

The delivery of the project would result in reduced traffic congestion for local roads and improved public transport opportunities, particularly along Parramatta Road, as outlined in the *Parramatta Road Urban Transformation Program*.

4.4.2 City of Sydney

Sustainable Sydney 2030 – Community Strategic Plan (2013)

The *Sustainable Sydney 2030 – Community Strategic Plan*[17] was published in 2014 by the City of Sydney Council. The Plan was developed in consultation with the community who were asked what kind of city they desired. The results of this consultation and subsequent strategic direction are outlined in **Table 4-5**.

Table 4-5 Sustainable Sydney 2030

Community values (from consultation)
People want a city that is: · Economically prosperous · A leader in environmental management · Liveable, inclusive and culturally alive · Safe to move about in and in a way that is environmentally responsible · Green, global and connected · That offers affordability and social diversity · Where people feel a sense of belonging, connected to the local village, shops and people in the streets, that is beautiful with ribbons of green · Which is friendly · Provides affordable space for creative people · That is globally connected · Which celebrates the outdoors · With efficient use of energy, water, and reduced water · That is an international gateway city to Asia · Where riding a bike is safe and enjoyable · Where economic benefits would be gained by enhancing sustainability · With walkable streets · With environmental leadership · Not clogged by cars · That tells its history · With distinctive precincts · With greater self-sufficiency · That includes indigenous people its future · Which has more green space.
Community vision and strategic directions
Green vision · The city would reduce its greenhouse gas emissions, with a network of green infrastructure to reduce energy, water and wastewater demands, led by major renewal sites · The city would help contain the Sydney regions' urban footprint by planning for new housing opportunities integrated with vital transport, facilities, infrastructure and open space. Connected vision · The city would be easy to get around with a network for walking and cycling, and transit routes connecting the city's villages, city centres and the rest of inner Sydney. The city would be easy to get to with an upgraded regional transit network that builds on the existing network, enhancing access to Sydney's heart from across the region · The city would commit to partnerships and co-operations between governments, the private sector and the community to lead change. The city is part of a wider national and global

[17] City of Sydney 2014, *Sustainable Sydney 2030 – Community Strategic Plan (2014*), City of Sydney

Community values (from consultation)
community and would pursue relationships with other Australian and international cities for cultural, trade and mutually beneficial exchange. Strategic directions for a sustainable Sydney (bold items indication items relevant to the socio-economic impact assessment) include: 1. A globally competitive and innovative city 2. A leading environmental performer 3. Integrated transport for a connected city 4. A city for walking and cycling 5. A lively and engaging city centre 6. Vibrant local communities and economies 7. A cultural and creative city 8. Housing for a diverse population 9. Sustainable development, renewal and design 10. Implementation through effective partnerships.

Source: City of Sydney 2014, *Sustainable Sydney 2030*

The delivery of the project would generally result in reduced traffic congestion for local roads and improved public transport opportunities, particularly along sections of Parramatta Road. The operation of the project would also improve business connectivity, enhancing freight and commercial movement networks, making it easier for companies to do business in Sydney.

4.5 Summary of key points

This SEIA has been prepared in accordance with Roads and Maritime's *Environmental Impact Assessment Practice Note – Socio-economic Assessment (EIA-N05).* A number of relevant state and local government plans and policies have also been identified and reviewed.

The project is consistent with the delivery of many of the proposed outcomes of these reports, particularly through improvements in business efficiency and savings on a regional economic scale. The operation of the project would increase travel speeds and reliability and reduce distances travelled by freight vehicles. The project would relieve road congestion, link communities and businesses, provide new open space, provide new active transport links and create capacity for improved public transport services.

5 Existing environment

This section provides an overview of the socio-economic characteristics of the study area. This background has been informed by the Australian Census of Housing and Population (ABS, 2011)[18], Australian Statistics Business Indicators (ABS 2016), Australian Statistics Business Indicators (ABS 2016) and the Bureau of Transport Statistics (NSW Government). The Greater Sydney Metropolitan area was used as a comparison to enable the precinct areas to be placed into perspective.

5.1 Study area demographic profiles

The study area is shown in **Figure 3-1** and is comprised of the following precincts:

- Ashfield-Haberfield precinct
- Leichhardt-Glebe precinct
- Alexandria-Erskineville precinct.

5.1.1 Ashfield-Haberfield precinct

The Ashfield-Haberfield precinct comprises the ABS SA2 boundaries known as Ashfield, Five Dock-Abbotsford, Burwood-Croydon and Haberfield-Summer Hill. The precinct includes the suburbs of Five Dock, Abbotsford, Ashfield, Haberfield, Summer Hill, Burwood and Croydon.

Precinct population by age distribution

As of 2011, the precinct had a population of about 76,119 residents. A lower proportion of these residents were under the age of 15 years (around 15 per cent) when compared to Greater Sydney (around 19 per cent). However, the precinct contained a higher proportion of residents within the young working family cohort of 15–44 years (around 47 per cent) and older 75+ years cohort (around eight per cent) when compared to Greater Sydney (around 44 per cent and six per cent respectively) (**Table 5-1**).

Table 5-1 Age distribution in the Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Age distribution	Total persons	76,119	4,391,676
	0-14 years	15.1%	19.2%
	15-29 years	22.4%	21.0%
	30-44 years	24.1%	22.5%
	45-59 years	18.9%	19.2%
	60-74 years	11.3%	11.9%
	75+ years	8.1%	6.1%

Source: Census 2011

Place of birth

The majority of residents within the Ashfield-Haberfield precinct were born in Australia and Oceania. This group comprised about 60 per cent of the population, followed by Asia (around 25 per cent), then Europe (about 12 per cent). This is compared to Greater Sydney where 71 per cent of the population were born in Australia or Oceania, around 15 per cent were born in Asia, and 10 per cent were born in Europe (**Table 5-2**).

[18] The 2016 Australian Census of Population and Housing statistics was not available at the time of analysis

Table 5-2 Place of birth of the Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Place of birth	Australia or Oceania	59.7%	71.3%
	Europe	12.4%	9.5%
	North Africa or Middle East	1.7%	2.9%
	Asia	25.1%	14.7%
	Americas	0.7%	0.7%
	Sub-Saharan Africa	0.4%	0.9%

Source: Census 2011

Cultural diversity

The precinct's cultural diversity indicators are outlined in **Table 5-3**. The number of people within the precinct that were born overseas (around 44 per cent) and spoke a language other than English (around 46 per cent) was high compared to Greater Sydney (around 40 per cent and 38 per cent respectively). The Aboriginal and Torres Strait Islander population within the precinct (around 0.5 per cent) was low compared to Greater Sydney (1.2 per cent).

Table 5-3 Cultural diversity

	Category	Ashfield-Haberfield precinct		Greater Sydney	
		No. of persons	% of total population	No. of persons	% of total population
Social characteristics	Aboriginal and Torres Strait Islander People	371	0.5%	54,746	1.2%
	People born overseas	33,684	44%	1,759,130	40%
	Language other than English	34,643	46%	1,659,226	38%

Source: Census 2011

Socio-economic Indexes for Areas (SEIFA)

The SEIFA advantage/disadvantage index summarises the household conditions within an area. This index is weighted one to 10, with 10 being the most advantaged. In this precinct the index is eight, slightly lower than the Greater Sydney index of nine. Both eight and nine are considered to be a high score. A high score indicates a relative lack of disadvantage in general. For example, an area may have a high score if there are (among other things): few households with low incomes, few people with no qualifications, and few people in low skilled occupations.

Need for assistance and dependents

Dependents are persons aged 0–14 and those over the age of 65 who are no longer in the workforce. As can be seen in Table 5-4, the precinct recorded a lower proportion of children aged 0–14 (around 15 per cent) compared to Greater Sydney (around 19 per cent). The precinct recorded a higher proportion of people aged 65 years and over (around 15 per cent) compared to Greater Sydney (around 13 per cent). The precinct also recorded a higher proportion of persons needing assistance (around five per cent) compared to Greater Sydney (around four per cent).

Table 5-4 Need for assistance or dependents

	Category	Ashfield-Haberfield precinct		Greater Sydney	
		No. of persons	% of total population	No. of persons	% of total population
Socio-economic characteristics	Need for assistance	4,134	5.4%	192,325	4.4%
	Children aged 0–14	11,488	15.1%	843,213	19.2%
	People aged 65 years and over	11,174	14.7%	564,444	12.9%

Source: Census 2011

Residential dwelling characteristics

As of 2011, there were around 28,121 occupied private dwellings within the precinct. A significant proportion of these were apartment-style dwellings (around 47 per cent), which was significantly higher than Greater Sydney (around 26 per cent) (**Table 5-5**).

Table 5-5 Residential dwelling characteristics within Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Residential dwelling characteristics	Separate house	40.5%	60.9%
	Townhouse	12.0%	12.8%
	Flat-unit-apartment	46.7%	25.8%
	Other dwelling	0.6%	0.5%
	Not stated	0.1%	0.1%

Source: Census 2011

Home ownership and household structure

Reflective of an area with a high proportion of apartment style living and a young workforce was the higher proportion of residents renting (around 39 per cent), when compared to Greater Sydney (around 32 per cent). Family households comprised 72 per cent of household structures and over half the population owned or were in the process of purchasing a house (around 57 per cent) (**Table 5-6**).

Table 5-6 Home ownership and household structure in Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Home ownership	Owned or being purchased	57.3%	65.2%
	Rented	39.4%	31.6%
	Other/not stated	3.3%	3.2%
Household structure	Family households	72.4%	73.1%
	Lone person households	20.4%	22.6%
	Group households	7.3%	4.3%

Source: Census 2011

Median incomes and rent per week

In 2011 the median household income for the precinct was $1,493 per week, which was slightly greater than the median weekly household income of Greater Sydney ($1,447). Personal income in the precinct was $640 per week, which was higher than Greater Sydney at $619 per week. Median rent however was also higher at $401 per week, compared to Greater Sydney, which recorded a median weekly rent of $351 per week (**Table 5-7**).

Table 5-7 Median household and personal income and rent per week within Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Economic medians	Median total personal income ($/weekly)	$640	$619
	Median total household income ($/weekly)	$1,493	$1,447
	Median rent ($/weekly)	$401	$351

Source: Census 2011

Education characteristics

Fifty-three per cent of residents within the precinct had attained a higher education qualification (that is, above the level of Higher School Certificate); this is high compared to 48 per cent of residents across Greater Sydney (**Table 5-8**).

Table 5-8 Higher education level attained for Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct	Greater Sydney
Education	Postgraduate Degree Level	8.9%	5.6%
	Graduate Diploma and Graduate Certificate Level	2.1%	1.6%
	Bachelor Degree Level	21.7%	16.9%
	Advanced Diploma and Diploma Level	9.5%	9.0%
	Certificate Level	10.9%	15.2%
	Level of education inadequately described	2.1%	2.0%

Source: Census 2011, count of persons over 15 years. Not Stated category not expressed.

Employment characteristics

As of 2011, there were around 64,631 residents aged 15 years and over within the precinct. Of these residents, around 65 per cent were employed. The precinct had a high proportion of residents employed in 'white collar' occupations (around 43 per cent) and a comparatively low proportion of residents employed in 'blue collar' occupations (around 18 per cent) when compared to Greater Sydney (around 37 per cent and 24 per cent respectively) (**Table 5-9**).

Table 5-9 Ashfield-Haberfield precinct employment characteristics

	Category	Ashfield-Haberfield precinct	Greater Sydney
Employment characteristics	Blue collar	18.2%	23.8%
	Community/service	31.3%	32.0%
	White collar	42.9%	36.6%
	Unemployment	5.8%	5.7%

Source: Census 2011

Key resident employment industries

The top four employment industries in this precinct are described in **Table 5-10**, compared to the top four employment industries of Greater Sydney as per **Table 5-11**.

Table 5-10 Resident employment characteristics of Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield precinct
Employment characteristics	Health care and social assistance	12%
	Professional, scientific and technical services	11%
	Retail trade	9%
	Education and training	9%

Source: TPA 2011

Table 5-11 Resident employment characteristics of Greater Sydney

	Category	Greater Sydney
Employment characteristics	Health care and social assistance	11%
	Retail trade	10%
	Professional, scientific and technical services	10%
	Manufacturing	8%

Source: TPA 2011

Travel to work

As identified in **Table 5-12**, 47 per cent of employed people living within the precinct stated that driving was their primary method of getting to work, this is low when compared to Greater Sydney (around 60 per cent).

Table 5-12 Resident of the travel mode to work (TPA) in the Ashfield-Haberfield precinct

Travel mode to work as of 2011		Ashfield-Haberfield Precinct		Greater Sydney	
Category		**Number**	**Percentage**	**Number**	**Percentage**
Car		17,655	47%	1,203,441	59%
Rail		9,420	25%	283,237	14%
Bus		2,653	7%	119,057	6%
Walking		1,449	4%	83,242	4%
Cycling		431	1%	15,604	1%
Other[19]		6,481	16%	348,215	17%

Source: TPA Journey to work 2011

Of those that travelled to the precinct for work (**Table 5-13**), around 58 per cent travelled by private car and 19 per cent travelled by public transport (around 16 per cent by rail and three per cent by bus).

19 Travel modes include: motorbike, did not go to work, tram, truck, other mode, taxi, worked at home, ferry and mode not stated.

Table 5-13 Primary travel mode of all workers travelling to jobs in the Ashfield-Haberfield precinct (TPA)

Travel mode to work as of 2011	Ashfield-Haberfield Precinct		Greater Sydney	
Category	**Number**	**Percentage**	**Number**	**Percentage**
Car 	15,813	58%	1,161,486	57%
Rail 	4,408	16%	284,501	14%
Bus 	902	3%	118,618	6%
Walking 	1,462	5%	83,437	4%
Cycling 	170	1%	15,490	1%
Other 	4,634	17%	338,735	17%

Source: TPA Journey to work data 2011

Vehicle ownership

As seen in **Table 5-14**, in the Ashfield-Haberfield precinct, around 44 per cent of occupied private dwellings had one registered motor vehicle garaged or parked at their address, around 28 per cent had two registered motor vehicles and seven per cent had three or more registered motor vehicles. Eighteen per cent of occupied private dwellings did not have a vehicle and relied on other transport modes.

Table 5-14 Vehicle ownership count of private occupied dwellings Ashfield-Haberfield precinct

	Category	Ashfield-Haberfield Precinct		Greater Sydney	
		Number	**Percentage**	**Number**	**Percentage**
Social characteristics	Households with no vehicles	5,142	18%	183,592	12%
	Households with one vehicle	12,839	44%	583,254	38%
	Households with two vehicles	8,245	28%	500,133	33%
	Households with three or more vehicles	2,059	7%	206,732	14%
	Number of motor vehicles or dwelling structure not stated	837	3%	47,681	3%

Source: Census 2011

Precinct population and employment projections

The TPA forecast shows that the population of the precinct would reach 111,067 persons by 2036, representing an increase of 24,759 persons (around 29 per cent) over its 2016 base population projection of 83,308 residents.

Employment within the precinct is forecast to increase from 32,442 jobs to 41,429 jobs by 2036. This represents an increase of 8,987 jobs or around 28 per cent over the period. **Table 5-15** summarises the projected change in demographic indicators for the precinct.

Table 5-15 Ashfield-Haberfield precinct demographic projections

	2016	2026	2036	Change	% change
Population	86,308	99,907	111,067	24,759	29%
Employment	32,442	36,726	41,429	8,987	28%
Workforce	46,991	54,132	60,041	13,050	28%

Source: TPA Population and Employment Projections 2014

5.1.2 Leichhardt-Glebe precinct

The Leichhardt-Glebe precinct comprises the SA2 boundaries known as Leichhardt-Annandale, Lilyfield-Rozelle, Balmain and Glebe-Forest Lodge. The precinct includes the suburbs of Glebe, Forest Lodge, Balmain, Rozelle, Lilyfield, Annandale, Leichhardt and a portion of Camperdown.

Precinct population by age

As of 2011, the precinct had a population of around 68,800 residents. A lower proportion of these residents were under the age of 15 years (around 15 per cent) when compared to Greater Sydney (around 19 per cent). However, the precinct contained a higher proportion of residents within the young working family cohort of 15–44 years (around 51 per cent) when compared to Greater Sydney (around 44 per cent) (**Table 5-16**).

Table 5-16 Age distribution of the Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Age distribution	**Total persons**	68,779	4,391,676
	0–14 years	15.1%	19.2%
	15–29 years	19.4%	21.0%
	30–44 years	31.2%	22.5%
	45–59 years	18.9%	19.2%
	60–74 years	11.2%	11.9%
	75+ years	4.2%	6.1%

Source: Census 2011

Place of birth

The majority of residents within the Leichhardt-Glebe precinct (in 2011) were born in Australia and Oceania (about 76 per cent), followed by Europe (around 15 per cent), then Asia (about seven per cent). This is compared to Greater Sydney where 71 per cent of the population were born in Australia or Oceania and about 15 per cent and about 10 per cent of the population were born in Asia or Europe respectively (**Table 5-17**).

Table 5-17 Place of birth of the Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Place of Birth	Australia or Oceania	75.5%	71.3%
	Europe	14.5%	9.5%
	North Africa and Middle East	0.6%	2.9%
	Asia	6.9%	14.7%
	Americas	1.8%	0.7%
	Sub-Saharan Africa	0.7%	0.9%

Source: Census 2011

Cultural diversity

The precinct's cultural diversity indicators are outlined in **Table 5-18**. Within the precinct, around 30 per cent of residents were born overseas and 17 per cent of people spoke a language other than English. Greater Sydney recorded a higher number of people born overseas (around 40 per cent) and a higher number of people who spoke a language other than English (38 per cent). The Aboriginal and Torres Strait Islander population within the precinct (around 0.5 per cent) was low compared to Greater Sydney at 1.2 per cent.

Table 5-18 Cultural diversity

	Category	Leichhardt-Glebe precinct		Greater Sydney	
		Number of persons	% of total population	Number of persons	% of total population
Social characteristics	Aboriginal and Torres Strait Islander people	869	0.5%	54,746	1.2%
	People born overseas	20,563	29.9%	1,759,130	40%
	Speaks a language other than English	11,366	17%	1,659,226	38%

Source: Census 2011

Socio-economic Indexes for Areas (SEIFA)

The advantage/disadvantage index summarises the household conditions within an area. This index was weighted 1–10 with 10 being the most advantaged. In this precinct, the index was 9.5, higher than the Greater Sydney index of nine.

Need for assistance and dependents

Dependents are persons aged 0–14 and those over the age of 65 who are no longer in the workforce. As can be seen in **Table 5-19**, the precinct recorded a lower proportion of children aged 0–14 (around 15 per cent) compared to Greater Sydney (around 19 per cent). The precinct also recorded a lower proportion of people aged 65 years and over (around 10 per cent) compared to Greater Sydney (around 13 per cent). The precinct recorded a lower proportion of persons needing assistance (around one per cent) compared to Greater Sydney (around four per cent).

Table 5-19 Need for assistance or dependents

	Category	Leichhardt-Glebe precinct		Greater Sydney	
		No. of persons	% of total population	No. of persons	% of total population
Socio-economic characteristics	Need for assistance	2,173	1.2%	192,325	4.4%
	Children aged 0–14	10,354	15%	843,213	19.2%
	People aged 65 years and over	6,910	10%	564,444	12.9%

Source: Census 2011

Residential dwelling characteristics

As of 2011, there were 28,710 occupied private dwellings within this precinct. A significant proportion of these were apartment style dwellings (around 34 per cent), which was higher than Greater Sydney where 26 per cent of dwellings were identified as apartments. Townhouses were the primary form of housing within the Leichhardt-Glebe precinct, contributing 37 per cent compared to Greater Sydney's 13 per cent (**Table 5-20**).

Table 5-20 Residential dwelling characteristics within Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Residential dwelling characteristics	Separate house	28.1%	60.9%
	Townhouse	37.0%	12.8%
	Flat-unit-apartment	33.8%	25.8%
	Other dwelling	1.1%	0.5%
	Not stated	0.1%	0.1%

Source: Census 2011

Home ownership and household structure

Reflective of an area with a high proportion of apartment style living and a young workforce was the higher proportion of residents renting (around 46 per cent), when compared to Greater Sydney (around 32 per cent). Family households comprised (around 65 per cent) of all households and just over half the population owned or were in the process of purchasing a house (around 52 per cent) (**Table 5-21**).

Table 5-21 Home ownership and household structure in Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Home ownership	Owned or being purchased	52.1%	65.2%
	Rented	45.5%	31.6%
	Other/not stated	2.4%	3.2%
Household structure	Family households	64.6%	73.1%
	Lone person households	25.9%	22.6%
	Group households	9.5%	4.3%

Source: Census 2011

Median incomes and rent per week

The median household income for the precinct was $2,062 per week in 2011. This was higher than the median weekly household income of Greater Sydney at $1,447 per week. Personal income in the precinct was $1,033 per week, which was also higher than Greater Sydney at $619 per week. Median rent was higher in the precinct at $455 per week, compared to Greater Sydney, which was $351 per week (**Table 5-22**).

Table 5-22 Median household and personal income and rent per week within Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Economic medians	Median total personal income ($/weekly)	$1,033	$619
	Median total household income ($/weekly)	$2,062	$1,447
	Median rent ($/weekly)	$455	$351

Source: Census 2011

Education characteristics

Sixty-three per cent of residents within the precinct had attained a higher education qualification (above High School Certificate); this is relatively high compared to 48 per cent of residents across Greater Sydney (**Table 5-23**).

Table 5-23 Education characteristics within Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct	Greater Sydney
Education	Postgraduate Degree level	12.1%	5.6%
	Graduate Diploma and Graduate Certificate level	3.4%	1.6%
	Bachelor Degree level	28.9%	16.9%
	Advanced Diploma and Diploma level	9.1%	9.0%
	Certificate level	9.3%	15.2%
	Level of education inadequately described	10.6%	2.0%

Source: Census 2011, count of persons over 15 years, Not Stated category not expressed

Employment characteristics

As of 2011, there were 58,425 residents aged 15 years and over within the precinct. Of these residents, 67 per cent were employed. The precinct had a high proportion of residents employed in 'white collar' occupations (around 59 per cent) and a comparatively low proportion of residents within 'blue collar' occupations (around 10 per cent) when compared to Greater Sydney (around 37 per cent and 24 per cent respectively) (**Table 5-24**).

Table 5-24 Leichhardt-Glebe precinct employment characteristics

	Category	Leichhardt-Glebe precinct	Greater Sydney
Employment characteristics	Blue collar	10.3%	23.8%
	Community/service	25.2%	32.0%
	White collar	58.7%	36.6%
	Unemployment	4.5%	5.7%

Source: Census 2011. Inadequately described and Not Stated categories not expressed

Key resident employment industries

The top four employment industries in this precinct were as per **Table 5-25**, compared to the top four employment industries of Greater Sydney as per **Table 5-26**.

Table 5-25 Employment characteristics of Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct
Employment characteristics	Professional, scientific and technical services	17%
	Education and training	10%
	Health care and social assistance	10%
	Financial and insurance services	10%

Source: TPA 2011

Table 5-26 Employment characteristics of Greater Sydney

Category	Category	Greater Sydney
Employment characteristics	Health care and social assistance	11%
	Retail trade	10%
	Professional, scientific and technical services	10%
	Manufacturing	8%

Source: TPA 2011

Travel to work methods

As shown in **Table 5-27** 43 per cent of employed residents stated that driving was their primary method of travelling to work in 2011, compared to 60% for Greater Sydney.

Table 5-27 Resident travel mode to work in the Leichhardt-Glebe precinct (TPA)

Travel mode to work as of 2011	Leichhardt-Glebe Precinct		Greater Sydney	
Category	**Number**	**Percentage**	**Number**	**Percentage**
Car 	16,981	43%	1,203,441	59%
Rail 	2,058	5%	83,242	4%
Bus 	8,167	21%	283,237	14%
Walking 	3,150	8%	119,057	6%
Cycling 	1,217	5%	15,604	1%
Other 	8,371	21%	348,215	17%

Source: TPA Journey to work data 2011

Of the approximate 27,000 jobs provided within the precinct, 6,960 were local resident employees. Of these workers, 56 per cent travelled to work by private car, seven per cent walked while only eight per cent travel by rail and eight per cent travel by bus (see **Table 5-28**).

Table 5-28 Primary travel mode of all workers travelling to jobs in the Leichhardt-Glebe precinct (TPA)

Travel mode to work as of 2011	Leichhardt-Glebe Precinct		Greater Sydney	
Category	**Number**	**Percentage**	**Number**	**Percentage**
Car 	15,105	56%	1,161,486	57%
Rail 	2,155	8%	284,501	14%
Bus 	2,060	8%	118,618	6%
Walking 	1,967	7%	83,437	4%
Cycling 	346	1%	15,490	1%
Other 	5,363	20%	338,735	17%

Source: TPA Journey to work data 2011

Vehicle ownership

In the Leichhardt-Glebe precinct, 49 per cent of occupied private dwellings had one registered motor vehicle garaged or parked at their address, 24 per cent had two registered motor vehicles and four per cent had three or more registered motor vehicles. Nineteen per cent of occupied private dwellings did not have a vehicle (see **Table 5-29**).

Table 5-29 Vehicle ownership count of private occupied dwellings Leichhardt-Glebe precinct

	Category	Leichhardt-Glebe precinct		Greater Sydney	
		Number	Percentage	Number	Percentage
Socio-economic characteristics	Households with no vehicles	5,474	19%	183,592	12%
	Households with one vehicle	14,207	49%	583,254	38%
	Households with two vehicles	7,012	24%	500,133	33%
	Households with three or more vehicles	1,252	4%	206,732	14%
	Number of motor vehicles or dwelling structure not stated	759	3%	47,681	3%

Source: Census 2011

Population and employment projections

The TPA forecasts that the population of the precinct would reach 95,808 persons by 2036, representing an increase of 19,634 persons or 26 per cent over its 2016 base population of 76,174 residents.

Employment within the precinct is forecast to increase from 32,128 jobs to 39,307 jobs by 2036. This represents an increase of 7,179 jobs or around 22 per cent over the period. The workforce in the area is also projected to increase by around 24 per cent from 46,155 in 2016 to 57,324. **Table 5-30** summarises the projected change in demographic indicators for the precinct.

Table 5-30 Leichhardt-Glebe precinct demographic projections

	2016	2026	2036	Change	% change
Population	76,174	85,943	95,808	19,634	26%
Employment	32,128	35,503	39,307	7,179	22%
Workforce	46,155	51,939	57,324	11,169	24%

Source: TPA Population and Employment Projections 2014

5.1.3 Alexandria-Erskineville precinct

The Alexandria-Erskineville precinct comprises the SA2 boundaries known as Sydenham-Tempe-St Peters, Redfern-Chippendale, Erskineville-Alexandria, Newtown-Camperdown-Darlington and Petersham-Stanmore. The precinct comprises the suburbs of Erskineville, Alexandria, Newtown, Darlington, Redfern, Chippendale, Eveleigh, Sydenham, Tempe, St Peters, Petersham, Stanmore and a proportion of Enmore and Camperdown.

Precinct population by age

As of 2011, the precinct had a population of around 77,973 residents. The age profile of the Alexandria-Erskineville precinct is younger than Greater Sydney. This was evident in the median age of Alexandria-Erskineville precinct being 33 years compared to 36 years for Greater Sydney in 2011.

A lower proportion of these residents were under the age of 15 years (around 11 per cent) when compared to Greater Sydney (around 19 per cent). However, the precinct contained a higher proportion of residents within the young working family cohort of 15–44 years (around 62 per cent) when compared to Greater Sydney (around 44 per cent) (**Table 5-31**).

Table 5-31 Age distribution of the Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
	Total persons	77,973	4,391,676
Age distribution	0–14 years	10.5%	19.2%
	15–29 years	28.8%	21.0%
	30–44 years	33.0%	22.5%
	45–59 years	16.6%	19.2%
	60–74 years	7.9%	11.9%
	75+ years	3.2%	6.1%

Source: Census 2011

Place of birth

The majority of residents within the Alexandria-Erskineville precinct were born in Australia and Oceania (about 72 per cent), followed by Europe (around 12 per cent), then Asia (around 12 per cent). This is compared to Greater Sydney where 71 per cent of the population were born in Australia or Oceania and about 15 per cent and about 10 per cent of the population were born in Asia and Europe respectively (**Table 5-32**).

Table 5-32 Place of birth of the Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
Place of birth	Australia or Oceania	72.2%	71.3%
	Europe	12.1%	9.5%
	North Africa and Middle East	0.9%	2.9%
	Asia	12.4%	14.7%
	Americas	1.8%	0.7%
	Sub-Saharan Africa	0.6%	0.9%

Source: Census 2011

Cultural diversity

The precinct's cultural diversity indicators are outlined in Table 5-33. Within the precinct 38 per cent of residents were born overseas and about 29 per cent of people spoke a language other than English. Greater Sydney recorded a higher number of people born overseas (around 40 per cent) and higher number of people who spoke a language other than English (around 38 per cent). The Aboriginal and Torres Strait Islander population within the precinct (around 1.3 per cent) was higher than that of Greater Sydney (around 1.2 per cent).

Table 5-33 Cultural diversity

	Category	Alexandria-Erskineville precinct		Greater Sydney	
		No. of persons	% of total population	No. of persons	% of total population
Socio-economic characteristics	Aboriginal and Torres Strait Islander people	1,214	1.3%	54,746	1.2%
	People born overseas	29,575	38%	1,759,130	40%
	Language other than English	22,352	29%	1,659,226	38%

Source: Census 2011

Socio-economic Indexes for Areas (SEIFA)

The advantage/disadvantage index summarises the household conditions within an area. This index was weighted 1–10 with 10 being the most advantaged. In this precinct the index is 8.75, slightly lower than the Greater Sydney index of nine.

Need for assistance and dependents

Dependents are persons aged 0–14 and over the age of 65 who are no longer in the workforce. As can be seen in **Table 5-34**, the precinct recorded a lower proportion of children aged 0–14 (seven per cent) compared to Greater Sydney (around 19 per cent). The precinct recorded a lower proportion of people aged 65 years and over (around eight per cent) compared to Greater Sydney (around 13 per cent). The precinct also recorded a lower proportion of persons needing assistance (around two per cent) compared to Greater Sydney (around four per cent).

Table 5-34 Need for assistance or dependents

	Category	No. of persons	% of total population	Greater Sydney	% of total population
Socio-economic characteristics	Need for assistance	1,752	2.2%	192,325	4.4%
	Children aged 0–14	8,178	10.%	843,213	19.2%
	People aged 65 years and over	5,868	7.5%	564,444	12.9%

Source: Census 2011

Residential dwelling characteristics

As of 2011, there were 32,643 occupied private dwellings within the precinct. A significant proportion of these were apartment style dwellings (around 50 per cent), which was higher than Greater Sydney (around 26 per cent) (**Table 5-35**).

Table 5-35 Residential dwelling characteristics within Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
Residential dwelling characteristics	Separate house	15.4%	60.9%
	Townhouse	37.1%	12.8%
	Flat-unit-apartment	46.4%	25.8%
	Other dwelling	0.9%	0.5%
	Not stated	0.3%	0.1%

Source: Census 2011

Home ownership and household structure

Reflective of an area with a high proportion of apartment style living and a young workforce was the higher proportion of residents renting (around 51 per cent), when compared to Greater Sydney (around 32 per cent), while 46 per cent of households were owned or being purchased. Family households comprised 53 per cent of households within the precinct compared to 73% in Greater Sydney (**Table 5-36**).

Table 5-36 Home ownership and household structure in Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
Home ownership	Owned or being purchased	46.2%	65.2%
	Rented	51.3%	31.6%
	Other/not stated	2.5%	3.2%
Household structure	Family households	52.6%	73.1%
	Lone person households	31.2%	22.6%
	Group households	16.2%	4.3%

Source: Census 2011

Median incomes and rent per week

The median household income for the precinct was $1,763 per week in 2011. This was slightly higher than the median weekly household income of Greater Sydney, which was $1,447 per week. Personal income in the precinct was $900 per week, which was higher than Greater Sydney at $619 per week. Median rent was also higher at $429 per week, compared to Greater Sydney, which recorded a weekly rent of $351 per week (**Table 5-37**).

Table 5-37 Median household and personal income and rent per week within Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
Economic medians	Median total personal income ($/weekly)	$900	$619
	Median total household income ($/weekly)	$1,763	$1,447
	Median rent ($/weekly)	$429	$351

Source: Census 2011

Education characteristics

Fifty per cent of residents within the precinct had attained a higher education qualification (above High School Certificate). This was slightly higher Greater Sydney at 48 per cent (**Table 5-38**).

Table 5-38 Higher education level attained within Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct	Greater Sydney
Education	Postgraduate Degree level	2.7%	5.6%
	Graduate Diploma and Graduate Certificate level	27.1%	1.6%
	Bachelor Degree level	8.9%	16.9%
	Advanced Diploma and Diploma level	9.7%	9.0%
	Certificate level	1.6%	15.2%
	Level of education inadequately described	12.7%	2.0%

Source: Census 2011, count of persons over 15 years, Not Stated category not expressed

Employment characteristics

As of 2011, there were around 69,795 residents aged 15 years or over within the precinct. Unemployment in the Alexandria-Erskineville precinct was five per cent, which was lower than the Greater Sydney region (around six per cent). The precinct had a high proportion of residents employed in 'white collar' occupations (around 52 per cent) and a comparatively low proportion of

residents within 'blue collar' occupations (around 13 per cent) when compared to Greater Sydney (around 37 per cent and 24 per cent respectively) (**Table 5-39**).

Table 5-39 Alexandria-Erskineville precinct employment characteristics

	Category	Alexandria-Erskineville precinct	Greater Sydney
Employment characteristics	Blue Collar	13.2%	23.8%
	Community/service	28.4%	32.0%
	White Collar	51.8%	36.6%
	Unemployment	5.2%	5.7%

Source: Census 2011, inadequately described and Not Stated categories not expressed

Key resident employment industries

The top four employment industries in this precinct were as per **Table 5-40**, compared to the top four employment industries of Greater Sydney as per **Table 5-41**.

Table 5-40 Employment characteristics of Ashfield-Haberfield precinct

	Category	Alexandria-Erskineville precinct
Employment characteristics	Professional, scientific and technical services	15%
	Education and training	10%
	Health care and social assistance	9%
	Financial and insurance services	8%

Source: TPA 2011

Table 5-41 Employment characteristics of Greater Sydney

	Category	Greater Sydney
Employment characteristics	Health care and social assistance	11%
	Retail trade	10%
	Professional, scientific and technical services	10%
	Manufacturing	8%

Source: TPA 2011

Travel to work methods

As identified in **Table 5-42**, 31 per cent of employed residents stated that driving was their primary method of travel to work in 2011, compared to 60% across Greater Sydney.

Table 5-42 Resident travel mode to work in the Alexandria-Erskineville precinct

Travel mode to work as of 2011		Alexandria-Erskineville Precinct			
Category		**Number**	**Percentage**	**Number**	**Percentage**
Car		14,734	31%	1,203,441	59%
Rail		11,862	25%	283,237	14%
Bus		5,315	11%	119,057	6%
Walking		5,383	11%	83,242	4%
Cycling		2,041	4%	15,604	1%
Other		7,610	16%	348,215	17%

Source: TPA Journey to work data 2011

Of those employed within the precinct about 52 per cent travelled to work by private car, 18 per cent travelled by rail, seven per cent walked, and six per cent travelled by bus (**Table 5-43**).

Table 5-43 Primary travel mode of all workers travelling to jobs in the Alexandria-Erskineville precinct (TPA)

Travel mode to work as of 2011		Alexandria-Erskineville Precinct		Greater Sydney	
Category		**Number**	**Percentage**	**Number**	**Percentage**
Car		32,069	52%	1,161,486	57%
Rail		11,337	18%	284,501	14%
Bus		3,441	6%	118,618	6%
Walking		4,262	7%	83,437	4%
Cycling		1,322	2%	15,490	1%
Other		10,184	17%	354,225	17%

Source: TPA Journey to work data 2011

Vehicle ownership

As seen in **Table 5-44**, in the Alexandria-Erskineville precinct, about 49 per cent of occupied private dwellings had one registered motor vehicle garaged or parked at their address, 16 per cent had two registered motor vehicles and three per cent had three or more registered motor vehicles. Twenty-nine per cent of occupied private dwellings did not have a vehicle and relied on other transport sources.

Table 5-44 Vehicle ownership count of private occupied dwellings Alexandria-Erskineville precinct

	Category	Alexandria-Erskineville precinct		Greater Sydney	
		Number	Percentage	Number	Percentage
Socio-economic characteristics	Households with no vehicles	8,923	29%	183,592	12%
	Households with one vehicle	16,083	49%	583,254	38%
	Households with two vehicles	5,552	16%	500,133	33%
	Households with three or more vehicles	1,092	3%	206,732	14%
	Number of motor vehicles or dwelling structure not stated	987	3%	47,681	3%

Source: ABS Census of Population and Housing – Census 2011

Population and employment projections

The TPA forecasts that the population of the precinct would reach 120,520 persons by 2036, representing an increase of 30,545 persons or 34 per cent over its 2016 population of 89,975[20].

Employment within the precinct is forecast to increase from 74,665 jobs to 97,575 jobs by 2036. This represents an increase of 22,910 jobs or 31 per cent over the period. **Table 5-45** summarises the projected change in demographic indicators for the precinct.

Table 5-45 Alexandria-Erskineville precinct demographic projections

	2016	2026	2036	Change	% change
Population	89,975	102,968	120,520	30,545	34%
Employment	74,665	86,946	97,575	22,910	31%
Workforce	56,160	62,564	71,916	15,756	28%

Source: TPA Journey to work data 2014

5.1.4 Summary of key findings

- As of 2011, the study area (all three precincts combined) had a population of 222,871 residents with the largest precinct being the Alexandria-Erskineville precinct (77,973)
- The study area's community was culturally diverse. The Ashfield-Haberfield precinct recorded over 44 per cent of residents born overseas and 46 per cent speaking a language other than English. The Alexandria-Erskineville precinct had the largest population of Aboriginal and Torres Straight Islanders of all three precincts (about 1.3 per cent), which is higher than Greater Sydney (about 1.2 per cent)

[20] The TPA considers the Census an undercount and adjusts its estimates accordingly.

- The study area had a similar lower population of people that need assistance (four per cent) compared to Greater Sydney (about 4.4 per cent). This includes people who required assistance for one or more of the three core activity areas of self-care, mobility and communication, because of a disability, long-term health condition (lasting six months or more) or old age.
- The study area had a lower proportion of children under 15 years (about 14 per cent) and persons aged over 65 years (about 11 per cent) compared to Greater Sydney (about 19 per cent and 12 per cent respectively). Of the three precincts, the Ashfield-Haberfield precinct contained the highest proportion of persons aged over 65 (about 15 per cent) and children under 15 years (about 15 per cent)
- The rate of unemployment in the study area (about five per cent) was slightly lower than Greater Sydney (about 5.7 per cent) overall. Ashfield-Haberfield had the highest unemployment rate (about 5.8 per cent)
- The study area contained a higher proportion of educated persons and professionals with high personal and median household incomes than Greater Sydney
- As of 2011, the study area contained 142,751 jobs with major industries being professional, scientific and technical services (about 15 per cent), health care and social assistance (about 10 per cent), education and training (about 9 per cent)
- There was a high home ownership rate across all precincts ranging from 46 per cent to 57 per cent. This was still however lower than the Greater Sydney rate of about 65 per cent. The Alexandria-Erskineville precinct had the highest percentage of renters (about 51 per cent)
- Family households were the most prevalent across all precincts. Alexandria-Erskineville had a large percentage of group households (around 16 per cent) compared to Greater Sydney (four per cent)
- Private vehicles were the predominant mode of transport for people living in the study area. All of the precincts had a higher proportion of rail and bus users in comparison to Greater Sydney
- Vehicle ownership across the study area averaged 0.9 vehicles per household, which was lower than the Greater Sydney average of 1.6 vehicles per household.

5.2 Social Infrastructure

This section provides an overview of key social infrastructure located within the study area (the Ashfield-Haberfield, Leichhardt-Glebe and Alexandria–Erskineville precincts) and identifies those located within close proximity of the project footprint.

Defining social infrastructure

Social infrastructure includes assets that accommodate social services or facilities that are used for the physical, social, cultural or intellectual development or welfare of the community. Social infrastructure may include physical infrastructure such as schools, libraries and the services, activities and programs that operate within these facilities. Open spaces, parks, recreation areas and sporting fields that support sport, recreational and leisure uses are also included in this definition.

Social infrastructure facilities generally operate at three levels of provision: local, district and regional. These are defined by the scale of the population catchment they are intended to serve, as well as the absolute physical distances involved. For example, a public primary school serves a local catchment, generally at a suburb level. However, a secondary school would seek to serve a wider catchment (serves multiple suburbs) and a university would cater for a significantly wider catchment (serves multiple LGAs).

In conducting an audit of social infrastructure for this report, local, district and regional facilities within the study area were identified. These facilities are identified in **Table 5-46** along with the catchments that they serve. As such, the audit provides an important indication of the type, number, and importance of these facilities within the study area.

The audit is indicative and based on the data available at the time of preparing report. This audit was sourced from various data points including Core List Australia (2016), local council social infrastructure lists, Google and MapInfo Geographical Information System (GIS). Due to errors in this

base data, facilities not being registered or the facility not having a virtual presence some facilities may not have been recorded.

Table 5-46 Social Infrastructure included within the audit

	Local	District	Regional
Childcare and educational facilities	· Primary school · Long day care · Preschool · Out of school hours care	· Secondary school	· Tertiary institution
Community facilities, libraries and places of worship	· Branch library · Meeting space · Community centre · Places of worship	· District library · Multipurpose community centre/community hub	
Health and emergency facilities	· Medical centre	· Integrated health clinic · Police shopfront · Ambulance standby point	· Hospital · Police station · Ambulance station
Sport, recreation and leisure facilities	· Playground · Outdoor sports court ie tennis or basketball court · Ovals and sports field · Neighbourhood open space and park	· Multi-purpose community/ neighbourhood sports centre · Indoor sport facility	· Sportsground (5 ha) · Indoor sports court and recreation centre · Multi-purpose leisure/aquatic centre · Passive open space (> 5 ha)

A range of community facilities of local, district and regional importance are located in the study area. The following sections identifies the childcare and education facilities; community and cultural facilities; community health facilities and sport, recreation and leisure facilities.

5.2.1 Childcare and education facilities

Catchments for childcare centres and primary schools are local in nature, primarily serving the needs of the local community. Secondary schools are district level facilities as they often draw from a wider catchment. Families are willing to travel further to enrol within schools with particular personal meaning, reputation or history.

At the time of undertaking the report, the study area contained a wide range of educational facilities including around 110 childcare centres, 50 primary schools, 15 secondary schools, three combined primary-secondary schools and 20 tertiary (higher education) educational facilities.

The University of Sydney is located in the north of the Alexandria-Erskineville precinct. In 2015, the university employed over 3,400 academic staff and enrolled over 54,000 students, of which 10,000 were international students. The university attracted over $400 million in federal research funding that year[21].

Table 5-47 provides a summary of the childcare and educational facilities within the study.

[21] Sydney University annual report 2015.

Table 5-47 Identified childcare and education facilities within the study area

Precinct	Provision	Facility types	No. of facilities
Ashfield-Haberfield	Local	Child care centres	37
	Local	Primary schools	11
	District	Secondary school	7
	District	Combined (primary and secondary)	3
	Regional	Tertiary	4
Leichhardt-Glebe	Local	Child care centres	34
	Local	Primary school	18
	District	Secondary school	6
	Regional	Tertiary	11
Alexandria-Erskineville	Local	Child care centres	39
	Local	Primary school	18
	District	Secondary school	3
	Regional	Tertiary	6

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

Table 5-48 provides a summary of the childcare and educational facilities located within close proximity to the project footprint.

Table 5-48 Identified childcare and educational facilities within close proximity to the construction ancillary facilities

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Ashfield-Haberfield	C1a, C2a and C3a	Local	Childcare	8	· The Infants Home, Family Day Care · Chaya's Family Day Care · Little VIPs Child Care Haberfield · St John's Pre-school · Guardian Early Learning Centre · Goodstart Early Learning Centre · Nurjahan's Family Day Care · Greenwood Five Dock
		Local	Primary School	1	· Haberfield Public School
Leichhardt-Glebe	C4	Local	Childcare	7	· Explore and Develop · Emmerick Street Community Preschool · Billy Kids Lilyfield Early Learning Centre · Zero Up Childcare · OAC Leichhardt Elswick St Campus · My Stepping Stone · St Columba's North Leichhardt OSHC
		Local	Primary school	2	· St Columba's Primary School Leichhardt North · Orange Grove Public School
		District	Secondary College	1	· Sydney Secondary College Leichhardt

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Alexandria-Erskineville	C5, C6 and C7	Local	Childcare	4	· Rosebud Cottage Childcare Centre · Lilyfield Early Learning Centre · Hilda Booler Kindergarten · Balmain Cove Early Learning Centre
		Regional	Tertiary Education	2	· Sydney Community College · TAFE NSW Petersham College, Annandale
	C8	Local	Childcare	4	· Rozelle Out of School Hours Care · St Thomas' Child Care Centre · Balmain Cove Early Learning Centre · Rozelle Child Care Centre
		Local	Primary school	1	· Rozelle Public School
		District	Secondary school	1	· Sydney Secondary College Balmain Campus
		Regional	Tertiary Education	1	· Sydney College of the Arts – The University of Sydney
	C9	Local	Childcare	10	· Camperdown Child Care Centre · Camperdown Sunshine Kids · Explore and Develop Camperdown · Guardian Early Learning Centre · Peekaboo - Camperdown (Learning Centre) · Annandale Child Care Centre · Sunshine Bubs Kindergarten · JoJo's Family Day Care · Explore & Develop Annandale · Lucas Street Child Care Centre
		Local	Primary school	2	· Annandale Public School · St Brendan's Primary School
		District	Special needs school	1	· Bridge Road School
		Regional	Tertiary	2	· Sydney Nursing School · The University of Sydney, Camperdown NSW
	C10	Local	Childcare	2	· St Peters Community Preschool · Tribe Out of School Hours
		Local	Primary school	1	· St Peters Public School

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

5.2.2 Community facilities, libraries and places of worship

The study area contains a number of community centres, halls and places of worship for a variety of faiths. These facilities provide opportunities for increased community, cultural and social activities and interaction. In addition to this, community centres and halls presented within the study area play a role in:

- Delivering a range of educational, recreation and health services and programs
- Building community connections and relationships
- Improving the inclusion of community members especially within areas of highly diverse cultural and linguistic backgrounds.

At the time of undertaking the report, the study area contained around 30 community centres/halls, 140 places of worship and 10 libraries.

Table 5-49 provides a summary of the community centres, libraries and places of worship located within the study area.

Table 5-49 Community centres, libraries and places of worship in the study area

Precinct	Facility types	No. of facilities
Ashfield-Haberfield	Places of worship	58
	Community centres/hall	12
	Library	4
Leichhardt-Glebe	Places of worship	38
	Community centre/hall	11
	Library	4
Alexandria-Erskineville	Places of worship	47
	Community centres/hall	4
	Library	3

Table 5-50 provides a summary of the community centres, libraries and places of worship located within close proximity to the project footprint.

Table 5-50 Community centres, libraries and places of worship within close proximity to the construction ancillary facilities

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Ashfield-Haberfield	C1a, C2a and C3a	Local	Place of worship	2	· Kingdom Hall of Jehovah's Witness · Anglican Church Sydney Diocese
Leichhardt-Glebe	C4	Local	Place of worship	2	· St Columba & the Holy Souls Catholic Church · St Gerasimos
		Local	Community centres	1	· Lucan Care Community Centre
	C5	Local	Place of worship	4	· St Joseph's Catholic Church
	C5, C6 and C7	Local	Community centres	1	· Lilyfield Community Centre
	C8	Local	Community centres	1	· Rozelle Neighbourhood Centre
		Local	Place of worship	1	· Darling Street Anglican Church

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Alexandria-Erskineville	C9	Local	Community centres	3	· Booler Community Centre · C3 Central City Church · St Joseph's Catholic Church
	C10	Local	Place of worship	1	· St Peters Church

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

5.2.3 Health and emergency facilities

The study area contains a range of health and emergency facilities servicing the local and wider community. These facilities include private and public hospitals, medical centres, general medical practices, fire, police and ambulance stations.

At the time of undertaking the report, the study area contained around 130 medical facilities and seven hospitals. Emergency services were also dispersed across the study area including police, ambulance and fire stations. There were around seven police stations, four ambulance stations and eight fire stations.

Table 5-51 provides a summary of the health and emergency facilities located within the study area.

Table 5-51 Identified health and emergency facilities in the study area

Precinct	Provision	Facility types	No. of facilities
Ashfield-Haberfield	Local	Medical centres (including general practitioners, collection centres and specialist medical)	58
	Regional	Hospitals	3
	District	Ambulance stations	1
	District	Fire stations	2
	District	Police stations	3
Leichhardt-Glebe	Local	Medical centres (including general practitioners, collection centres and specialist medical)	42
	Regional	Hospitals	2
	District	Ambulance stations	1
	District	Fire stations	3
	District	Police stations	2
Alexandria-Erskineville	Local	Medical centres (including general practitioners, collection centres and specialist medical)	35
	Regional	Hospitals	2
	District	Ambulance stations	2
	District	Fire stations	3
	District	Police stations	2

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

Table 5-52 identifies the health and emergency facilities located within close proximity to the project footprint.

Table 5-52 Identified health and emergency facilities within close proximity of the construction ancillary facilities

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Ashfield-Haberfield	C1a, C2a and C3a		None		
Leichhardt-Glebe	C4		None		
	C5, C6 and C7		None		
	C8	Local	Medical centre (including GP, collection centres and specialist medical)	2	· Rozelle Medical Centre · Rozelle Total Health
Alexandria-Erskineville	C9		Medical Centre, (including general practitioners, collection centres and specialist medical)	4	· Community Mental Health Centre Camperdown · Missenden Medical Centre · Southern Radiology Centre · Therapies for kids
	C10		None		

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

5.2.4 Sport, recreation and leisure facilities

The study area contains a substantial amount of active and passive space in the form of parks, reserves, playgrounds, sporting fields, aquatic centres and bowling clubs. The area also benefits from cycling and walking paths located alongside waterfronts and other natural waterways. For the purpose of the audit facilities have been broken down into parks/reserves (passive spaces), playgrounds, sporting grounds/ovals (active spaces) and specialised sporting facilities. Specialised sporting facilities include facilities such as bowling clubs, tennis courts, golf courses, basketball courts, leisure and aquatic centres.

At the time of undertaking the report, there were about 150 parks/reserves located within the study area, 30 sporting grounds, three skate parks, 100 playgrounds and 40 specialised sports facilities. It should be noted that many of the playgrounds and sporting facilities were located within the identified parks and reserves. **Table 5-53** provides a summary of the sporting/recreational facilities within the study area precincts.

Table 5-53 Identified sporting/recreational facilities within study area

Precinct	Provision	Facility types	Number of facilities
Ashfield-Haberfield	Local	Park/reserves	59
	Local	Playgrounds	33
	District	Sporting grounds	8
	District	Specialised sports facilities	13
	District	Skate parks	3
Leichhardt-Glebe	Local	Park/reserves	48
	Local	Playgrounds	28
	District	Sporting grounds	9
	District	Specialised sports facilities (including courts)	14
Alexandria-	Local	Park/reserves	43

Precinct	Provision	Facility types	Number of facilities
Erskineville	Local	Playgrounds	45
	District	Sporting grounds	10
	District	Specialised sports facilities	12

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

Table 5-54 identifies sport, recreation and leisure facilities are within close proximity to the project footprint.

Table 5-54 Sporting/recreational facilities within close proximity of the construction ancillary facilities

Precinct	Construction site	Provision	Facility types	No. of facilities	Name of facility
Ashfield-Haberfield	C1a, C2a and C3a	Local	Sports ground	1	· Hammond Park
	C1a, C2a and C3a	Local	Playgrounds	4	· Algie Playground · Livvi's Park Playground · Crocker Park Playground · Hammond Park Playground
		Local	Parks/reserves	4	· Croker Park · Wadim Jegorow Reserve · Reg Coady Reserve · Hammond Park · Algie Park
		District	Sports ground	1	· Timbrell Park
Leichhardt-Glebe	C4	Local	Playground	1	· Richard Murden Reserve Playground
					·
		Local	Sports ground	1	· Blackmore Park
		Local	Parks/reserves	1	· Richard Murden Reserve · Pioneers Memorial Park
	C5, C6 and C7	Local	Playground	1	· Easton Park Playground
		Local	Sports fields	1	· Easton Park
		Local	Parks/reserves	2	· Easton Park · Federal Park · Cohen Park · Buruwan Park · O'Connor Reserve
	C8	Local	Playground	2	· Shields Playground · Bridgewater Park Playground
		Local	Parks/reserves	1	· Bridgewater Park
		District	Parks/reserves	1	· King George Park · Callan Park
Alexandria-Erskineville	C9	Local	Playgrounds	2	· Camperdown Park Playground · O'Dea Reserve Playground
		Local	Parks/reserves	1	· Douglas Grant Memorial Park · O'Dea Reserve
		Local	Sports ground	1	· Camperdown Park
	C10	District	Sports ground	1	· Camdenville Park
		Local	Playground	1	· Sydney Park Playground
		Local	Parks/reserves	2	· Camdenville Park · Simpson Park
		Regional	Parks/reserves	1	· Sydney Park

Source: Core List Australia 2016, Council Social Infrastructure Lists, Google and MapInfo GIS

5.3 Employment centres

5.3.1 Strategic, district and local centres

In developing Towards our Greater Sydney 2056[22] (a draft update to A Plan For Growing Sydney), the Greater Sydney Commission (GSC) identified that some centres make a substantially greater contribution to the economy of Greater Sydney than others. On this basis, the draft District Plans have defined a hierarchy, which includes three types of centres: strategic, district and local. These centres vary in terms of scale and contribution to Greater Sydney's job growth and productivity as well as service provision to local communities.

Strategic centres

Strategic centres, including transport gateways, are locations that currently or are planned to have least 10,000 jobs and have the scale, industries and location needed to support Greater Sydney. These are priority locations for employment, retail, housing, services and mixed-uses and tend to have one or more of the following characteristics[23]:

- A higher proportion of knowledge-economy jobs, principally relating to the presence of major hospitals, tertiary education institutions, stand-alone office development or a combination of these
- The presence of existing or proposed major transport gateways
- A major role in supporting the increased economic activity of the eastern, central or western cities.

District centres

District centres including transport gateways, are locations that currently or are planned to have between 5,000 and 10,000 jobs. District centres have jobs, facilities and services that support district populations and tend to have one or more of the following characteristics[24]:

- The scale of retail activity, generally over 50,000 square metres of floor space
- The presence of health and education facilities that serve the district and the local community
- The level of transport services.

Local centres

Local centres vary in size from a few shops on a corner, to a vibrant main street. They are on a smaller scale than district centres and generally serve the local population[25].

5.3.2 Strategic and district centres

Strategic and district centres located within Greater Sydney, as identified in the draft District Plans, are illustrated on **Figure 5-1.**

[22] Greater Sydney Commission 2016, *Towards our Greater Sydney 2056*, NSW Government.

[23] Greater Sydney Commission 2016, *Draft Central District Plan*, NSW Government.

[24] Greater Sydney Commission 2016, *Draft Central District Plan*, NSW Government.

[25] Greater Sydney Commission 2016, *Draft Central District Plan*, NSW Government.

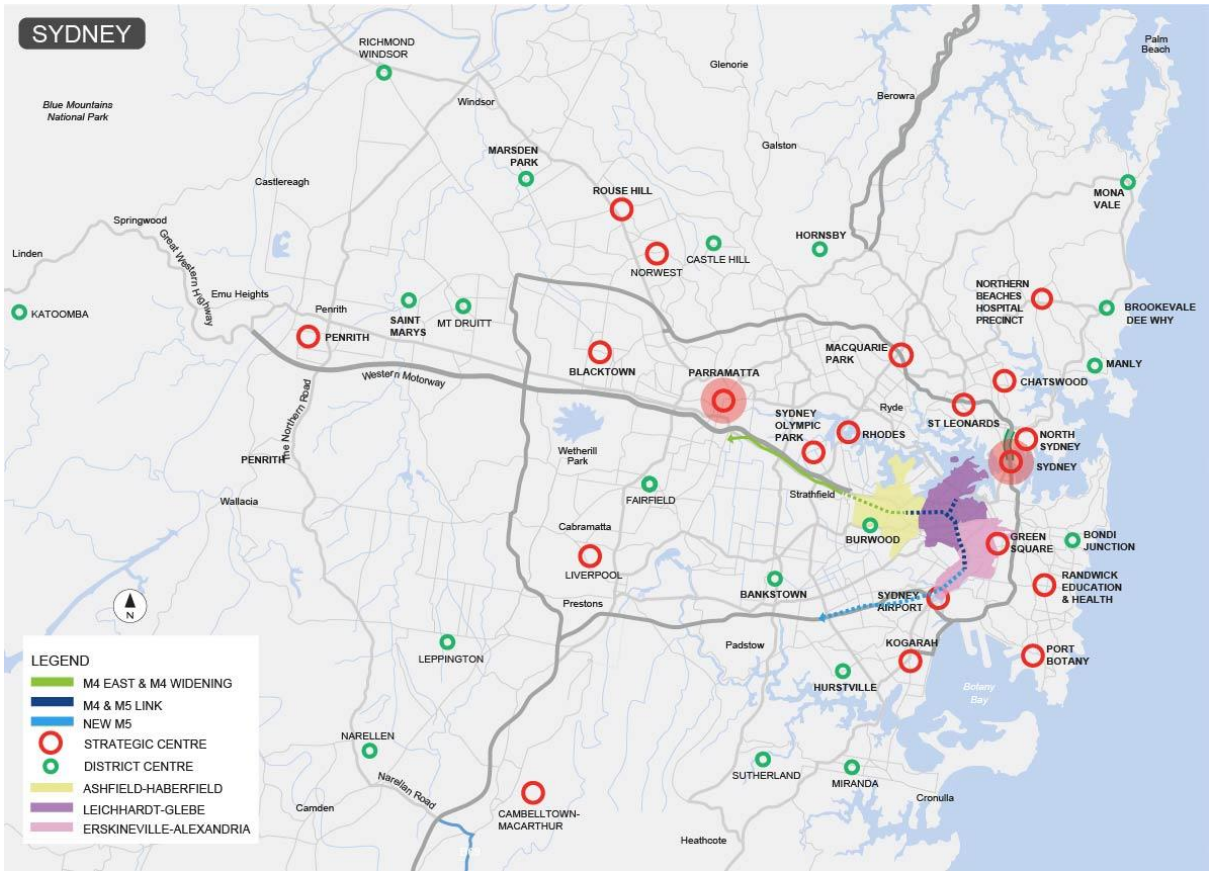


Figure 5-1 Strategic and district centres in Greater Sydney

Source: HillPDA 2017, adapted from information in the draft District Plans (indicative only)

The draft District Plans nominate job targets for the strategic and district centres to provide guidance to councils and State agencies as to the likely and potential scale of employment growth and to inform land use and infrastructure planning. **Table 5-5** outlines the employment projections identified for each strategic and district centre.

The baseline estimate job targets reflect the projected jobs growth that is anticipated in the centre. The higher estimate is an aspirational growth scenario to reflect outcomes in the case of further investment and land use planning in centres.

The targets reflect the crucial influence that transport has on making areas more attractive for businesses and more accessible to workers. As almost half of Greater Sydney's jobs are located in strategic and district centres, improving connections to these centres would have a significant impact on the socio-economic environment.

Table 5-55 Strategic and district centre employment numbers

Centre Type	District	Centre	2016 Job Estimate	2036 Job Baseline Estimate	2036 Higher Estimate
Strategic	Central	Sydney City	496,900	662,000	732,000
		Sydney Airport	18,100	22,000	24,500
		Green Square-Mascot	59,500	75,000	80,000
		Randwick Health & Education	22,800	32,000	35,500
		Port Botany	14,900	17,000	18,500
		Rhodes	15,700	22,000	25,500
	West Central	Greater Parramatta City Westmead	96,500	156,000	170,500
		Sydney Olympic Park	30,100	45,000	46,500
		Norwest	32,400	49,000	53,000
		Blacktown	13,200	17,000	19,500
	North	Macquarie Park	58,500	73,000	79,000
		North Sydney	60,400	76,000	81,500
		St Leonards	47,100	54,000	63,500
		Chatswood	24,700	31,000	33,000
		Northern Beaches Hospital and surrounding industrial areas	9,300	12,000	1,300
	West	Greater Penrith	33,400	44,000	45,000
	South West	Liverpool	29,000	36,000	39,000
		Campbelltown-Macarthur	20,400	27,000	31,000
	South	Kogarah	11,800	16,000	20,500
District	Central	Bondi Junction	13,800	17,000	20,500
		Burwood	10,300	12,000	14,000
		Eastgardens-Maroubra Junction	6,900	8,000	9,000
	West Central	Castle Hill	9,800	16,000	19,500
		Rouse Hill	4,200	10,000	11,000
		Mount Druitt	6,700	8,000	8,500
		Marsden Park	300	5,000	8,500
	North	Brookvale-Dee Why	20000	23,000	26,000
		Hornsby	14300	18,000	22,000
		Manly	5,000	6,000	6,500
		Mona Vale	4,300	5,000	6,000
	West	St Marys	8,300	10,000	11,500
		Richmond-Windsor	10,300	12,000	16,500
		Katoomba	2,700	3,000	5,500
	South West	Fairfield	5,400	6,000	10,000
		Narellan	10,600	14,000	16,500
		Leppington	400	7,000	12,500
	South	Bankstown Airport	15,000	17,000	20,000
		Bankstown	12,100	17,000	25,000
		Hurstville	11,600	1,500	20,000
		Miranda	7,000	8,000	11,500
		Sutherland	5,700	8,000	9,000
		Campsie	4,800	7,000	7,500

Source: HillPDA 2017, adapted from information in the draft District Plans

5.3.3 Local centres

Figure 5-2 illustrates the local centres located within the study area. The local centres within the study area are generally clustered on the main transport routes (such as bus routes) and provide either a specialist service to the broader area or a convenience service for the local community. Rozelle Local Centre (as defined in the draft District Plan) is the only local centre within close proximity to the project footprint. The business clusters that contribute to this local centre are Darling Street and Victoria Road. Specific detail of these clusters are described in the section below.

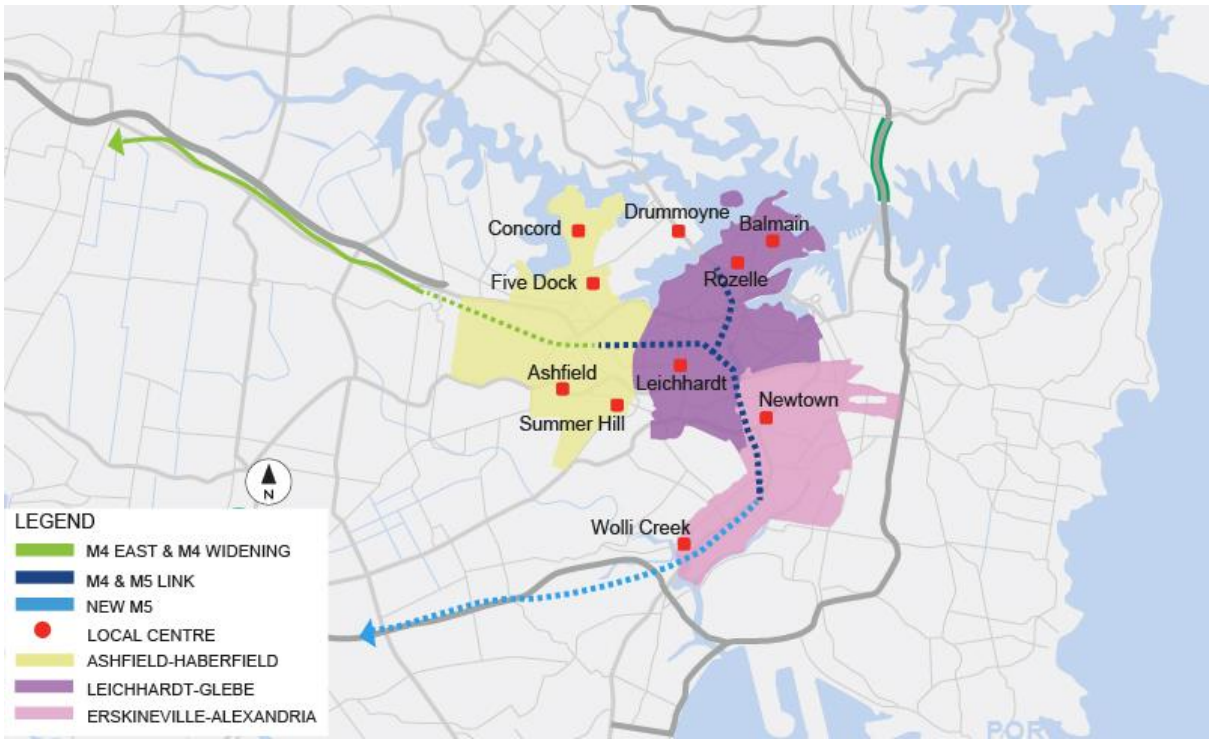


Figure 5-2: Local centres within the study area

Source: HillPDA 2017, adapted from information in the draft Central District Plans (indicative only)

Business clusters

Although not necessarily confined within a Local Centre, a number of business uses are dispersed across the study area forming business clusters. These business clusters range in size and provision and have been described below.

Ashfield-Haberfield

The following business and industry clusters are located within close proximity to the project footprint within the Ashfield-Haberfield precinct.

Figure 5-3 Business and industry clusters within close proximity of the construction ancillary facilities C1a, C2a & C3a at Haberfield (Option A)

Table 5-56 Description of business clusters within close proximity of the construction ancillary facilities C1a, C2a and C3a at Haberfield (Option A)

Project area	Business cluster name	Business land zoning	Business cluster description
Wattle Street civil and tunnel site (C1a) Haberfield civil and tunnel site (C2a) Northcote Street civil site (C3a)	Parramatta Road Haberfield	B6 Enterprise Corridor	Parramatta Road at Haberfield is a linear specialist retail centre generally containing car dealerships, smash repairers and home building and renovation suppliers. These business types are destination (purpose visit) retailers and are not reliant on passing trade. Service stations and take-away food businesses are also located along the road. These businesses would be more reliant on drop in customers and passing trade, however would not be dependent on pleasant amenity to attract customers. A large Bunnings is an anchor tenant along the road and would attract higher volumes of customers. The cluster would serve a wide catchment.

Project area	Business cluster name	Business land zoning	Business cluster description
Wattle Street civil and tunnel site (C1a) Northcote Street civil site (C3a)	Ramsay Road Convenience	B1 Neighbourhood Centre	Ramsay Road Convenience is a small commercial centre on the intersection of Harrabrook Avenue, Ramsay Road and Connecticut Avenue. The centre contains a mix of passive and active uses including a restaurant, veterinary hospital, mechanic, catering company, hair salon and a shutter and blinds company. The majority of the cluster would not be as dependent on passing trade and would primarily service the local community.
Wattle Street civil and tunnel site (C1a) Haberfield civil and tunnel site (C2a)	Ramsay Street Convenience	B1 Neighbour-hood Centre	Ramsay Street is a small commercial business cluster on the corner of Ramsay Street and Alt Street. The cluster contains primarily commercial office and wholesale retail space. One restaurant operates out of the corner store and would be more dependent on pleasant amenity. The cluster would not be as dependent on passing trade and would service the local community.

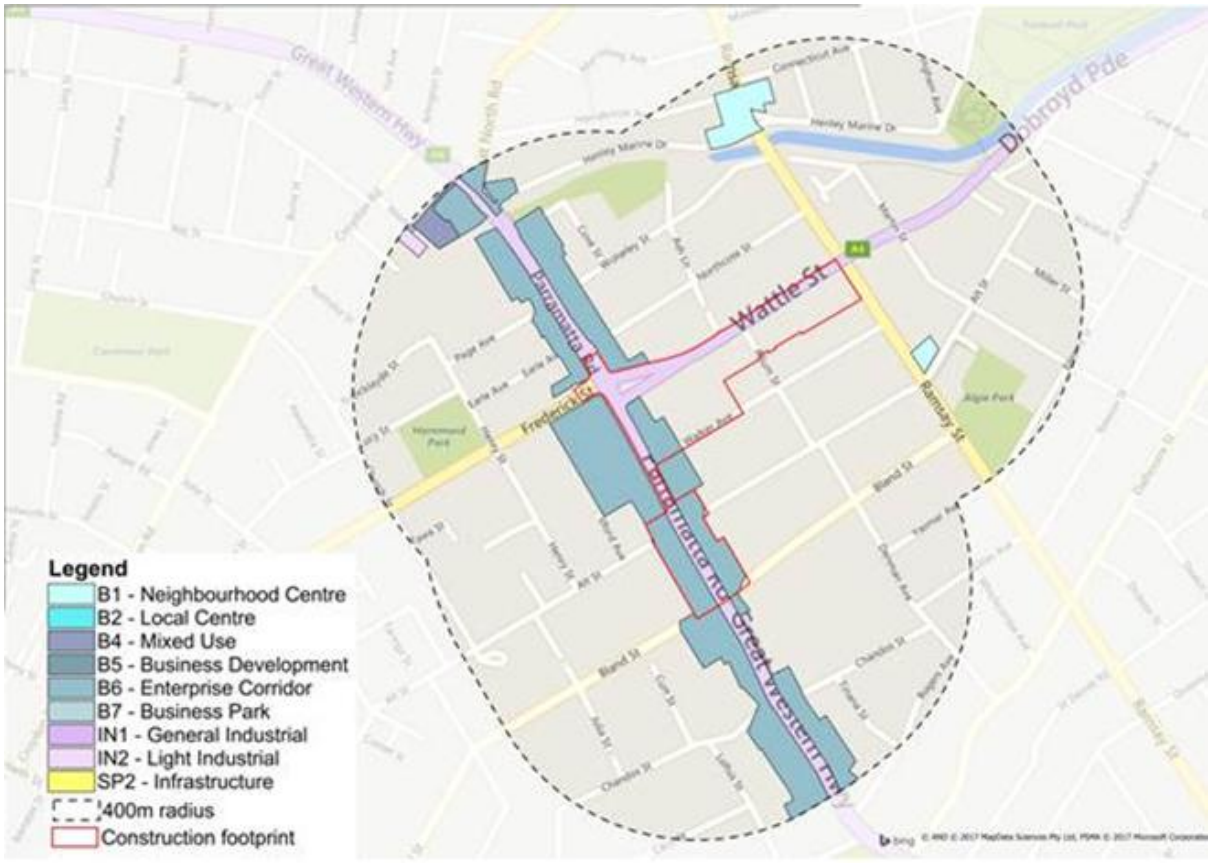


Figure 5-4 Business and industry clusters within close proximity of construction ancillary facilities C1b, C2b and C3b at Haberfield (Option B)

Table 5-57 Description of business clusters within close proximity of construction ancillary facilities C1b, C2b and C3b at Haberfield (Option B)

Ancillary facility	Business cluster name	Business land zoning	Business cluster description
Parramatta Road West civil and tunnel site (C1b) Haberfield civil site (C2b) Parramatta Road East civil site (C3b)	Parramatta Road Haberfield	B6 Enterprise Corridor	Parramatta Road at Haberfield is a linear specialist retail centre generally containing car dealerships, smash repairers and home building and renovation suppliers. These business types are destination (purpose visit) retailers and are not reliant on passing trade. Service stations and take-away food businesses are also located along the road. These businesses would be more reliant on drop in customers and passing trade, however would not be dependent on pleasant amenity to attract customers. A large Bunnings is an anchor tenant along the road and would attract higher volumes of customers. The cluster would serve a district catchment.
Haberfield civil site (C2b)	Ramsay Street Convenience	B1 Neighbourhood Centre	Ramsay Street is a small commercial business cluster on the corner of Ramsay Street and Alt Street. The cluster contains primarily commercial office and wholesale retail space. One restaurant operates out of the corner store and would be more dependent on pleasant amenity. The cluster would not be dependent on passing trade and would service the local community.

Leichhardt-Glebe

The following business and industry clusters are located within close proximity to the project footprint within the Leichhardt-Glebe precinct.

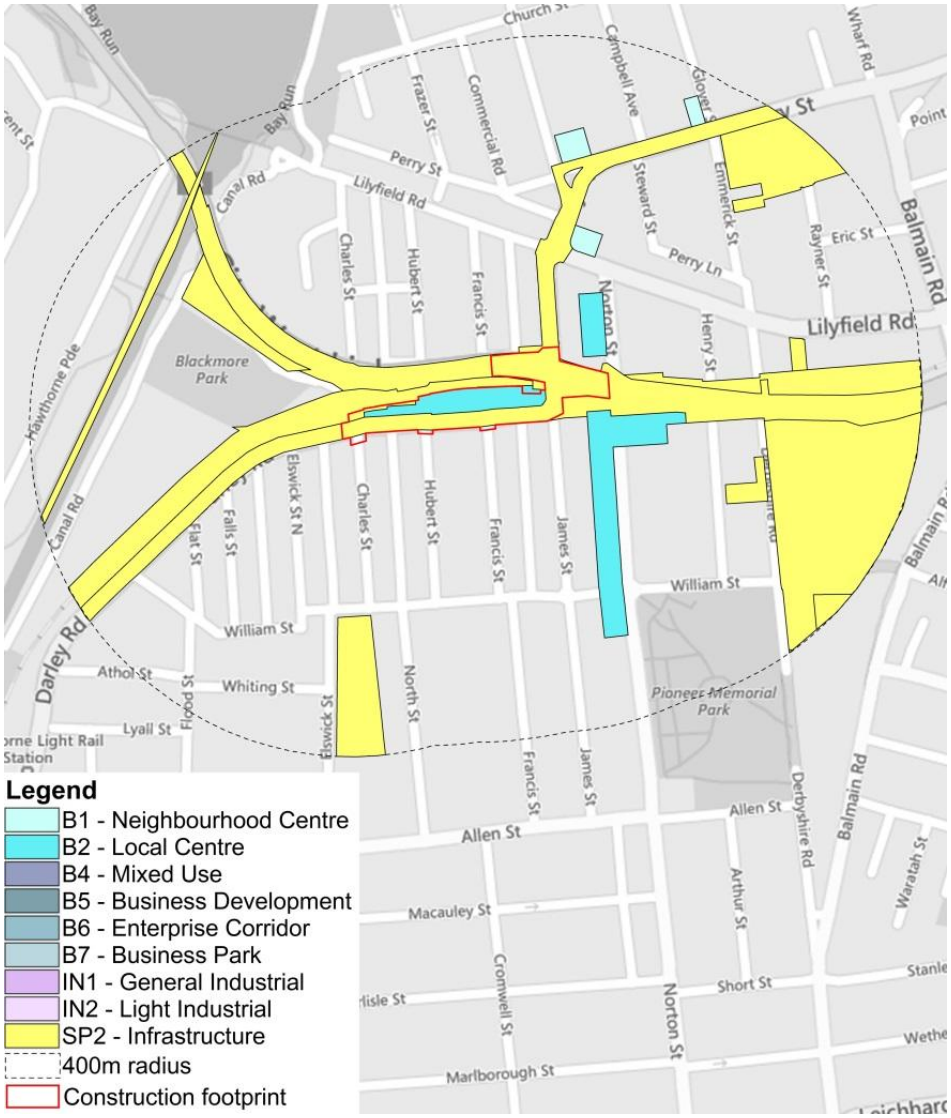


Figure 5-5 Business and industry clusters within close proximity of the Darley Road civil and tunnel site (C4)

Table 5-58 Description of business clusters within close proximity of the Darley Road civil and tunnel site (C4)

Ancillary facility	Business cluster name	Business land zoning	Centre description
Darley Road civil and tunnel site (C4)	Canal Road	SP1 Special activities: Canal Road arts precinct	A cluster of specialised creative arts businesses is located in the cluster on Canal Road, adjoining Blackmore Park. The business mix includes prop suppliers, film services, wig making and a costume rental service. The cluster services a wide catchment and is unlikely to be dependent on passing trade.

Ancillary facility	Business cluster name	Business land zoning	Centre description
	Norton Street	B2 Local centre	The Norton Street cluster contains a mix of speciality retail and personal service businesses. A mix of convenience stores, speciality clothing, homewares and beauty salons are dispersed along the street. A number of restaurants and cafés are also present. Automotive repair garages and building supply retailers are located towards City West Link end. The business cluster primarily contains passive uses, however some businesses would benefit from passing trade. The cluster caters primarily to a neighbourhood catchment.
	Lilyfield Neighbourhood	B1 Neighbourhood Centre B2 Local Centre	There are a number of small and dispersed commercial uses north of the construction site on Perry Street, Lilyfield Road and Norton Street. These uses are predominantly neighbourhood convenience shops and cafés or small speciality businesses and retail. These businesses would primarily serve a neighbourhood catchment and are likely to rely on passing trade.

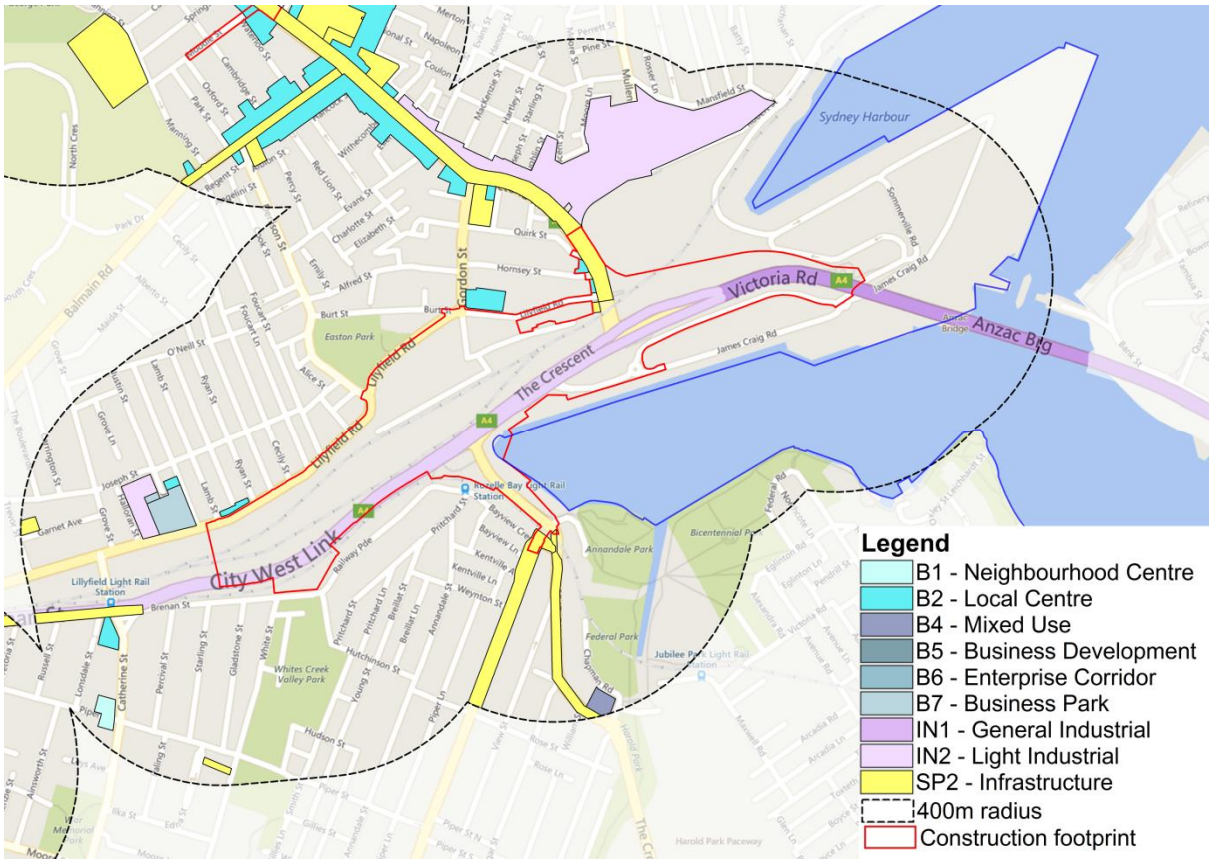


Figure 5-6 Business and industry clusters within close proximity of construction ancillary facilities C5, C6 and C7 Rozelle

Table 5-59 Description of business clusters within close proximity of construction ancillary facilities C5, C6 and C7 - Rozelle

Ancillary facility	Business cluster name	Business land zoning	Business cluster description
Rozelle civil and tunnel site (C5) The Crescent civil site (C6) Victoria Road civil site (C7)	Catherine Street Convenience	B2 Local Centre	Catherine Street, Lilyfield contains two small business centres. A larger convenience store is located on the corner of City West Link and operates as the anchor tenant. A small mixed use retail centre is present, containing a newsagency, health and beauty, jeweller, café and a grocer. These businesses cater to a neighbourhood catchment and are likely to be reliant on passing trade.
	Lilyfield Road	B1 Neighbourhood Centre B2 Local Centre	Lilyfield Road contains two small business clusters both containing passive commercial office and wholesale retail uses. The businesses would likely serve a broader specialised catchment and are unlikely to be dependent on passing trade.
	Roberts Street	IN2 Light Industry	The business uses along Robert Street, Rozelle (Victoria Road end) mostly include passive services such as mechanics, auto body repair shops and light industry manufacturing and trade. Robert Street would be considered a destination services area as many customers would be driving specifically to the business. The businesses would service both a neighbourhood and wider catchment and are unlikely to be dependent on passing trade.
	James Craig Road	Unincorporated Sydney Foreshore Authority	James Craig Road, Rozelle is a working waterfront area with businesses being predominantly marine related, such as dry storage, slipways, harbour cruises, government agency (Maritime NSW), public marina berths as well as supportive food services such as cafés. The working waterfront would be dependent on access and connectivity, servicing a wide catchment. The business clusters are unlikely to be dependent on passing trade.
	Chapman Road	B4 Mixed Use	Two large specialist retail providers are located in the cluster. The businesses would service a wide catchment and are unlikely to be dependent on passing trade.
	Victoria Road	B2 Local Centre and IN20 Industrial Light Industry	Victoria Road, Rozelle contains a mix of active and passive business uses. An industrial precinct is located in the southern section of Victoria Road, which contains a number of urban support services and warehousing businesses. Heading northward along Victoria Road there are number commercial, retail and medical businesses leading to Darling Street. The businesses would service both a neighbourhood and wider catchment and are more likely to be dependent on passing trade.

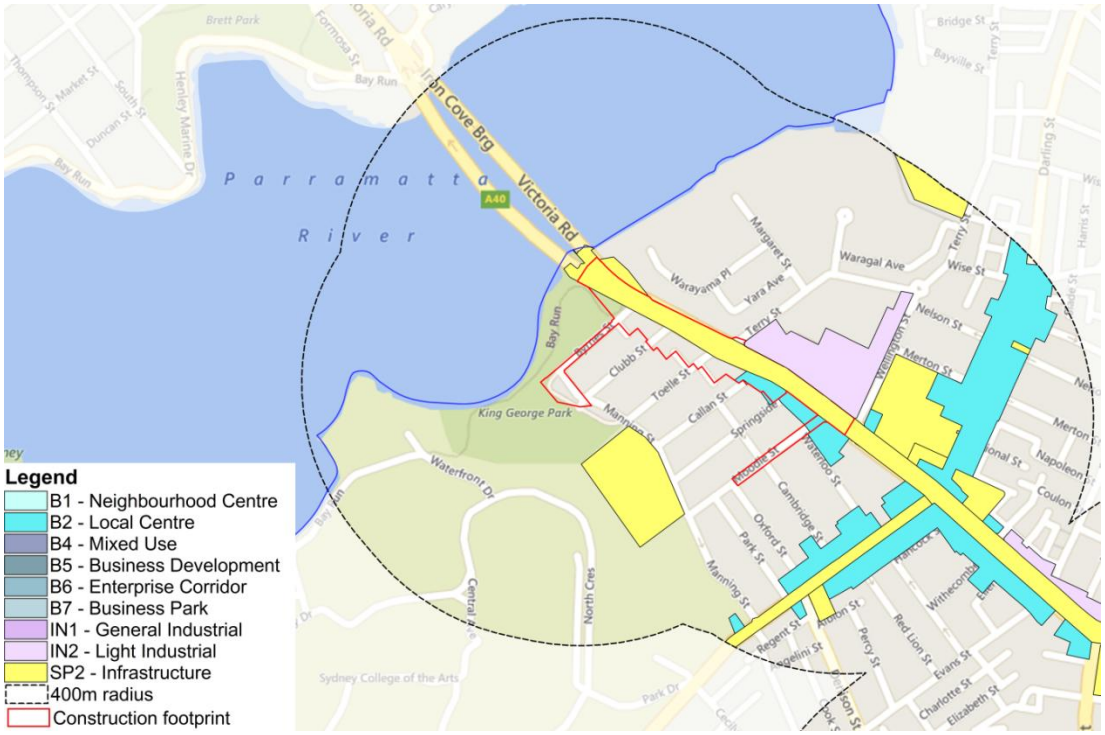


Figure 5-7 Business and industry clusters within close proximity of the Iron Cove Link civil site (C8)

Table 5-60 Description of business clusters within close proximity of the Iron Cove Link civil site (C8)

Ancillary facility	Business cluster name	Business land zoning	Business cluster description
Iron Cove Link civil site (C8)	Victoria Road	B2 Local Centre	Victoria Road, Rozelle contains a mix of active and passive business uses. The Iron Cove Bridge end of the cluster contains a mix of businesses including pubs, service stations and auto repair shops. The businesses in close proximity to the Darling Street intersection contain a variety of retail and personal medical services. These businesses generally offer specialised services or products that customers would travel to specifically. The businesses would serve a wide catchment and although they are heavily dependent on business visibility, they would be less dependent on passing trade.
	Darling Street	B2 Local Centre	Darling Street, Rozelle is oriented towards food services such as cafés, restaurants and takeaway shops. There is also a mix of personal retailing such as clothing stores, hairdressers, bike shops and a small contingent of commercial services (banks and post offices) and health services (gyms and medical centre). Darling Street is an active centre that would rely on passing trade and would service both a neighbourhood and wider catchment.
	Crystal Street	IN2 Light Industrial	Crystal Street is zoned industrial and reflects a precinct that is transitioning from that of a traditional industrial to a residential precinct. Businesses in this cluster are unlikely to be dependent on passing trade and would serve a wider catchment.

Alexandria-Erskineville

The following business and industry clusters are located within close proximity to the project footprint within the Alexandria-Erskineville precinct.

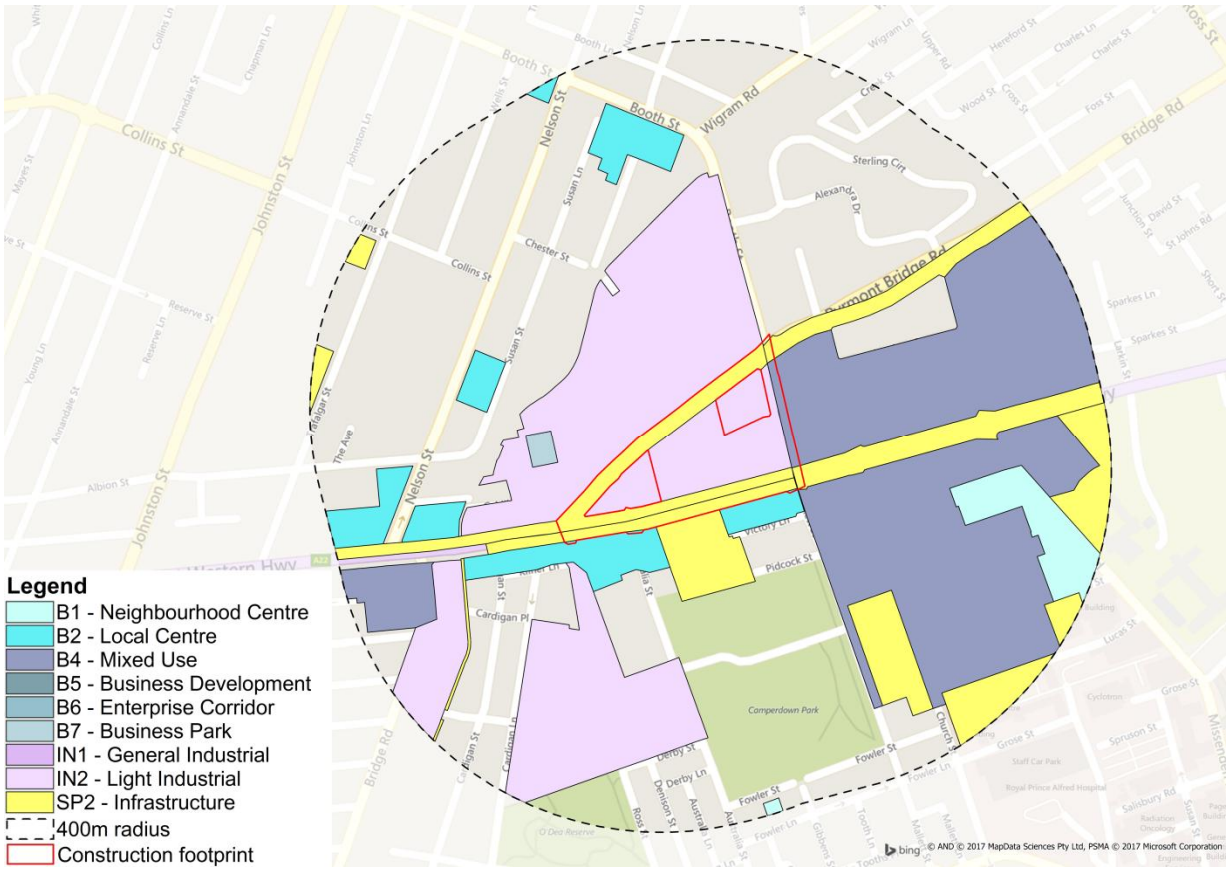


Figure 5-8 Business and industry clusters within close proximity of the Pyrmont Bridge Road tunnel site (C9)

Table 5-61 Description of business clusters within close proximity of the Pyrmont Bridge Road tunnel site (C9)

Ancillary facility	Business cluster name	Business land zoning	Business cluster description
Pyrmont Bridge Road tunnel site (C9)	Annandale-Camperdown	B1 Neighbourhood Centre B2 Local Centre B4 Mixed Use B7 Business Park IN2 Light Industrial	A diverse mix of uses are located is the Annandale-Camperdown business cluster. Light industrial uses including warehouse and storage facilities, commercial operators, large format specialised retailers, personal service providers and food and beverage businesses are oriented to the north of Pyrmont Bridge Road. Along Parramatta Road there is a mix of food and speciality retail services. A number of serviced apartments, hotels and student accommodation are located to the east and south-east of the site in the B4 mixed use area. Specialised retail, personal service operators, café and restaurant providers and small business operators are located along the Missenden Road frontage. The Annandale-Camperdown business cluster would rely on passing trade and would service both a neighbourhood and wider catchment.

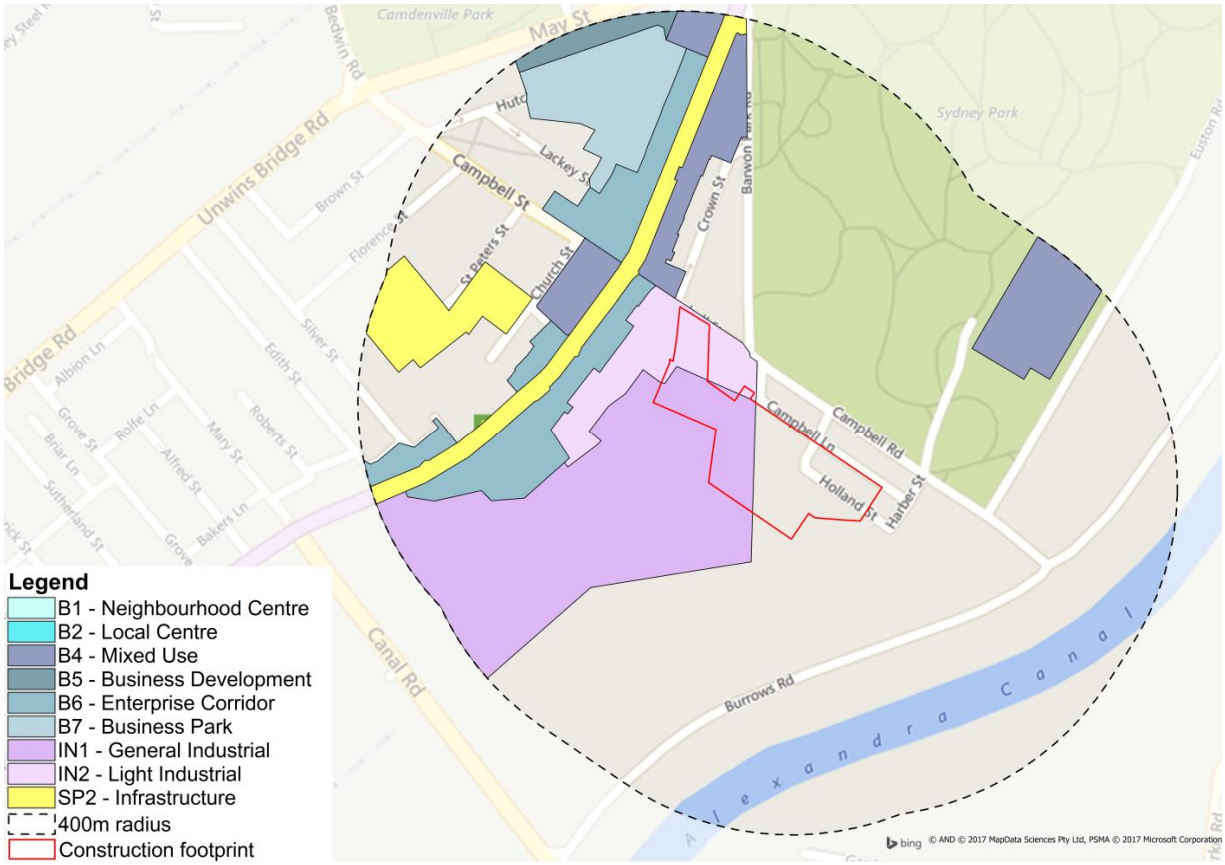


Figure 5-9 Business and industry clusters within close proximity of the Campbell Road civil and tunnel site (C10)

Table 5-62 Description of business clusters within close proximity of the Campbell Road civil and tunnel site (C10)

Ancillary facility	Business cluster name	Business land zoning	Centre description
Campbell Road civil and tunnel site (C10)	Princes Highway	B4 Mixed Use B6 Enterprise Corridor B7 Business Park IN2 Light Industrial	A mix of takeaway food services such as KFC and McDonald's front the Princes Highway. A business park is located to the west of the construction site, containing office and warehousing space for a variety of businesses. Domestic building and interior supply businesses are dominant in the area. The B6 Enterprise Corridor zoning along the Princes Highway, allows for the clustering of commercial, retail, bulky goods, wholesaling, urban support and industrial businesses. There are also hospitality services present such as the IBIS budget hotel and fast food restaurants linked to the operation of Sydney Airport. Campbell Road itself contains limited business uses, with the majority of the land being utilised by WestConnex. This centre is unlikely to be dependent on passing trade or pleasant amenity.
	Burrows Road Industrial	IN1 General Industrial	This centre contains a variety of heavy industrial uses, manufacturers, office, wholesalers, specialised services and trades and food and beverage providers. This centre is unlikely to be dependent on passing trade or pleasant amenity.
	Euston Road	B4 Mixed Use	The cluster contains an office business park that would provide employment for the broader district. This centre is unlikely to be dependent on passing trade.

5.4 Businesses within the study area

Table 5-63 highlights the total number of businesses located within the study area as of June 2016[26]. Alexandria-Erskineville contains the largest number of businesses out of the three precincts in the study area.

Table 5-63 Total number of businesses

Precinct	Total number of businesses
Ashfield-Haberfield	9,029
Leichhardt-Glebe	9,136
Alexandria-Erskineville	10,611
Total	28,776

Source: ABS, 2016; HillPDA calculations

[26] ABS. '8165.0 Counts of Australian Businesses, including Entries and Exits, Jun 2012 to Jun 2016, Table 1, Businesses by Industry Division by Statistical Area Level 2 by Employment Size Ranges, June 2016 '.

As identified in **Table 5-64**, in June 2016, there were around 11,670 employed people in the study area. Across the study area, all precincts have a high number of businesses with fewer than 20 employees and non-employing businesses (ie independent contractors, sole proprietorships or professional partnerships who would not hire additional employees). This is likely to be attributable to the larger proportion of construction and professional services businesses in the precinct that would not require additional back office staff (eg independent contractors or professional partnerships who manage their own businesses).

At around 4,500 the Alexandria-Erskineville provides the largest employment figures. This precinct also includes the largest number of businesses employing more than 200 employees.

Table 5-64 Total number of employing businesses

Precinct	Employees					
	Total (non-employing)	1–4	5–19	20–199	200+	Total (employing)
Ashfield-Haberfield	5,517	2,725	647	131	9	3,512
Leichhardt-Glebe	5,494	2,717	753	166	6	3,642
Alexandria-Erskineville	6,096	2,960	1,103	434	18	4,515
Total	17,107	8,402	2,503	731	33	11,669

Source: ABS, 2016; HillPDA calculations

5.4.1 Industry value added and employment

The metric of 'Industry Value Added' (IVA) refers to the total value of goods and services produced by an industry, minus the cost of goods and services used in the production process. IVA is a more refined measure of economic contribution than gross output as some industries have higher levels of output but require large amounts of input expenditure to achieve that (eg mining versus retail sales)[27].

Small area estimates of IVA (eg at the SA2 level) are not routinely provided by the ABS as part of their standard release. As a result, to estimate local economic activity HillPDA divided total Statewide IVA by the Statewide number of employees to derive an average IVA per employee. HillPDA then multiplied average IVA per employee by the most recent industry employment estimates within the study area (making any necessary adjustments for inflation as required).

Using this approach, the study area as a whole was found to generate around $9.7 billion[28] of IVA per year. Comparatively, in June 2016 Greater Sydney IVA was around $284.5 billion and NSW Gross State Product (GSP) was around $538.5 billion[29]. At two per cent the study area contributes to a relatively small fraction of GSP.

HillPDA estimates that employment industries within the IVA for each of the three precincts within the study area were as follows[30]:

- Ashfield-Haberfield precinct – contributed an estimated $950 million IVA with the largest contributing industry being health care and social assistance, contributing 18 per cent of the precincts total IVA and 10 per cent of the study areas IVA
- Leichhardt-Glebe precinct – contributed an estimated $2,690 million IVA with the largest contributing industry being professional, scientific and technical services, contributing 14 per cent of the precincts total IVA and 28 per cent of the study areas IVA

[27] IVA also excludes taxes less subsidies. We have also excluded ownership of dwellings, which consists of property owners and owner-occupiers of dwellings. Ownership of dwellings is often excluded for this purpose land-use and industry analysis.
[28] Indexed to $2016.

[29] ABS. '5220.0 Australian National Accounts: State Accounts, Series A2478800F'.

[30] HillPDA calculation based on per capita information from the ABS, '5220.0 Australian National Accounts: State Accounts, Series A2478800F'.

- Alexandria-Erskineville precinct – contributed an estimated $6,040 million IVA with the largest contributing industry being information media and telecommunications, contributing 13 per cent of the precincts total IVA and 62 per cent of the study areas IVA.

Table 5-65 summarises HillPDA's estimates of IVA by industry sector. Across the study area, the top three industries by IVA were health care and social assistance, professional, scientific and technical services and information media and telecommunications, which represent 10.8 per cent, 10.6 per cent and 10.4 per cent of IVA respectively.

Table 5-65 Industry value added by industry sector ($000, rounded)

Description	Ashfield-Haberfield IVA ($000)	Leichhardt-Glebe IVA ($000)	Alexandria-Erskineville IVA ($000)	Total IVA ($000)	% of study area total
Agriculture, forestry and fishing	1,000	3,900	1,600	6,500	0.1%
Mining	-	1,100	9,300	10,400	0.1%
Manufacturing	29,600	164,600	641,800	836,000	8.6%
Electricity, gas, water and waste services	7,300	9,600	56,800	73,700	0.8%
Construction	46,900	168,700	210,300	425,900	4.4%
Wholesale trade	28,700	152,600	590,000	771,300	8.0%
Retail trade	76,700	198,500	217,500	492,700	5.1%
Accommodation and food services	38,800	110,700	137,500	287,000	3.0%
Transport, postal and warehousing	19,300	71,700	652,500	743,500	7.7%
Information media and telecommunications	18,100	235,600	757,700	1,011,400	10.4%
Financial and insurance services	44,000	135,000	150,300	329,300	3.4%
Rental, hiring and real estate services	125,400	123,200	143,300	391,900	4.0%
Professional, scientific and technical services	73,400	374,500	574,500	1,022,400	10.6%
Administrative and support services	33,800	174,500	170,200	378,500	3.9%
Public administration and safety	127,200	175,000	334,500	636,700	6.6%
Education and training	80,700	182,100	581,400	844,200	8.7%
Health care and social assistance	173,800	280,800	593,100	1,047,700	10.8%
Arts and recreation services	8,300	40,900	75,900	125,100	1.3%
Other services	21,800	83,200	141,700	246,700	2.5%
Total	950,000	2,690,000	6,040,000	9,680,000	100%

Source: ABS, 2016; HillPDA calculations

At a precinct level, within Leichhardt-Glebe, health care and social assistance and professional, scientific and technical services were the two largest generators of economic value (about 24.3 per cent together), likely reflecting the presence of the Royal Prince Alfred hospital and the University of Sydney.

In Ashfield-Haberfield, health care and social assistance, public administration and safety and rental, hiring and real estate services were the largest contributors to IVA. This potentially reflects the presence of two hospitals (Sydney Private Hospital and Wesley Hospital) and NSW Government offices, such as Family and Community Services and Housing NSW.

Within the Alexandria-Erskineville precinct, transport, postal and warehousing and information media and telecommunications are the two largest industries. However, looking at the employment figures in **Table 5-66**, retail trade represents a much larger proportion of jobs across Alexandria-Erskineville despite having a lower IVA, reflecting the relatively lower economic contribution per job. On both an IVA and employment perspective, education and training, health care, and social assistance reflect important contributions to the study area, together representing 25.5 per cent of jobs and 19.5 per cent of IVA.

Table 5-66 Precinct employment by industry sector

Description	Ashfield-Haberfield	Leichhardt-Glebe	Erskineville-Alexandria	Total jobs	% of total
Agriculture, forestry and fishing	11	43	18	72	0.1%
Mining	-	3	25	28	0.0%
Manufacturing	220	1,223	4,769	6,212	6.8%
Electricity, gas, water and waste services	23	30	178	231	0.3%
Construction	497	1,788	2,229	4,514	5.0%
Wholesale trade	185	985	3,808	4,978	5.5%
Retail trade	1,489	3,854	4,224	9,567	10.5%
Accommodation and food services	771	2,201	2,735	5,707	6.3%
Transport, postal and warehousing	170	633	5,759	6,562	7.2%
Information media and telecommunications	76	987	3,175	4,238	4.7%
Financial and insurance services	153	470	523	1,146	1.3%
Rental, hiring and real estate services	628	617	718	1,963	2.2%
Professional, scientific and technical services	619	3,157	4,843	8,619	9.5%
Administrative and support services	232	1,198	1,169	2,599	2.9%
Public administration and safety	1,097	1,509	2,885	5,491	6.0%
Education and training	999	2,255	7,199	10,453	11.5%
Health care and social assistance	2,115	3,417	7,217	12,749	14.0%
Arts and recreation services	120	589	1,094	1,803	2.0%
Other services	349	1,331	2,268	3,948	4.3%
Total	9,754	26,290	54,836	90,880	100%

Source: Bureau of Transport Statistics, "Journey to Work Survey: Table 17 Origin SA2 by Destination SA2 by Mode 15

5.5 Transport and access

Sydney's population is increasing with infill development and urban renewal projects contributing to inner-city growth. Balancing the needs of passenger vehicles, public transport and freight movement is a key challenge in planning for future transport infrastructure.

Changes to road, public transport and/or active transport networks during construction have the potential to result in impacts on access and connectivity for residents, business owners and visitors. As access and connectivity are major components of the socio-economic assessment, it is important

to consider the baseline transport infrastructure present within the study area. The existing baseline condition is presented below and has largely been drawn from **Appendix H** (Technical working paper: Traffic and transport) of the EIS, which provides a detailed analysis of the existing transport and traffic environment.

5.5.1 Passenger vehicles and public transport

Parramatta Road, Victoria Road, City West Link and King Street/Princes Highway are all major arterial roads that provide access between the city and the west, south-west and north-west. These routes dissect the urban environment carrying significant volumes of traffic daily.

Roads and Maritime has a number of traffic counters and classifiers in place across the NSW road network. **Figure 5-10** illustrates the location of traffic counters with the correlating information highlighted in **Table 5-67**. The information highlights the traffic volumes on major road networks relevant to the project. These roads are more likely to experience changes in traffic volumes during construction and upon operation of the project.

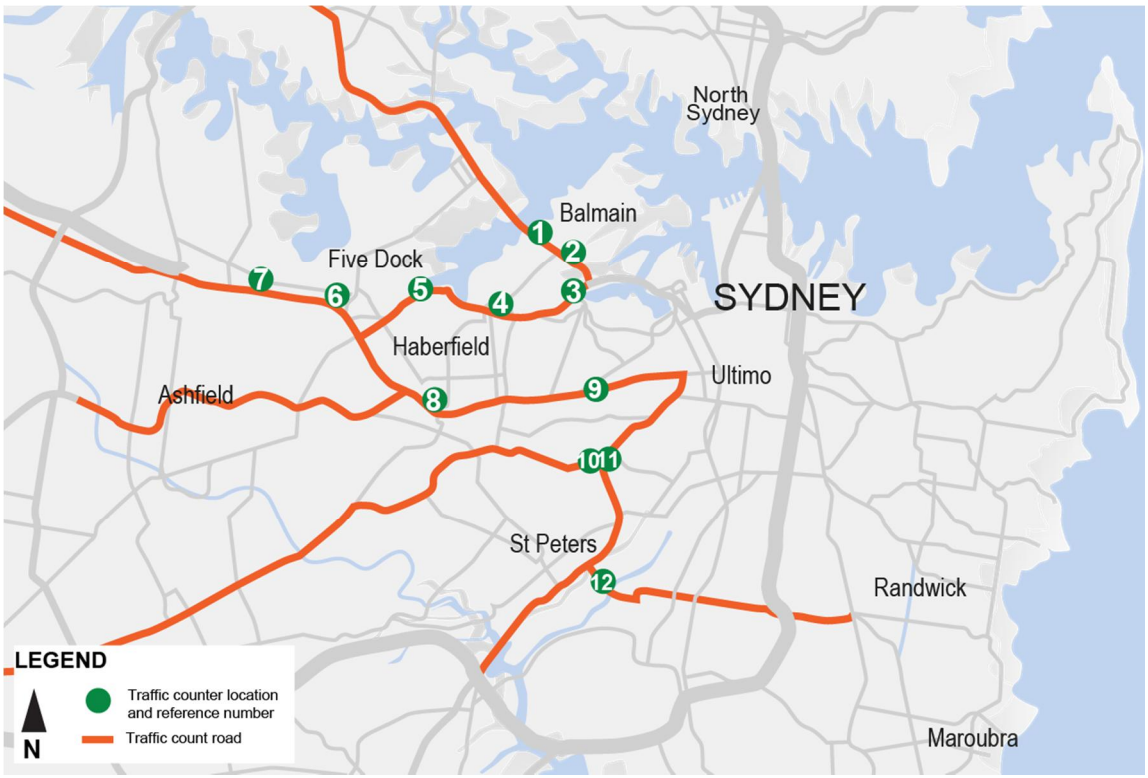


Figure 5-10 Traffic counter locations as relevant to the M4-M5 Link project

Source: HillPDA 2016 and Traffic Volume Viewer 2016

Table 5-67 All vehicle average daily traffic count 2016

Figure 5-10 ref.	Traffic counter locations	North-bound	South-bound	East-bound	West-bound	Classifier
1	**Victoria Road** (at Byrnes Street, Rozelle)				35,710	N/A
2	**Victoria Road** (at Evans Street, Rozelle)			32,866		Light vehicle: 95% Heavy vehicle: 5%
3	**City-West Link Road** (at The Crescent)			25,195	22,015	N/A
4	**City-West Link Road** (at James Street, Lilyfield)				27,214	Light vehicle: 94% Heavy vehicle: 6%
5	**City-West Link Road** (at Timbrell Drive, Haberfield)				25,962	Light vehicle: 93% Heavy vehicle: 7%
6	**Parramatta Road** (at Arlington Street, Five Dock)			39,801		Light vehicle: 91% Heavy vehicle: 9%
7	**Parramatta Road** (at Cheltenham Road, Five Dock)			36,856	37,547	N/A
8	**Parramatta Road** (at Brown Street, Leichhardt)			31,696	30,827	N/A
9	**Parramatta Road** (at Mathieson Street, Annandale)			29,647	21,249	N/A
10	**Enmore Road** (at Bailey Street, Newtown)	14,626	13,334			N/A
11	**King Street** (at Newman Street, Newtown)	10,540	10,274			N/A
12	**Canal Road** (north of Burrows Road, St Peters)			13,304	14,773	Light vehicle: 88% Heavy vehicle:12%

Source: Roads and Maritime, Traffic Volume Viewer 2016

As can be seen in **Table 5-67**, Parramatta Road currently carries the largest volume of daily traffic, with up to 39,801 vehicles travelling eastbound at one section of the road. Around 91 per cent of this traffic comprises of light vehicles. Victoria Road travelling through Rozelle also accommodates relatively high volumes of traffic, greater than 30,000 vehicles in each direction daily. City West Link ranges between around 22,000 to 27,000 across various traffic counter locations. The majority of traffic along these routes is light vehicles.

Private vehicles are the predominant mode of transport across the study area, with 39 per cent of residents travelling to work by this method.

Other modes of transport available across the study area include light rail, heavy rail and bus. At the time of the Census data collection in 2011, the light rail system from Lilyfield to Dulwich Hill was not operational. The introduction of the light rail may have an impact on commuter travel modes and subsequently the data presented is only reflective of commuter movement patterns as of 2011. The light rail network now runs from Central Station to Dulwich Hill via Glebe, Lilyfield, Leichhardt and Summer Hill. There are services every eight to 10 minutes in peak periods, with off-peak services every 15 minutes (Transport for NSW 2016).

Three rail lines intersect within the study area, the T1 North Shore, Northern and Western Line, the T2 Airport, Inner West and South Line and the T3 Bankstown Line. These provide rail access to the

suburbs of Ashfield, Summer Hill, Redfern, Erskineville, St Peters, Newtown, Sydenham, Eveleigh and Chippendale. At the time of the Census, rail transport was the primary mode of public transport across the study area carrying 19 per cent of resident commuters.

Bus transportation was the second preferred mode of transport across the study area carrying 13 per cent of residents. Parramatta Road, Victoria Road and King Street are important bus corridors, with a number of services operating both inbound and outbound from the city. Parramatta Road is the main corridor connecting residents of western Sydney to the Sydney CBD, with the highest number of transit passengers of any corridor in Sydney (40,000 in peak hour period towards CBD)[31]. There are no regular bus routes on City West Link. Although numerous bus routes operate across the study area, the main bus routes operating include:

Ashfield-Haberfield

- L37 running along Ramsay Street in Haberfield, along Norton Street, Balmain Road, Victoria Road across Anzac Bridge into the city
- L38 and L39 running along Ramsay Street in Haberfield into Norton Street and down Parramatta Road.

Leichhardt-Glebe

- 433 from Balmain to Broadway along Darling Street, Victoria Road, The Crescent and Broadway
- M50 along Victoria Road and across Anzac Bridge into the city
- 441 from Birchgrove, through Balmain across Anzac Bridge into the city
- 440 from Victoria Road, Rozelle, via Balmain Road, Norton Street and Parramatta Road to the city
- 470 from Lilyfield Light Rail, via Booth Street and Pyrmont Bridge Road to Broadway.

Alexandria-Erskineville

- 422 from St Peters via King Street to the city
- L23 from Kingsgrove via Illawarra Road, Enmore Road, and King Street to the city
- L28 from Hurlstone Park via King Street to the city through Newtown
- 352 and 355 from Marrickville via King Street to Bondi Junction
- M30 from Sydenham via King Street to the city.

A small proportion of residents travel to work by ferry (one per cent). This form of transport is only available in the Leichhardt-Glebe precinct, which recorded two per cent of commuters opting for ferry transportation and the Ashfield-Haberfield precinct recording one per cent of commuters. Ferry stops are located at Balmain East, Balmain, Birchgrove, Cockatoo Island, Drummoyne, Abbotsford and Chiswick.

5.5.2 Pedestrians and cyclists

Walking was the most common form of active transport for commuters across the study area with eight per cent of residents walking to work. The Alexandria-Erskineville precinct recorded the highest number of commuters walking to work (11 per cent), followed by Leichhardt-Glebe (eight per cent) and Ashfield-Haberfield (four per cent). Cumulatively across the precincts, a smaller percentage of commuters chose to cycle to work (three per cent). The Alexandria-Erskineville precinct recorded the highest number of cycling commuters (four per cent), followed by Leichhardt-Glebe (three per cent) and Ashfield-Haberfield (one per cent).

[31] NSW Government 2012, NSW *Long Term Transport Master Plan,* Transport for NSW, pg 86.

Figure 5-11 illustrates the separated dedicated cycling lanes and bicycle friendly roads relevant to the study area. Victoria Road and Anzac Bridge are the primary separate dedicated cycleways in the study area. *Sydney's Cycling Future 2013* strategy also identifies Lilyfield Road as a strategic bicycle corridor. There are limited separated dedicated cycling lanes or dedicated cycling lanes in the south of the study area around St Peters and Newtown. There are limited segregated cycling paths along Parramatta Road corridor and King Street. Cycling in these areas is encouraged on local roads instead.

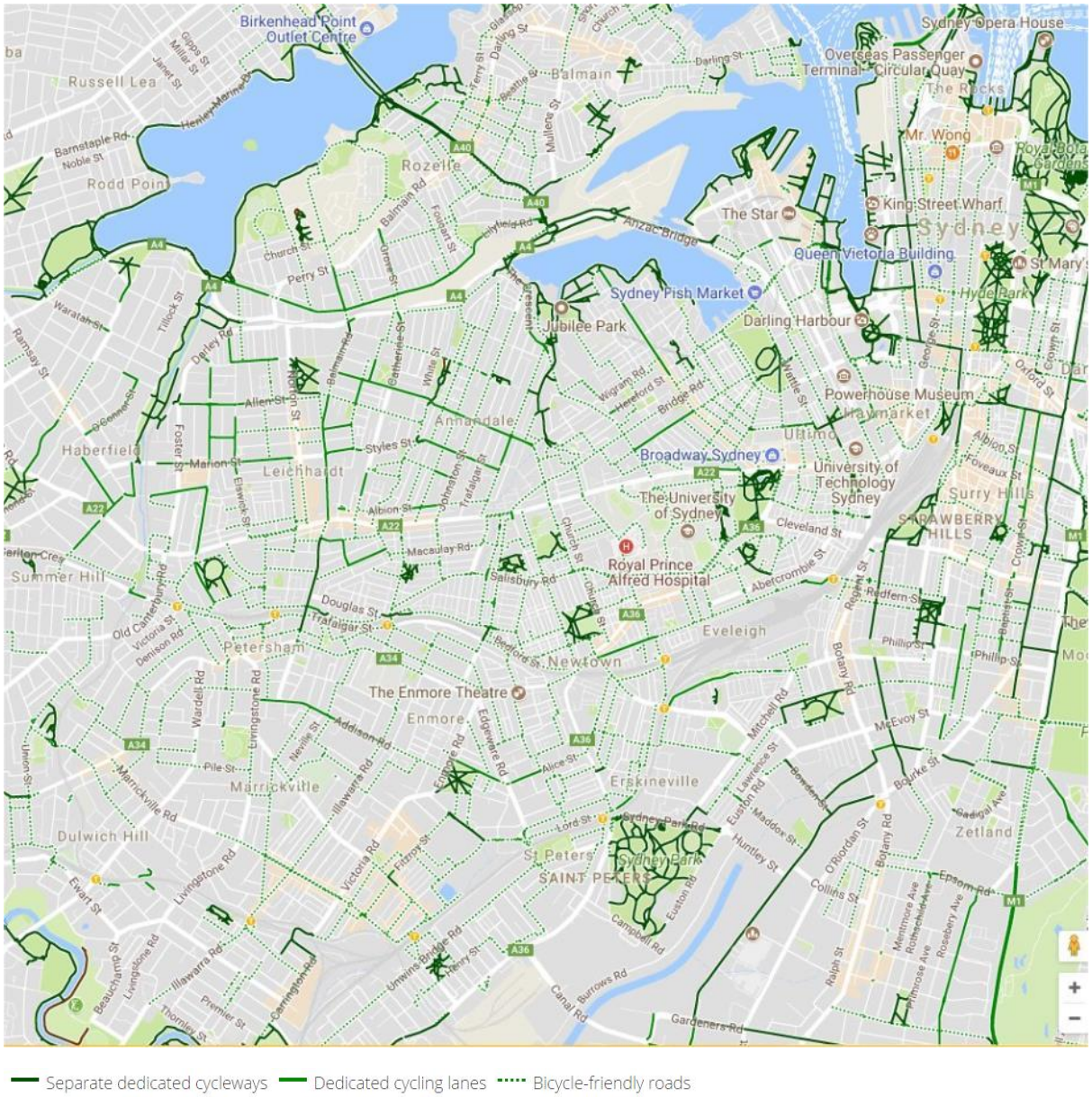


Figure 5-11 Cycling paths in Sydney

Source: Sydney Cycleways 2017

The current cycling network is predominantly oriented towards recreational trips rather than commuter trips, with dedicated cycleways concentrated within recreational spaces and along the foreshore.

There are a number of cycling and/or walking paths within the study area or in close proximity to the study area that would generate recreational cyclist activity. The Iron Cove walking and cycling path, Jubilee Park, Richard Murden Reserve, Sydney Park, Victoria Park and the Johnston Creek connection all provide separated and generally slow speed cycleways appropriate for children and inexperienced riders. These parks and spaces are also popular with recreational walkers.

As identified in **Appendix N** (Technical working paper: Active transport strategy) of the EIS, significant and highly valued active transport networks include the Bay Run, Glebe Foreshores, Anzac Bridge cycle and pedestrian shared path and the northern part of the Greenway (the active transport connection between Cooks River and Iron Cove). The shared path along Whites Creek to Buruwan Park is used by both cyclists and pedestrians. Shared pedestrian and cycle paths also run both sides of Victoria Road with important connectivity provided by overpasses at the city end of Victoria Road and across City West Link, providing connection to the foreshore.

The New M5 project includes a significant number of new and upgraded active transport links as a component of the project. The area around the St Peters interchange would include new separated cycleways, shared paths and pedestrian paths. Details of the new network can be found in in the **Appendix N** (Technical working paper: Active transport strategy) of the EIS and the New M5 EIS. Upgraded active transport links would also be provided by the M4 East project.

5.5.3 Freight and commercial vehicles

Increasing the productivity and efficiency of movement enables the efficient delivery of goods to consumers and increases the provision and accessibility of specific services (eg trade services). The project forms part of the Urban National Land Transport Network for Sydney, which identifies major connections through urban areas to ports, airports and intermodal facilities. These connections are considered of critical importance to national and regional economic growth, development and connectivity. The M4-M5 Link project provides a link between the M4 East and the New M5 to enable efficient movement of freight and commercial vehicles across Sydney to key metropolitan and regional markets.

Figure 5-12 illustrates and **Table 5-68** defines the motorways and routes of national significance. Parramatta Road currently operates as a major commercial vehicle thoroughfare supporting the delivery of goods and services to major centres such as Parramatta, Sydney Olympic Park and the Sydney CBD. City West Link, King Street/Princes Highway and Victoria Road are also main arterial roads within the study area. Canal Road is located in close proximity to the major industrial and port area around Sydney Airport and subsequently has a high number of commercial and heavy vehicle movements. The road traffic counters shown in **Figure 5-12** identify that:

- Nine per cent of road users are heavy vehicles along Parramatta Road
- Six per cent of road users along City West Link are heavy vehicles
- Five per cent of road users along Victoria Road are heavy vehicles
- Twelve per cent of road users along Canal Road are heavy vehicles.

The statistics for King Street and Enmore Road were not available at the time of writing the report.

Table 5-68 Road number and names

Road category	Road names
M1	Eastern Distributor, Southern Cross Drive
M4	Western Motorway
M5	M5 East
A1	General Holmes Drive, The Grande Parade, President Avenue, Princes Highway
A3	King Georges Road, Roberts Road, Centenary Drive
A4	City-West Link Road, The Crescent, Victoria Road, Western Distributor
A22	Broadway, Greater Western Highway, Parramatta Road
A34	Enmore Road, Stanmore Road
A36	Princes Highway, King Street, City Road
A40	Victoria Road

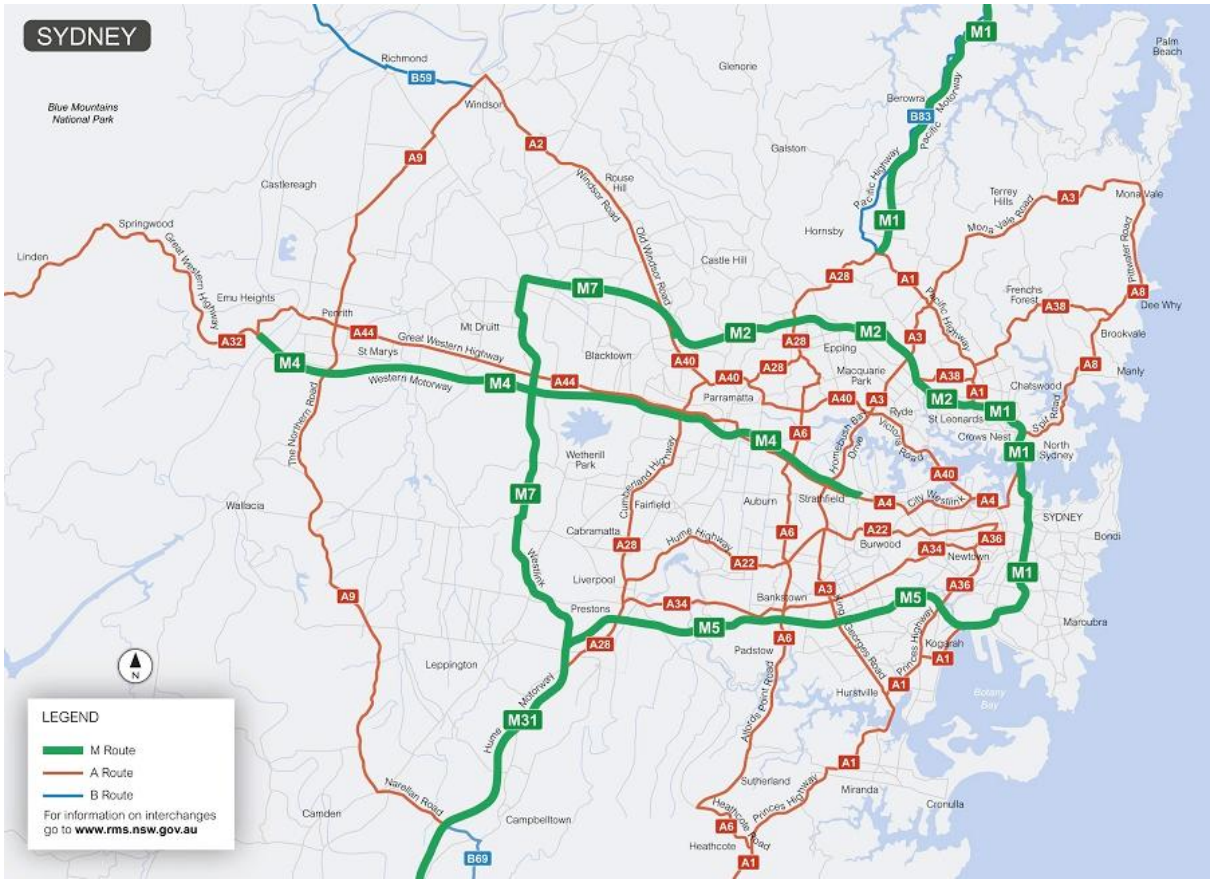


Figure 5-12 Motorways and routes of national significance

Source: NSW Government, Road number and name changes in Sydney, Department of Transport, Roads and Maritime

In 2011, the *NSW Freight and Ports Strategy*[32] identified that 63 per cent of freight tasks, reported in NSW, were undertaken by road. The *2014 State Infrastructure Strategy Update*, prepared by Infrastructure NSW also identified that urban roads support around 278,000 heavy freight vehicle movements and more than 1.2 million light commercial vehicle trips every day. Currently these movements are forced onto urban arterial roads due to insufficient motorway connectivity between major centres and distribution areas such as Port Botany and Sydney Airport.

The Sydney metropolitan area is however experiencing growth in traffic volumes, with longer peak periods and traffic congestion. As the population increases conflicts are arising where freight movements seek to utilise the same road network as other local users, causing adverse effects on transport efficiency and costs, community amenity and the environment. Sustained congestion increases the cost of freight movement and goods and service delivery, reducing the efficiency of the transport network and hindering business and economic growth. The *2014 State Infrastructure Strategy Update* identifies that congestion was costing Sydney around $5 billion a year, set to grow to $8 billion annually by 2020[33].

[32] Transport for NSW 2013.

[33] Infrastructure NSW 2014, State Infrastructure Strategy Update.

6 Consultation and community values

Community consultation is an integral aspect of the SEIA. The consultation process communicates values and issues that assist the decision making process for the project. This section presents a summary of the community values and feedback from consultation as it relates to the SEIA.

A range of communication and consultation activities conducted through different media for the M4-M5 Link project were undertaken during the development of the concept design and EIS. **Chapter 7** (Consultation) of the EIS identifies the community and stakeholder consultation undertaken for the project, along with the key issues raised.

Community values were also scoped from additional sources, including:

- Community strategic documents from each LGA as identified in **Chapter 4**
- Community Feedback Report (SMC 2016) prepared following the community briefing sessions between August and September 2016
- Agency and stakeholder submissions on previous WestConnex projects
- Agency and stakeholder submissions on the Rozelle Rail Yards site management works
- Community feedback from the Concept Design Report and associated community information sessions (held between May and August 2017)
- Agency comments on the M4-M5 Link project.

6.1 Consultation summary

Table 6-1 provides a summary of the key socio-economic issues raised during community and business consultation.

Table 6-1 Key social-economic considerations identified during community and business consultation

Key socio-economic considerations		Report section
Property impacts		
Property acquisition	· Appropriate compensation for property acquisition · Uncertainty and transparency around the property acquisition process · Operation of acquisition assistance phone line after project commencement · Loss of local businesses · Displacement concerns relating to the inability to relocate into same suburb.	**Section 7.3**
Property values	· Property value fluctuations due to uncertainty regarding: · Property acquisition locations and process · The alignment of WestConnex.	**Section 6.2**
Uncertainty	· Uncertainty regarding: · Property or neighbouring property(s) being acquired · Potential damage occurring to heritage homes · Housing being located in close proximity to project corridor · Tunnelling undermining building foundations · Disruption to electricity, water and gas services during construction.	**Chapter 6** (Construction work) of the EIS **Chapter 12** (Land use and property) of the EIS **Appendix F** (Utilities Management Strategy)

Key socio-economic considerations		Report section
Amenity impacts		
Visual	· Request for replanting of trees along Victoria Road after construction · Request for measures to reduce the visual impact of construction at compound locations.	**Section 8.2**
Noise and vibration	· Hours of construction and impact on local residents and businesses · Local areas including Lilyfield Road and Rozelle interchange · Disturbance at night and on weekends due to construction occurring outside of standard construction hours · Requests for noise assessments with associated mitigation measures and abatements · Requests for trucks to be precluded from using local roads during construction and operation.	**Section 7.2.2** **Section 8.2.2**
Air quality and human health	· Dust and contaminated waste during construction · The location, composition and filtration system of ventilation outlet · Proximity of residential, business and open space locations during operation · Residents' health and safety as a result of pollution and increased traffic on local roads during construction and operation. · Request for air quality studies before, during and after construction.	**Section 7.2.3** **Section 8.2.3**
Heritage	· Potential impact on residential heritage homes and conservation areas along the project corridor · Prioritise heritage protection and conservation · Protect heritage items in Glebe, specifically along Arundel Street.	**Section 7.4.1**
Access and connectivity impacts		
Public transport	· The temporary relocation of bus stops during construction · The design and integration of public transport.	**Section 7.1.3**
Access and connectivity	· Road closures during construction and operation · Construction compound locations · Tunnel site access locations · Connectivity between Rozelle and Glebe · Increase connectivity to local social infrastructure.	**Section 7.1** **Section 8.1**
Congestion	· Potential congestion as a result of construction sites · Further congestion along Anzac Bridge after construction · Upon operation, tunnel entries and exits would become congested areas.	**Section 7.1** **Section 8.1**
Parking	· Loss of on/off-street parking during construction and operation.	**Section 7.1.2** **Section 8.1.4**
Toll prices	· Toll prices discouraging use and result in congestion on toll free routes during operation.	**Section 8.6.3**
Active transport	· Increasing pedestrian and cycle path connectivity around the project · Providing a pedestrian over-crossing above City West Link and Victoria Road during construction and operation · Construct footbridge at Lilyfield Road · Open Glebe Island Bridge for pedestrian use	**Section 8.1.2** **Appendix N** (Technical working paper: Active transport strategy) of the EIS

Key socio-economic considerations		Report section
	· Provide cycle ways to connect and complete the 'greenway', linking Cooks River, Iron Cove and The Bays Precinct.	
Social infrastructure impacts		
Social infrastructure	· Loss of open space during construction and operation · Any changes to the Bay Run that compromise the existing efficiency of the active transport loop · Changes to Callan Park · Reinstated open space to include sporting facilities · Increased amenity and access to Sydney Park · Retention of Easton Park and Blackmore Park for community use.	**Section 7.10** **Section 8.3**
Consultation		
Notification	· Residents and businesses to be given adequate notification of project commencement · Engagement of residents and business located in close proximity to the tunnels · Comprehensive and transparent information to be made publicly available · Request that businesses are kept up to date and informed about the project, particularly during construction.	**Chapter 10**
Business and industry		
Access and connectivity	· Traffic management of congestion and bottleneck in relation to business amenity, passing trade and efficiency of business deliveries · Customer access as a result of changed environment.	**Section 7.9**
Parking	· Limited parking for customers and employees due to construction related activities · Construction workers competing for customer and employee car parking.	**Section 7.9**
Business visibility	· Impact on the visibility of businesses due to potential road detours, changed traffic volumes or construction related hoardings.	**Section 7.9**
Business revenue	· Increase in business revenue due to potentially more customers as a result of construction workers in area · Reduction in business revenue due to construction activity.	**Section 7.9**
Business amenity	· Dust and pollution concerns as a result of construction activity and construction traffic · Concern regarding increased noise and vibration around businesses.	**Section 7.9**

6.2 Community values

Community values are those that are held in common by residents and visitors in regards to a particular area or the enhancement of quality of life or sense of place. Values can be tangible or intangible. Physical aspects such as heritage items, social infrastructure or local features such as public art and trees are generally highly valued by communities, as are intangible elements such as the connection to water and places, the perception of safety and health or the sense of belonging and connectivity with people.

This section describes the community values held by residents, businesses and visitors in the study area. The community values have been informed through project consultation (summarised in **Table 6-1** and **Chapter 7** (Consultation) of the EIS and the review of the local government Community Plans and Strategic Plans as outlined in **section 4.4**).

As identified in **Table 6-1**, the community raised concern regarding property value fluctuations due to uncertainty around property acquisition locations and process, and the ultimate project alignment. An assessment of the impact of the project on residential and commercial property prices has not been included in the preparation of the EIS given the large number of factors that influence the value of a property. It is extremely difficult to anticipate market perceptions, particularly as these in turn are influenced by broader macroeconomic considerations (eg strength of the economy, outlook for economic growth, interest rate levels and availability of finance, unemployment levels). As such, a reliable assessment of the interaction between the project and the property market cannot be made with any certainty.

6.2.1 Neighbourhood identity and character

Neighbourhood identity and character relates to the distinctive features of a place or environment that generate a sense of ownership by the community and contribute to a person's appreciation of their surroundings. These features can be tangible or intangible. Results from community consultation and the policy review identified community values that were associated with neighbourhood identity and character are as follows.

- Public art should be integrated to create a distinct sense of place
- Local schools, preschools and centres of adult learning should remain a community focus with access to new technology
- Heritage should be protected and enhanced
- Significant trees and vegetation enhance scenic amenity and should be retained
- Open space contributes to neighbourhood identity with specific areas holding particular community importance included King George Park, Blackmore Park, Easton Park, the Glebe Foreshore Parks and Sydney Park.
- Local amenity in residential neighbourhoods and around open space is important both day and night
- Views and vistas of heritage, waterways and the city skyline are to be protected
- Businesses and community are to work together to improve the local economy
- Communities are to be equitable, cohesive, connected, caring, diverse, healthy, safe, culturally active, creative and innovative, and have a strong sense of belonging and place.

6.2.2 Community safety, health and well-being

Community safety, health and well-being are a key priority for communities within the study area. Community members indicated the importance of construction activities being undertaken in a manner that considers the health, safety and well-being of residents. The strategic plans also highlight safety, health and well-being as core principles. Results from community consultation and the policy review identified community values that were associated with community safety, health and wellbeing are as follows.

- Assistance should be provided for vulnerable, disabled and isolated people
- Construction traffic should be minimised on local streets to conserve safety for residents
- The health and safety of residents should be prioritised around construction areas
- Dust and contamination waste during construction should be minimised
- The location, composition and filtration system of the ventilation outlets should be carefully considered
- Comprehensive and transparent information should be made publicly available.

6.2.3 Community cohesion

Community cohesion refers to the connections and relationships between individuals and their neighbourhoods. Levels of community cohesion and sense of belonging are said to be good where communities have access to a diverse range of local and regional infrastructure, barriers to movement

are minimised and there are a variety of meeting places, which encourage strong support networks. Values relating to community cohesion were raised during consultation and within the strategic plans as follows:

- People feel a sense of belonging, connected to the local village, shops and people in the streets
- More accessible and efficient public transport is delivered
- A range of cultural facilities, opportunities for artistic expression, and an exciting range of events and entertainment opportunities are provided
- Connections to green spaces and public spaces are enhanced and encourage community groups to meet and share culture
- Acquisitions are minimised to prevent the displacement of people from their communities
- Traffic management is incorporated into construction plans to minimise congestion and bottlenecking in relation to business amenity, passing trade and efficiency of business deliveries
- Pedestrian and cyclist connections to the waterfront and public spaces are maintained and enhanced, particularly Glebe Foreshore Walks and the Bay Run
- Public transport is designed and integrated into existing environments
- Streets are walkable and safe to move around.

7 Assessment of construction impacts

Since the inception of the M4-M5 Link project, various options have been considered in the development of the project, including the location of the interchanges, the alignment of the mainline tunnel and the inclusion and configuration of the Iron Cove Link as a way to improve efficiencies and design outcome of the project.

In response to community concern and design constraints, a number of substantial changes have been made to the project design. An overview of options development and design alternatives have been outlined in detail in **Chapter 4** (Project development and alternatives) of the EIS. Project design alterations to reduce potential socio-economic construction impacts include:

- Adjustment of the project footprint to avoid using Easton Park at Rozelle during construction and to minimise impact on Lilyfield Road and the heritage listed Sydney Water sewerage pumping station
- Adjustment of the project footprint to avoid using areas around Blackmore Park, Leichhardt during construction
- Deletion of a construction site in Derbyshire Road, Leichhardt adjacent to Sydney Secondary College (Leichhardt campus) to prevent amenity, traffic and heritage impacts
- As a result of the deletion of the Camperdown interchange, adjustment of the mainline tunnel alignment further to the west which has avoided construction impacts on the Royal Prince Alfred Hospital and the University of Sydney
- The selection of spoil haulage routes to primarily follow the arterial road network and avoid local roads
- The restriction of hours for spoil haulage from the Darley Road construction site to standard construction hours to avoid noise, traffic and amenity impacts on local residents.

These design and construction changes have avoided several potentially substantial construction and operation impacts on the community and have improved the efficiency and design of the project outcome. Despite these improvements, construction of the project would still affect a range of socio-economic factors across the study area.

This section discusses the impacts that may be experienced across the study area due to construction works and utility works associated with the project. These works have the potential to affect residents, businesses, road users, social infrastructure users and the wider community, both positively or negatively. An assessment of the proposed project activities has been undertaken to determine the type and magnitude of the impacts and to identify measures to avoid, minimise, manage and mitigate these.

This section has been structured to assess the effects of construction on the broader socio-economics environment (**sections 7.1** to **7.8**) before identifying specific impacts on business and social infrastructure in **sections 7.9** and **7.10**. This assessment considers impacts on:

- Access and connectivity
- Local amenity
- Property acquisitions
- Community values
- Population and demography
- The local and regional economy
- Business and industry
- Social infrastructure.

7.1 Access and connectivity

Changes to road, public transport and active transport are likely to arise from the establishment and operation of construction sites, portals, interchanges, surface road changes and ancillary infrastructure that trigger alterations or disruptions to traffic and transport connections and access to properties, businesses and social infrastructure. These include changes to:

- Road network efficiency and connectivity
- Parking availability
- Public transport connectivity
- Pedestrian and cyclist connectivity.

The direct impact of changes in property access for residents, businesses and social infrastructure have been discussed in **section 7.9** (business) and **section 7.10** (social infrastructure).

7.1.1 Road network

Changes in road network efficiency and connectivity would occur across the study area as a result of construction activities. This would include traffic disruptions and diversions due to temporary, partial or full closures of roads, increased construction traffic (including heavy vehicles) and changes to speed limits near construction works. All traffic modifications, including road closures and diversions, are outlined in detail in **Appendix H** (Technical working paper: Traffic and transport) of the EIS. These changes are likely to affect general motorists, freight operations and deliveries. Impacts on public transport are discussed in **section 7.1.3**. Changes in access to businesses are discussed in **section 7.9** and changes in access to social infrastructure are discussed in **section 7.10.**

Direct and indirect traffic disruptions are likely to be experienced on local and arterial roads in most suburbs that are in close proximity to construction sites. This would include the suburbs of Ashfield, Haberfield, St Peters, Camperdown, Annandale, Lilyfield, Leichhardt, and Rozelle.

The significance of the impact on the performance of the road network would vary depending on the traffic volumes that the road carries and the level of importance of the transport route.

Direct local road impacts

Local road alterations, would affect the accessibility of areas for local residents, businesses and visitors. Direct local road impacts are expected on:

- Northcote Street (Haberfield Option A - C3a), which would be closed at the intersection (as per the existing arrangement of the M4 East project) for the duration of construction. This intersection would be reinstated at the completion of construction
- Darley Road, due to temporary lane closures during the establishment of construction vehicle access to the site
- Chapman Road at Annandale, due to temporary changes of the intersection. Access to the commercial premises that use Chapman Road, including the Multihull Central Marina, as well as the Glebe Foreshore Parklands would be protected and maintained at all times
- Gordon Street between Lilyfield Road and the Rozelle Rail Yards, which would be permanently closed as part of the project
- Lilyfield Road, which would require temporary lane closures for short periods. Access to Lilyfield Road from Victoria Road may be temporarily restricted during the works however alternative access to Lilyfield Road would be available from Hornsey Street and Gordon Street during these periods
- Hornsey Street at Rozelle, which would require lane closures for short periods. Access to Hornsey Street from Victoria Road would require full closure during the works for short periods however alternative access would be available from Lilyfield Road and Gordon Street during these periods

- Quirk Street at Rozelle, which would require lane closures for short periods. Access to Quirk Street from Victoria Road would require full closure for short periods. Alternative access would be available from Hornsey Street and Gordon Street
- Moodie Street at Rozelle, where temporary lane closures of one lane may be required to facilitate utility works
- Callan Street at Rozelle, where access at the intersection with Victoria Road would require temporary closures. Alternative access would be available during these periods from Springside Street and McCleer Street
- Toelle Street at Rozelle, where access at the intersection with Victoria Road would require temporary closures. Alternative access would be available during these periods from Springside, McCleer, Callan and Manning streets
- Clubb Street at Rozelle, where access to Victoria Road would be permanently closed and a cul-de-sac established. Alternative access to Clubb Street would be available via Manning Street via Toelle Street or from Callan Street and McCleer Street via Springside Street
- Byrnes Street at Rozelle, where temporary lane closures of one lane may be required to facilitate utility works. Works would also be carried out to move the terminus near Victoria Road south to accommodate the revised design
- Bignell Lane at Annandale would be permanently realigned between Mallett Street and Pyrmont Bridge Road. Temporary closures of Bignell Lane would be required during construction to allow for the realignment works. Rear access to commercial properties along Bignell Lane would be maintained during construction.

These streets are primarily residential streets. Maintaining access to residential properties, including ensuring the operability of clearways and driveways, is important in enabling the continuity of an individual's daily routine. In most instances, these modifications would be temporary with local roads reinstated upon completion of construction works. Properties along these roads may experience a marginal increase in travel time. Closures would be outside of peak periods or within evening periods where feasible and reasonable.

Overall, the effect of construction on local roads would be medium term at a locality extent. The severity of change from the existing baseline environment would be small. The consequence of change would be slight and the likelihood high. As such, the overall significance of impact on the socio-economic environment would be minor negative.

Direct arterial road impacts

Construction impacts on major roads have the capacity to influence the performance of the broader road network both nearby and further afield. Such changes associated with the project are likely to affect both local communities and the broader region, potentially resulting in adverse impacts upon the socio-economic environment. Construction impacts on major road networks would increase traffic congestion, travel time, accessibility of local areas and the efficiency of freight, commercial vehicles and public transport movements. However, closures would be planned for outside of peak traffic periods where feasible and reasonable. Arterial road impacts are expected on:

- Parramatta Road, Ashfield and Haberfield, where works would be carried out to facilitate ingress and egress for construction traffic
- City West Link at Leichhardt, where a right turn lane would be included to enable construction vehicles to turn into Darley Road
- City West Link at Lilyfield and Rozelle, where works would be carried out to facilitate ingress and egress for the Rozelle civil and tunnel site and upgrades and improvements to the eastbound and westbound carriageways. Works would require temporary traffic diversions and short-term lane closures
- The Crescent at Annandale and Rozelle, where works would be carried out to facilitate ingress and egress for The Crescent civil site and to realign The Crescent and reconstruct the intersection with City West Link. The new alignment of The Crescent would be constructed 'offline' (that is, next to the existing alignment) and traffic would be switched onto the new alignment when ready.

The old alignment of The Crescent would be demolished. Works would require traffic diversions, traffic signal modifications and some short-term lane closures. Access to the commercial premises in the marina as well as the Glebe Foreshore Parklands would be maintained at all times

- Victoria Road at Rozelle, where works would require some short-term lane closures (outside peak periods), traffic signal modifications and temporary diversions at the intersection with The Crescent to allow for construction of the new bridge in line with the permanent design. All traffic lanes in each direction would generally be maintained
- Victoria Road near Iron Cove, where works would be carried out to facilitate ingress and egress for the Iron Cove Link civil site and upgrades and improvements to the eastbound and westbound carriageways. Works would require temporary traffic diversions and short-term lane closures
- Parramatta Road and Pyrmont Bridge Road, Annandale where works would be carried out to facilitate ingress and egress for construction traffic.

As identified in **Appendix H** (Technical working paper: Traffic and transport) of the EIS, there are three key areas that would require detailed traffic staging due to the substantial existing volumes of traffic. Detailed traffic staging plans would be required at:

- Victoria Road/The Crescent/Anzac Bridge approach intersection – reconstructing the intersection to accommodate existing connectivity, the new M4 East Motorway/Iron Cove Link to Anzac Bridge connections and construction of a new bridge at Victoria Road
- City West Link/The Crescent intersection – realigning The Crescent at Annandale to the west, building a new bridge over Whites Creek and modifying the intersection
- Victoria Road at Iron Cove – realigning the westbound (southern) carriageway of Victoria Road to create sufficient space to build new tunnel portals and entry and exit ramps for the Iron Cove Link.

Appendix H (Technical working paper: Traffic and transport) of the EIS indicates that the majority of arterial roads likely to be directly affected by construction work are already operating at or near their capacity during peak periods. The following discussion identifies the socio-economic effects of construction if traffic delays occur.

Traffic delays have the capacity to affect freight and commercial vehicle transport efficiency, commuter travel times and general access and connectivity to surrounding areas or employment centres. These impacts would have direct effects on the socio-economic environment, costing individuals and businesses time and money. The consequence of this adverse traffic environment may also have secondary effects on the socio-economic environment, with the potential that individuals would spend less time and money at local businesses within the study area. This may influence the revenue generation and productivity of the local economy.

As identified in **section 5.5.3**, freight and commercial vehicle movements are an integral component of the economy. The major arterial routes of Parramatta Road, City West Link, Wattle Street and Victoria Road carry high volumes of heavy vehicle movements, which would be affected by the road alterations during construction. Numerous industries are dependent upon efficient transport along these arterial roads to service business operational requirements. Network inefficiencies along these major freight and commercial vehicle routes would increase labour and operating expenses, with freight costs anticipated to increase due to the time shipments take in the supply and delivery chain. This would have an impact on both local and regional industries.

Increased traffic congestion may also reduce the amenity of an environment, with idle vehicles increasing noise impacts and enhancing the concentration of vehicle emissions in a particular area. This may affect human health and residential and business amenity, resulting in the reduction in the appeal of a place and the potential reduction in business revenue or return customers.

Increases in traffic may also reduce roadside safety, particularly in areas heavily frequented by pedestrian and cyclists, such as near schools, child care centres, aged care facilities and near public transport stops. This would particularly be the case at Alt Street due to the proximity of Haberfield Public School and the Parramatta Road East civil site (C3b) and along Parramatta Road due to the proximity of Bridge Road School and the Pyrmont Bridge Road tunnel site (C9).

The project attempts to minimise adverse impacts from road closures by reducing the lane closures during peak periods. At all locations where temporary and permanent road closures are required, access to properties would be maintained and signage for road closures or detours would be installed. Specific traffic management measures would be determined during detailed design and documented in a CTAMP prepared as part of the CEMP.

The implementation of the CTAMP would assist in reducing the negative impacts associated with changes and alterations to the road network. This Plan would however not be capable of mitigating all impacts, with inefficiencies still anticipated to affect road users. Construction impacts on arterial roads have the capacity to affect a large number of people and businesses both locally and regionally. Overall, the effect of construction on arterial roads would be medium term across a regional extent. The severity of change from the existing baseline environment would be medium. The consequence of the impact would be moderate, with a high likelihood. As such, the overall impact upon the socio-economic environment would be moderate negative**.**

Construction vehicles

The use of local roads by construction traffic was identified as a key concern for both community members and business operators during consultation for the project. The layout and access arrangements for the construction ancillary facilities have had regard to this concern. Where possible, vehicle access points would have direct access to the arterial road network to minimise the need for heavy vehicles to travel on local roads, through residential areas.

Light vehicles

The number of daily light vehicle, one way movements, is expected to range from 10 to 350 light vehicles per construction site. The greatest number of light vehicle movements are anticipated at:

- Rozelle civil and tunnel site (C5) estimating 350 daily one way vehicle movements mostly affecting Lilyfield Road on to Victoria Road and City West Link
- Northcote Street civil site (C3a) estimating 150 daily one way vehicle movements affecting Wolseley Street and Wattle Street
- Parramatta Road East civil site (Option 3b) estimating 150 daily one way vehicle movements affecting Alt and Bland streets and Parramatta Road
- Victoria Road civil site (C7) and estimating 140 daily one way vehicle movements affecting Victoria Road and Hornsey Street
- Iron Cove Link civil site (C8) estimating 140 daily one way vehicle movements affecting Victoria Road.

These light vehicle movements may reduce the amenity of local streets around the construction sites and increase traffic at local road intersections. Increased traffic, particularly on local streets may affect the safety of the environment, particularly if those streets are primarily residential and had previously experienced lower traffic numbers. This would be the case for Wolseley Street, Alt Street, Bland Street and Hornsey Street. Alt Street is also located in close proximity to the Haberfield Public School, which would generate larger vehicle numbers in its own right. The increase in number of light vehicles on this road may affect intersection performance and may reduce road safety, particularly for children.

Light vehicles would generally distribute fairly quickly across the road network, with minimal effect on the performance of the road network during peak periods.

Heavy vehicles

Heavy vehicles would also be required to deliver and remove construction plant equipment and materials, spoil and waste from the construction sites. Specific heavy vehicle access, egress and haulage routes are described in **Appendix H** (Technical working paper: Traffic and transport) of the EIS. Daily heavy vehicle movements would vary across the construction sites, ranging from 10 to 517 per site. The greatest number of heavy vehicle movements are anticipated at:

- Rozelle civil and tunnel site (C5) with 517 daily one way heavy vehicle movements anticipated

- Parramatta Road West civil and tunnel site (C1b) with 140 daily one way heavy vehicle movements anticipated
- Haberfield civil and tunnel site (C2a) with 136 heavy vehicle daily one way heavy vehicle movements anticipated
- Wattle Street civil and tunnel site (C1a), Pyrmont Bridge Road tunnel site (C9), and Campbell Road civil and tunnel site with 133 daily one way heavy vehicle movements at each of these locations
- Northcote Street civil site (C3a) and Darley Road civil and tunnel site (C4) with 100 daily one way heavy vehicle movements anticipated.

All other construction sites, are anticipated to experience less than 100 heavy vehicle movements per day.

To reduce traffic and amenity impacts on local roads, spoil haulage routes would operate mainly on arterial roads including Parramatta Road, M4 East tunnels (if possible, when available), Wattle Street, Victoria Road, The Crescent, City West Link, Pyrmont Bridge Road, Campbell Street and the Princes Highway. Spoil management has been discussed in **Chapter 23** (Resource use and waste minimisation) of the EIS, which outlines the preferred management of spoil haulage and waste minimisation. A Construction Waste Management Plan, as part of the CEMP, would be prepared and implemented for the project.

Parramatta Road and City West Link would be cumulatively the most effected by heavy vehicle movements, as multiple construction sites link to these roads. These sites already carry significant traffic volumes with additional construction vehicles potentially further contributing to congestion and a reduction in road network efficiency. City West Link would carry around 700 daily (one way) heavy vehicle movements that would, in most instances, connect to the M4 East Motorway. Around 208 of these heavy vehicle movements would be during peak AM and PM periods. Where possible, spoil haulage from Haberfield would also utilise the M4 East tunnel.

The above mentioned arterial roads already cater for heavy vehicles, with the increased number of construction vehicles unlikely to further reduce amenity. The increased number of construction vehicles would however contribute to congestion and may reduce trip efficiency between Sydney City and the west. The residents and employees that reside in the precincts of Ashfield-Haberfield and Leichhardt-Glebe would be most affected by any reductions in the efficiency of the road network.

Construction traffic would be managed through a Construction Traffic and Access Management Plan (CTAMP), which is to be prepared as part of the CEMP. Through effective management, negative impacts of construction vehicle traffic on the socio-economic environment would be reduced.

Overall, the effect of construction vehicle traffic on the road network would be medium-long term, generally confined to the LGA. The change from the baseline environment would be medium. The overall consequence of construction traffic would be moderate, with effects highly likely to occur. As such, the overall impact upon the socio-economic environment would be moderate negative.

Road and intersection performance

Appendix H (Technical working paper: Traffic and transport) of the EIS identifies the changes in level of service of roads and intersection performance due to construction activities. Generally, changes in level of service or intersection performance are the result of lower speed limits around construction areas, removal of traffic lanes, detours or the introduction of new intersections.

Although there is no evidence regarding these impacts from the traffic modelling, at a worse case, these impacts may result in:

- Route redirection (or ‘rat-running’) as drivers seek alternative faster routes on local roads or parallel road to avoid traffic congestion
- Modal shift as people seek alternative transport forms to travel to destinations
- Inefficiencies caused by reduced traffic mobility both within and outside peak periods.

These changes would have an impact on travel time and may reduce the accessibility of areas or generate secondary impacts (eg amenity, reduced safety) on surrounding neighbourhoods. Route redirection may alter the volume of traffic on local streets and increase pressure on local intersections. Examples of areas where this may occur include:

- Streets to the north of Rozelle civil and tunnel site (C5) where route redirection would seek to avoid congestion along City West Link
- Streets to the west of Iron Cove Link civil site (C8) where route redirection would seek to avoid congestion on Victoria Road
- Streets around the Pyrmont Bridge Road tunnel site (C9) where route redirection would seek to avoid congestion on Parramatta Road and Pyrmont Bridge Road.

This may affect the safety and amenity of neighbourhood streets due to increased traffic volumes and may reduce accessibility for residents living in these areas. Local streets, which typically carry limited traffic volumes, are commonly utilised by residents (particularly children) as additional recreational spaces. The ability to congregate and recreate in a street encourages social interaction between neighbours. Increased traffic volumes on local streets, reduces the safety and capacity of residents to utilise these spaces and may contribute to instances of community severance.

During construction, it may become more efficient for people to catch public transport rather than drive, due to the increase in traffic. This modal shift would increase demand on the public transport system, adding to crowding on services or requiring additional services to be scheduled. The provision of additional services would be an expense for service providers that may not have been previously budgeted. It may also reduce the flexibility and reliability of commuting for some people. Modal shift would however assist in alleviating traffic, benefitting the efficiency of the broader network.

Traffic congestion generally affects commuter travel time. This in turn may affect the amount of time people may spend with family and friends or undertaking personal activities (outside commute and work times). Traffic congestion may also increase stress levels as people become more anxious about reaching their destination on time.

Increased travel time has economic impact, potentially creating inefficiencies for freight operations and business servicing and deliveries. It may increase costs to businesses and the economy due to longer trip time, additional driver wages and fuel consumption. Traffic delays also affect accessibility for residents, businesses and social infrastructure users. This hindrance to access may deter customers or visitors from travelling to an area, potentially affecting business revenue or social infrastructure utilisation.

As outlined in **Appendix H** (Technical working paper: Traffic and transport) of the EIS, a number of the roads and intersections in the study area are already constrained or at capacity in the peak periods. The introduction of construction works in these areas is likely to increase intersection waiting times periods and travel times for road users.

During construction, changes in road level of service (LoS) are forecast on the following roads:

- On Parramatta Road, north of Wattle Street, the eastbound mid-block level of service is forecast to drop from LoS D to LoS E in the PM peak hour
- On City West Link, west of The Crescent at Rozelle, the westbound mid-block level of service is forecast to decrease from LoS E to LoS F in the AM peak hour.

The level of service on all other road is forecast to remain stable with only minor positive or negative variances in delays expected throughout construction.

Intersection performance across the study area during construction was also assessed in **Appendix H** (Technical working paper: Traffic and transport) of the EIS. This report indicated that the majority of intersections were unlikely to experience significant increases in average delays and the overall impact of construction activities on the road network would be minimal. Despite this, some prominent intersections would experience a decline in performance. These include:

- Wattle Street and Ramsay Street intersection (PM peak hour)
- Dobroyd Parade, Timbrell Drive and Mortley Avenue intersection (AM and PM peak hours)

- City West Link Road and James Street intersection (AM and PM peak hours)
- City West Link and The Crescent intersection (AM and PM peak hours).

It is noted that this is a worst-case assessment, based on peak construction traffic levels, and adverse road and intersection impacts would be expected to reduce once peak construction is complete.

Increased intersection delays and traffic congestion have the capacity to:

- Increase stress and anxiety for road users (**section 7.1**)
- Reduce resident, business and social infrastructure accessibility (**section 7.1**)
- Increase air and noise pollution (**section 7.2**)
- Incur greater service and delivery costs for businesses (**section 7.9**)
- Affect the costs and efficiency of the freight network (**section 7.9**).

Although there are predicted delays and longer waiting periods at intersections, the variances between the 'with' and 'without construction' scenarios are in most instances, less than five per cent. Construction would generate a small net worsening of intersections across the study area. The effect would be medium term and has the capacity to alter the efficiency of the network across the LGA. The consequence of the changes on the socio-economic environment would be moderate, with a high likelihood. As such, the overall impact upon the socio-economic environment would be moderate negative.

Road network summary

Overall, the changes to the road network due to the construction of the project would have an adverse impact on the socio-economic environment. Construction of the project would generate an increase in construction vehicle traffic on the roads and noticeably affect some intersection and road performances, as well as having a direct impact on local and arterial roads. These changes have the capacity to reduce the amenity of the environment, affect health and safety of commuters and surrounding communities, impact on motorist, commercial vehicle, freight and commuter efficiency and costs and reduce overall access and connectivity. The impacts may also affect the economic productivity of local and regional industries.

A CTAMP would be prepared as part of the CEMP to address, manage and reduce impacts on surrounding communities, wherever possible. To reduce the uncertainty around traffic and transport changes, it is recommended a Community Communication Strategy (CCS) be developed for the project. The details of the CCS are outlined in **Chapter 10**. Clear communication regarding changes in the road and traffic environment during the project would assist in reducing uncertainty and enable road users to adequately plan for the changes. Where possible, it is recommended that project information be graphically represented providing information regarding alternative travel routes, the additional distances and the duration that detours would remain in place.

The effective implementation of these management measures would reduce the extent of adverse construction impacts on the socio-economic environment. It is recognised that these measures would be unable to alleviate all socio-economic impacts arising from the impact of construction on road performance.

The construction effects would extend for a medium duration and would potentially affect the efficiency of road networks across the broader LGA. The effects would reflect a medium change from the existing baseline road network condition. The consequence of these changes is moderate and with impacts having a high likelihood of occurring. The overall significance of impact on the socio-economic environment would therefore be moderate negative.

7.1.2 Parking availability

Alterations to parking availability near construction compounds and other work areas may affect the availability of parking for local residents, commuters, businesses and social infrastructure users.

The loss of parking spaces during the construction phase was a specific concern raised during community consultation and the business impact survey. Of the businesses surveyed, 61 per cent

thought the project would have no impact on parking while 39 per cent identified that a reduction in parking would have a negative impact on their business. This concern was particularly prevalent for businesses in close proximity to the construction compounds, such as those in Camperdown and Rozelle.

The main reasons for decreases in parking availability identified by businesses and residents were:

- The increased number of construction workers in the area
- The potential for parking to be removed due to the presence of construction sites.

During construction, some un-restricted on-street parking spaces would be temporarily or permanently lost due to the presence of construction compounds. This is likely to be confined to:

- The northern carriageway of Darley Road, Leichhardt between Francis Street and Charles Street (on-street car parking to be reinstated upon completion)
- The eastbound carriageway of Hornsey Street, Rozelle near Victoria Road
- Callan, Toelle and Clubb streets, Rozelle near Victoria Road, adjacent to the premises being acquired
- Parking along the southern (westbound) carriageway of Lilyfield Road, Rozelle
- Informal car parking in King George Park, adjacent to Manning Street, Rozelle to facilitate the construction of the bioretention facility.

Depending on the alignment of the project design and utilisation purpose of the car parks, some of these car parking spaces would be reinstated upon completion of required works, generally within the short-term.

The removal of parking spaces on Darley Road would reduce the availability of on-street parking for light rail commuters and would increase demand for parking on other nearby streets. Should construction workers also use on-street parking the demand for parking in this area would further increase. Local residents would then be competing with both regular commuters and construction workers for parking. A similar scenario may occur at the Rozelle Bay light rail stop, which is in close proximity to The Crescent civil site (C6).

To reduce the impact of construction worker parking in the various neighbourhoods, construction compounds have been designed to provide around 700 dedicated car parking spaces across the following construction sites:

- Northcote Street civil site (C3a) – around 150 car parking spaces (if Option A is used)
- Parramatta Road East civil site (C3b) – around 140 car parking spaces (if Option B is used)
- Rozelle civil and tunnel site (C5) – around 400 car parking spaces
- Campbell Road civil and tunnel site (C10) – around 150 car parking spaces.

The provision of on-site construction worker car parking at the Darley Road, Pyrmont Bridge Road and Iron Cove Link construction sites is limited, however alternative arrangements to supplement on-site construction car parking would be investigated during detailed design.

Construction workforce would also be encouraged to use public transport. There are existing bus and light rail services in close proximity to most of the construction sites. Catching public transport would not be possible for all workers, however, as some may be required to work late/night shifts or carry tools/equipment with them as part of their construction activities.

Residential streets, in close proximity to construction sites, which are not constrained by parking time limits, would likely experience an increase in construction worker parking. Elderly people, those with a disability or families with young children, who may have difficulty walking greater distances, would be particularly affected if they were required to park further away from their homes.

The removal or increased competition for on-street parking would also affect parking convenience for customers, clients and workers of local businesses. This could lead to a decision by customers/clients to use an alternative service or business, resulting in a decline in business revenue (see **section 7.9**).

Similarly, for social infrastructure users, enhanced competition for car parking or parking access restrictions could lead to them choosing to use alternative facilities, potentially severing ties with community networks or affecting personal routines (see **section 7.4.3**).

The extent of parking impacts around particular construction compounds would vary dependent on the number of workers expected at each site and the availability of suitable alternative public transport options. In higher density areas, such as surrounding the Pyrmont Bridge Road tunnel site (C9), an increase in around 100 construction workers would place additional pressure on an already constrained parking area. This area is mixed use, with residents, employees and social infrastructure users already competing for parking. The addition of construction workers to this area would increase competition for parking, potentially raising stress and anxiety levels for motorists seeking parking spaces, deterring customers from businesses and reducing accessibility for residents and employees.

A car parking strategy would be prepared and would include items such as forecasting of construction parking demand, review of existing parking supply and use on local streets in the area, impact on existing parking, consultation activities and proposed mitigation measures, such as management of workforce parking and transport, alternative parking arrangements and communication and engagement. This would include the identification of areas where there are high levels of existing parking demand around the construction ancillary facilities and works sites and identifying alternative car parking sites for use by the construction workforce. Processes for monitoring, reporting and corrective actions would also be part of the strategy.

The strategy would be developed in consultation with local councils and stakeholders associated with public facilities adjacent to project sites, as well as with the M4 East and New M5 contractors (where relevant) to identify opportunities to access parking during their respective construction periods and once those periods are completed.

The construction effects would extend for a medium-long duration, however would generally be confined to a suburb extent. The effects would result in a medium change from the existing baseline condition. The consequence of the construction effects would be slight, however there would be a high likelihood of the effects occurring. The overall impact on the socio-economic environment would therefore be minor negative.

7.1.3 Public transport network

During construction, public transport in the project corridor and surrounding areas may be affected by the relocation of stops, increases in traffic, road alterations during traffic staging or delays arising from congestion. Community, stakeholder and business consultation identified changes to public transport as an important concern. The business survey respondents suggested that about 16 per cent of staff and customers rely on public transport to access businesses within the study area.

The construction of the project would not directly affect the operation of heavy rail or light rail services. Passenger access to stations within or in proximity to the study area may however be affected by temporary traffic changes and congestion arising from the presence of construction works. Construction works would affect light rail stops at Leichhardt North (Darley Road) and Rozelle Bay (The Crescent). In both cases, access to light rail stops would be retained at all times, although some local diversions of pedestrian movements may be required.

Construction would have a more tangible impact on bus public transport passengers due to:

- The temporary or permanent relocation of bus stops, potentially increasing the distance bus patrons are required to walk
- Slower travel speeds due to congestion and increased intersection delays, therefore affecting commuter travel time or the potential for missed transport connections due to the delays
- Reduced reliability of bus service timetabling due to traffic congestion or detours.

The project would require temporary or permanent modifications to existing bus infrastructure around the Rozelle and Iron Cove interchange surface works, including:

- Two bus stops on The Crescent:
    - The relocation of the existing northbound bus stop at The Crescent, currently located around

150 metres north of Johnston Street (permanent)

- The relocation of the existing southbound bus stop at The Crescent, currently located around 100 metres north of Johnston Street (temporary).

· Five bus stops on Victoria Road:

- The relocation of the existing northbound bus stop on Victoria Road, currently located around 20 metres south of Lilyfield Road (temporary)
- The relocation of the existing northbound bus stop on Victoria Road, currently located between Lilyfield Road and Hornsey Street (temporary)
- The relocation of the existing southbound bus stop on Victoria Road, currently located around 100 metres south of Robert Street (temporary)
- The relocation of the existing westbound bus stop on Victoria Road, currently located between Toelle Street and Clubb Street (temporary)
- The relocation of the existing eastbound bus stop on Victoria Road, currently located between Terry Street and Crystal Lane (temporary).

This would result in some pedestrians being required to walk slightly further to bus stops, however the extra distance is minor (less than 200 metres) and would be manageable for most people. Where bus stops are relocated, pedestrian access, including disabled facilities, would be maintained.

Upon operation, bus stops would be reinstated generally in the same location as existing. The northbound bus stop on The Crescent would be permanently moved to the south to allow for the realignment. This would have no discernible change from the baseline condition.

Bus services near construction compounds and project-related road works may experience a reduction in passenger amenity while waiting for buses. Noise walls and construction hoarding around sites should assist in mitigating this issue. As commuters also spend a relatively small amount of time waiting for transport services, it is likely that patrons would be able to tolerate and adapt to the change.

Effects on bus travel times due to traffic congestion may affect the following routes:

· Routes travelling along Victoria Road south and north bound

· Route 433 that travels along The Crescent

· Route 438 and 439 that travel along Ramsay Street

· Routes 461 with a north and south bound bus stop on Parramatta Road near Wattle Street, Haberfield (Stop ID 204512 and ID 213132)

· Routes travelling eastbound along Parramatta Road (413, 436, 438, 439, 440, 461, 480, 483, L38, L39 and M10) using the stop on Parramatta Road at Mallett Street (Stop ID 203835).

There are no planned road closures along any existing bus routes, however some traffic lane closures and speed limit restrictions would be required, which may affect the efficiency and potentially reliability of bus services.

Based on the above, impacts upon bus routes would likely be temporary and confined to specific bus routes, with impacts managed and mitigated where possible through the CTAMP. Any changes to bus stops and bus services would be undertaken in consultation with Transport for NSW and the bus service provider, with relevant information being communicated to bus users.

Overall, the effect of construction on the public transport network would be medium term at a suburb extent. The severity of impact on the baseline condition would be small and the consequence of construction effects would be slight, with a likelihood of possible. As such, the overall significance of impact on the socio-economic environment would be minor negative.

7.1.4 Pedestrian and cyclist network

The construction of the project requires some existing pedestrian footways and cycling paths to be closed or diverted, has the potential to affect travel duration, movement patterns and accessibility. As detailed in **Appendix H** (Technical working paper: Traffic and transport) of the EIS, a key objective of the construction program would be to minimise disruption to pedestrian and cyclists and to maintain network efficiency by transferring from the existing infrastructure to final infrastructure as soon as possible.

Section 5.5.2 of the existing environment chapter, highlights a number of existing strategic links for cyclists and pedestrians in and around the project. Construction of the project would slightly alter or require diversion to some of these strategic links, including:

- The Bay Run
- Shared paths along Victoria Road
- Victoria Road pedestrian and cyclist overpass
- The cyclist and shared pathways along Lilyfield Road
- City West Link overpass near Victoria Road.

These links were identified during consultation as being important commuter links. These temporary alterations may affect connectivity, local amenity (see **section 7.2**) and community values (see **section 7.3**).

Table 7-1 identifies the proposed alterations to the pedestrian and cyclist environment during construction. To maintain connectivity, all necessary diversions would be in place prior to the removal of existing linkages (including overpass). Figures of the pedestrian and cyclist diversions may be found in **Appendix H** (Technical working paper: Traffic and transport) of the EIS.

Table 7-1 Alterations to the pedestrian and cyclist network

Construction compound	Construction duration	Alterations	Impact
Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Northcote Street civil site (C3a)	Medium term (4 years)	· Increased interactions between construction vehicles and pedestrians using footpaths, particularly along Parramatta Road near the Northcote Street civil site (C3a) and along Walker Avenue at Haberfield · Temporary closure of a section of footpaths on both sides of Northcote Street at Haberfield during construction. This would be a continuation of the current closure of these sections of footpaths along Northcote Street to facilitate construction of the M4 East project. Alternative access to Parramatta Road would be provided via Ash Lane and either Wolseley Street or Wattle Street at Haberfield · No diversions would be required.	Reduced safety and amenity
Parramatta Road West civil and tunnel site (C1b), Haberfield civil site (C2b), Parramatta Road East civil site (C3b)	Medium term (4 years)	· Increased interactions between construction vehicles and pedestrians and cyclists along Alt Street near the Parramatta Road West civil and tunnel (C1b) and Bland Street near the Parramatta Road East civil site (C3b) · Periodic, short-term closures of footpaths on both sides of Alt Street on the eastern and western sides of Parramatta Road. These would be most likely to occur during site establishment, when access to these sites is being established. Where a footpath is temporarily closed, the	Reduced safety and amenity

Construction compound	Construction duration	Alterations	Impact
		corresponding footpath on the other side of the road would remain open.	
Darley Road civil and tunnel site (C4)	Medium term (4 years)	· Temporary closure of the footpath on the northern side of Darley Road at Leichhardt, between around Canal Road and Darley Road, may be required. This would be most likely to occur during site establishment works · The footpath along the southern side of Darley Road would remain open at all times, and would act as an alternative to the northern footpath during temporary closures · There is an on-road cycle route on Darley Road at Leichhardt that connects to the Lilyfield Road commuter route via City West Link/James Street intersection. No diversions would be required. · Traffic management measures would be implemented at the entry and exit driveways to manage potential interactions between construction traffic and pedestrians and cyclists · The project would not affect the existing pedestrian path that runs along the southern side of City West Link and connects the Leichhardt North light rail stop with Charles Street at Lilyfield (via the bridge over City West Link) · Increased interactions are likely between construction vehicles and pedestrians using the northern footpath along Darley Road between Charles Street and City West Link and cyclists using the on-road cycle route along Darley Road.	Reduced safety and amenity
Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7)	Medium term (4 years)	Victoria Road and Lilyfield Road to Anzac Bridge (east-west): · The existing connection between the eastern side of Victoria Road and Anzac Bridge would be maintained during construction. This connection may be temporarily realigned · Periodic closures of the footpath on the southern side of Lilyfield Road between around Lamb Street at Lilyfield and Victoria Road at Rozelle. The footpath along the northern side of Lilyfield Road would not be affected by the project · The Victoria Road pedestrian and cycle bridge would be removed, with alternative routes established before closure of the bridge · Connections between the Anzac Bridge and the western side of Victoria Road would be provided via an underpass below Victoria Road and into the Rozelle Rail Yards. A ramp would connect the Rozelle Rail Yards with the western side of Victoria Road and Lilyfield Road · Periodic, short-term closures of the shared path on the eastern and western side of Victoria Road may be required. Where this is the case, the shared path on one side of the road would be maintained.	Diversions

Construction compound	Construction duration	Alterations	Impact
		Victoria Road to The Crescent (north-south): · Pedestrian and cycle bridge spanning City West Link to be removed, with alternative routes established before closure of the bridge · The existing at-grade connection between the western side of Victoria Road and The Crescent would be retained with a ramp connecting up to Lilyfield Road and Victoria Road · The Anzac Bridge to Somerville Road to James Craig Road connection would be retained.	Diversions Reduced safety
		The Crescent and Bayview Crescent: · Pedestrian and cyclist access around Rozelle Bay would be retained with only minor alterations · Periodic, temporary closures of the footpath on the eastern and western side of The Crescent at Annandale between City West Link and Johnston Street during construction. Works would be staged so that one of the shared paths on either side of The Crescent would remain open at all times · At-grade, signalised crossing of The Crescent at the intersection with City West Link would be retained during construction · A temporary connection between Rozelle Bay and the Rozelle Bay light rail stop would be provided for pedestrians · Connections between Whites Creek shared path and Rozelle Bay (through Buruwan Park) to be diverted via Bayview Crescent and Johnston Street, crossing at The Crescent/Johnston Street existing intersection.	Increased travel distance and difficulty
Iron Cove Link civil site (C8)	Medium-long term (5 years)	Victoria Road (southern side): · Temporary closure of shared path between Springside Street and Byrnes Street · Pedestrians and cyclists temporarily diverted via Byrnes, Manning, Callan, McCleer and Springside streets (additional 400m diversion) · Connection to the Bay Run and Iron Cove Bridge (westbound) altered but retained. Victoria Road (northern side): · Shared path on northern side of Victoria Road maintained · Connection to the Bay Run and Iron Cove Bridge (westbound) retained.	Increased travel distance and difficulty
Pyrmont Bridge Road tunnel site (C9)	Medium term (4 years)	· No requirement for diversions · Increased construction vehicle interactions for pedestrians using the northern footpath along Parramatta Road and southern footpath along Pyrmont Bridge Road.	Reduced safety

Construction compound	Construction duration	Alterations	Impact
Campbell Road civil and tunnel site (C10)	Medium-long term (5 years)	· Delivery of the New M5 project would include construction of a separated cycle path along Campbell Road (by 2020) · Increased interactions between construction vehicles and pedestrians and cyclists using shared path on the southern side of Campbell Road. Interactions would be minimised due to signalised intersection being provided as part of New M5 project.	Reduced safety

The majority of diversions, listed in **Table 7-1,** do not result in significant changes from the existing pedestrian and cyclist network connections. There are two instances where the alternative active transport route would result in increased travel distance or difficulty for users. The proposed diversion on the southern side of Victoria Road at Iron Cove Link civil site (C8) and the proposed diversion between Whites Creek and Rozelle Bay via Johnston Street. These would both extend the travel distance and require users to navigate more difficult terrain than the existing routes. This may present difficulties for less capable cyclists or pedestrians with reduced mobility.

The introduction of temporary signalised crossings, delays due to construction vehicles entering and exiting sites or extended travel routes may temporarily increase pedestrian wait times and journey to work times for active transport commuters.

As identified in **Table 7-1**, the amenity, safety and subsequent user experience of pedestrian and cyclist routes around construction sites would likely be temporarily affected due to the introduction of construction activities, heavy vehicles and construction traffic into the local environment. This has the potential to result in:

- An increase in the amount of uneven surfaces (due to cracks and pot-holes in the existing roads and pavements from construction vehicles or activities) or construction debris (nails, soil runoff etc.) on pedestrian and cyclist routes, which may increase trip hazards and injuries, travel times (if tyre punctures occur) or reduce the appeal of the route
- Reduced local amenity due to construction activities producing noise and dust
- Reduced surveillance and sightlines, increased potential for entrapment spaces and increased instances of anti-social behaviour (eg graffiti) due to construction hoarding and facilities
- Increased pedestrian/cyclist conflicts with vehicles.

While the opportunity to walk or cycle in the study area would be maintained, the alterations and changes may detract from the experience of the pedestrian and cyclist environment and potentially deter people from enjoying an active lifestyle or feeling connected with their community. Depending on the length and terrain of alternate routes, some people may elect to take a shorter, less safe option (eg on active public roads), rather than detouring along a recommended detour route.

As identified in the existing environment **section 5.5.2**, eight per cent of the population across the study area currently walk to work and three per cent cycle. Any alterations to commuter-oriented networks would therefore affect the commute efficiency and connectivity for over a tenth of the population living in the study area and others that pass through the study area on their daily commute.

Changes would also affect popular recreational pedestrian and cyclist paths in Rozelle and Glebe such as the Bay Run and the Glebe Foreshore walk. These paths are heavily used by both locals and visitors from outside these suburbs. The potential impacts are only minor with access maintained throughout the construction period.

A CTAMP would be prepared as part of the Construction Environmental Management Plan (CEMP). This plan would aim to reduce the extent of impacts outlined and identify and refine safe routes for pedestrians and cyclists during construction. It is recommended that this plan incorporate:

- Specifications around the standards of pedestrian and cyclist environments (around construction sites and on alternate routes) that include provisions around lighting, surveillance, safe accesses

near construction compounds, graffiti management, avoidance of entrapment spaces, good sightlines and other crime prevention through environmental design elements

- At regular stages of construction, roads, footpaths, shared pathways as directly affected by the project would be subject to 'make good' provisions, particularly in the case of changes that affect public safety
- Provisions to ensure pathways are maintained in good condition and are clear of debris
- Provisions that encourage the maintenance of access for all levels of mobility, as far as practical
- Information regarding alternative travel routes including the difficulty of terrain, the additional distances and the duration of time detours would be in place
- Construction signage clearly identifying the detour route, its intended duration and location of alternative crossing if applicable.

Overall, construction of the project would directly affect the pedestrian and cyclist environment. The impacts would affect pedestrian and cyclist network users across the LGA. Changes would be medium term and reflect a small change to the existing baseline environment. The consequence of the impact would be slight, with a high likelihood of these effects occurring. As such, the overall impact on the socio-economic environment would be minor negative.

7.2 Local amenity

Amenity has its meaning of pleasantness, but also has a physical (or tangible) component. This includes the character and appearance of buildings, proximity to commercial or recreational facilities, quality of infrastructure and absence of noise, unsightliness or offensive odours. It also has a psychological or social component[34].

Changes to local amenity may affect the ability of a resident, a visitor or the community to enjoy or undertake activities (eg hanging washing outdoors, opening windows, enjoying walks) within their residential property or local area. During construction, the following may affect local amenity:

- The removal of established vegetation
- The introduction of construction facilities to the environment, affecting views
- Light spill from night-time construction works
- Noise, vibration, dust arising from construction activities
- Unpleasant odours
- Increased traffic volumes and/or congestion.

Concerns regarding impacts on local amenity were raised during community consultation. During construction, impacts on local amenity are generally contained within close proximity of construction activities and compounds. The following section details the impacts on local amenity that would affect the residents and the broader community as a result of construction.

The sensitivity of an individual resident to amenity impacts would vary depending on their physical or psychological attributes, their living situation, or how they use their place of residence or neighbouring areas. For instance, some individuals are light sleepers and may have difficulty sleeping if noise impacts occur during the evening. Alternatively, a person may work or study at home, which would expose them to a longer duration of construction impacts compared to a person that is employed elsewhere.

Construction effects on the amenity of businesses are discussed in **section 7.9** and social infrastructure in **section 7.10**.

[34] Victorian Government Solicitors Office, 2008, What is "amenity": Planning and Environmental Law, viewed on 26th June 2017, http://www.vgso.vic.gov.au/sites/default/files/publications/What%20is%20amenity.pdf

7.2.1 Noise and vibration

Noise and vibration arising from construction activities has the potential to affect local amenity. Construction activities have the potential to generate high noise levels that may affect the ability to enjoy a place, human health and wellbeing, daily routine, employee productivity, the ability to communicate and interact, and the ambience of social infrastructure and workplaces generally.

Appendix J (Technical working paper: Noise and vibration) of the EIS found that construction activities would generate an exceedance of noise levels for some nearby sensitive receivers at all construction compound locations. Construction activities may also generate vibration effects above human comfort levels in some locations.

Noise

The construction of the project would generate considerable noise, with the highest noise exceedances generally experienced at the first row of receivers (buildings) to construction sites.

Across the majority of construction areas, the highest noise level exceedances are predicted during pavement and infrastructure works, which require the use of concrete saws and/or rock breakers. These works are generally temporary (two weeks) and intermittent (only when concrete saws or rock breakers are in use). These works are likely to be required both within and outside of standard working hours. The demolition of existing buildings (24 weeks duration), utility works (24 weeks duration) and roadworks (192 weeks duration) are also likely to affect a high number of receivers. The operation of laydown areas across the study area are expected to generate noise exceedances and potentially disrupt night-time amenity. The operation of laydown areas would extend for a longer duration (up to 132 weeks).

Daytime noise impacts

Table 7-2 outlines the maximum number of receivers that may be affected during any day-time construction activity as a worst-case scenario. These figures are indicative only and are based on the current design which would be further refined during the detailed design stage. The noise modelling does consider the implementation of standard mitigation measures including scheduling of activities during normal working hours, acoustic sheds, noise walls and planned construction traffic movements. Where the exceedance is greater than 11 dBA, some community reaction to noise may be expected. It must be noted that the most noise intensive construction works that result in the greatest number of exceedances at receivers are anticipated to be relatively short term (around two weeks).

Table 7-2 Maximum number of receivers that may be affected by daytime construction noise impacts

Construction site	Number of receivers		
	Highly noise affected[35] (residential receivers >75 dBA)	Daytime (>11 dBA exceedance – all receivers)	Daytime (out of hours) (>11 dBA exceedance – all receivers)
Haberfield Option A (C1a, C2a, C3a)	5	13	24
Haberfield Option B (C1b, C2b, C3b)	13	49	72
Darley Road (C4)	36	59	101
Rozelle (C5)	29	40	16
The Crescent (C6)	0	6	0
Victoria Road (C7)	20	29	0
Iron Cove Link (C8)	53	91	97
Pyrmont Bridge Road (C9)	6	18	19

[35] *Based on ICNG definition (ie predicted $L_{Aeq(15minute)}$ noise at residential receiver is 75 dBA or greater).*

Construction site	Number of receivers		
	Highly noise affected[35] (residential receivers >75 dBA)	Daytime (>11 dBA exceedance – all receivers)	Daytime (out of hours) (>11 dBA exceedance – all receivers)
Campbell Road (C10)	0	0	0

The **Appendix J** (Technical working paper: Noise and vibration) of the EIS does however identify 177 properties that would be highly noise affected during day-time construction and would require additional treatments to minimise daytime noise impacts (based on current design). The specific location of receivers requiring further mitigation may be found in Annexure H of **Appendix J** (Technical working paper: Noise and vibration) of the EIS. Additional mitigations include ongoing notification and verification.

Social infrastructures facilities may be particularly sensitive to health and amenity impacts associated with noise exceedances eg health and aged care facilities, childcare and educational facilities, places of worship and active and passive open space. During the worst case construction activities (ie during high noise generating activities) the following facilities are anticipated to experience noise exceedances:

- Place of worship - Kingdom Hall of Jehovah's Witnesses at 12 Wattle St, Haberfield
- Childcare - The Infants Home at 17 Henry St, Haberfield
- Education facility - Yasmar training facility at 185 Parramatta Rd, Haberfield
- Childcare - Chaya's Family Day Care at 12/111 Alt Street, Ashfield
- Childcare - Nurjahan's Family Day Care at 12a/115 Alt Street, Ashfield
- Childcare - Explore and Develop at 372 Norton Street, Lilyfield
- Childcare - Billy Kids learning at 64 Charles St, Lilyfield
- Childcare - Rosebud Cottage Child Care Centre at 5 Quirk Street, Rozelle
- Recreation Easton Park Playground, Lilyfield Road, Rozelle
- Rozelle Public School at 663 Darling St, Rozelle.

Appendix J (Technical working paper: Noise and vibration) of the EIS identifies a number of additional mitigation measures to be implemented that would reduce noise impacts on receivers as well as the number of potentially highly affected properties. These include increasing the height of site hoarding, upgrading the acoustic shed performance and limiting the total sound power level of equipment operating within the acoustic sheds to 110 dBA. With implementation of these additional measures, the extent of impact on daytime receivers (outlined in **Table 7-2**) would be reduced, with the majority of receivers experiencing very low or no noise impacts during daytime activities.

Where noise effects cannot be mitigated there is the potential for adverse impacts upon the socio-economic environment. Noise impacts may also affect the way people utilise space, their ability to communicate and the way individuals undertake daily activities. This includes heightened annoyance, stress and sleep disturbance. This would be particularly felt by people that work from home, shift workers, the elderly or households with young children that are more dependent on quieter environments to work, rest and relax. As identified in **section 5.1**, health care and social assistance was one of the top three resident employment industries across all precincts. This industry generally employs a large proportion of their workforce under shift work arrangements. Considering this, there is a high chance of the study area containing a higher numbers of shift workers that rely on a quieter environment during the day to rest and recuperate.

To assist in reducing the cumulative effect of utility works and project works, it is proposed that a Utility Co-ordination Committee be established to ensure better planning and co-ordination of utility works. This would include coordination between different works being undertaken as part of the M4-M5 Link project as well as those associated with other projects.

Although intermittent, the duration of impact would be medium term concentrated at a locality level. The severity of impact would be a medium alteration from the baseline conditions; considering

existing surrounding daytime urban noise levels. The severity of impact would however dissipate the further the receiver is from the site. The likelihood of impact to receivers in the immediate locality would be near certain. The likelihood of impact would also reduce the further the receiver is from the site. With consideration of all of these factors, the overall significance of impact on the day-time socio-economic environment would be minor negative.

Night-time noise impacts

High levels of construction noise at night may interrupt sleep patterns with consequential impacts upon health and well-being. As identified in **Appendix K** (Technical working paper: Human health risk assessment) of the EIS, ongoing sleep disturbance may affect an individual's creativity, performance, memory, concentration, risk-taking behaviour and risk of accidents. This may have secondary effects on the socio-economic environment such as a reduction in employee productivity (affecting business operation and revenue) and student performance at school.

The severity of noise level exceedance varies across the study area, depending on proximity to construction sites and associated noise levels. As background noise levels are lower during night-time periods, the potential impact of construction activity on the amenity of night-time environments may be greater.

Table 7-3 outlines the maximum number of receivers that may be affected during night-time construction activity as a worst-case scenario, without additional mitigation. These figures are indicative only and are based on the current design which would be further refined during the detailed design stage. The noise modelling undertaken for the project does consider the implementation of standard mitigation measures including scheduling of activities during normal working hours, acoustic sheds, noise walls and planned traffic movement. It must be noted that the most noise intensive night-time construction works, including pavement and infrastructure works, line marking and utility adjustments generate the greatest number of exceedances (as reflected in the below table), however these are anticipated to be of short duration (around two weeks).

Table 7-3 Maximum number of receivers that may be affected by night-time construction noise impacts

Construction site	Number of receivers			
	Highly noise affected residential receivers	Evening (>11 dBA exceedance – all receivers)	Night-time (>11 dBA exceedance – all receivers)	Potential sleep disturbance (>11 dBA exceedance)
Haberfield Option A (C1a, C2a, C3a)	5	29	162	148
Haberfield Option B (C1b, C2b, C3b)	7	72	214	177
Darley Road (C4)	36	159	382	371
Rozelle (C5)	0	28	265	602
The Crescent (C6)	0	0	14	3
Victoria Road (C7)	0	0	0	0
Iron Cove (C8)	22	146	253	238
Pyrmont Bridge Road (C9)	4	14	26	60
Campbell Road (C10)	0	0	1	0

Night-time amenity would be affected by several proposed construction activities. As defined in the **Appendix J** (Technical working paper: Noise and vibration) of the EIS, the Noise Catchment Areas (NCA) that are subject to the greatest impacts during night-time construction works and require additional mitigation treatments include those:

- Adjoining the Haberfield construction site in NCA03 to the north (along Wattle Street to the east of Ash Lane) and NCA06 to the south (along Walker Ave to the south) and opposite the construction site in NCA01 (near Page Ave and Earle Ave)
- Adjoining the Darley Road construction site in NCA09 to the north (including the southern end of Hubert Street and Francis Street in Lilyfield) and NCA13 to the south (including the northern end of Charles Street, North Street, Hubert Street, Francis Street and James Street)

- Adjoining the Rozelle construction site west of The Crescent in NCA21 (along Bayview Crescent and Railway Parade), north of the construction site in proximity to Victoria Road in NCA25 and NCA29 (including sections of Lilyfield Road, Hornsey Street, Quirk Street and Robert Street) and to the south of the construction site near White Creek in NCA20
- Adjoining the Iron Cove Link construction site north and south of Victoria Road in NCA33, NCA34 and NCA36
- Adjoining and opposite the Pyrmont Bridge construction site in NCA41 (north along Pyrmont Bridge Road), NCA44 (along Layton Street) and in NCA42 between Denison Street and Australia Street.

Mitigation measures would need to be tailored to each household's individual situation, with suitable mitigation measures being developed in collaboration with each during detailed design and project construction. A suitably qualified and experienced acoustic advisor would monitor activities and make recommendations to avoid or minimise the extent of impacts.

Noise impacts upon specific social infrastructure and business receivers are discussed in **section 7.10**.

The primarily residential areas around the Haberfield, Darley Road, Rozelle and Iron Cove Link construction sites are expected to be the most affected by high night-time noise exceedance impacts. For front row receivers, immediately adjoining or adjacent construction sites, night-time noise exceedances would be near certain, however the potential severity of impact would recede moving away from the construction site.

Although intermittent, the duration of impact would be medium-long term concentrated at a locality level. The severity of impact would be a large alteration to the baseline conditions. The consequence and likelihood of impact on receivers in the locality would be significant and near certain. The likelihood and consequence of impact would however dissipate to moderate and possible the further the receiver is from the site. With consideration of all of these factors, the overall impact on the socio-economic environment would be moderate negative.

Ground borne noise impacts

As the project involves tunnelling, ground-borne noise impacts may be experienced during construction. Ground borne noise is only likely to be an issue where tunnelling occurs at depths of less than 30 metres below ground. Across the majority of the alignment, the tunnel depths are in excess of 30 metres. The areas less than 30 metres in depth occur where the tunnels are approaching the surface at:

- Wattle St, Haberfield near Martin and Waratah streets
- Rozelle, near Lamb, Justin, Alfred, Burt and Denison streets and Lilyfield Road
- Rozelle near Callan, Springside and Moodie streets
- St Peters, near Crown Street.

Considering the roadheader works would be progressing at a rate of around 20 metres per week, it is anticipated that ground-borne noise impacts would only be experienced for a short duration at any one location. Roadheader technology, compared to tunnel boring machines, generates less ground borne noise and vibration. Tunnelling works would however occur 24 hours a day, seven days a week with worst-case predictions primarily affecting residential receivers.

Appendix J (Technical working paper: Noise and vibration) of the EIS indicated that without mitigation, potential noise exceedances would occur at up to 456 residential properties. NCA24 to the north of the Rozelle construction site and east of Victoria Road is predicted to experience the greatest number of ground-borne noise exceedances (159 receivers). One social infrastructure sensitive receiver is located in this noise catchment and two in NCA42. No commercial receivers are anticipated to be affected by ground-borne noise exceedances.

Similar to airborne noise effects, ground-borne noise impacts may affect the amenity of an environment and reduce the capacity to enjoy a space, concentrate, sleep or communicate. This may elevate stress levels and lead to sleep disturbance and reduced productivity.

The following mitigation measures would be considered where feasible and reasonable:

- Validation of predicted ground-borne noise levels (note that this may not be required where the ground-borne noise impacts would last less than three weeks at any one sensitive receiver and should be confirmed at a later design stage)
- Notification letterbox drops to receivers in the area around the works location, detailing work activities, time periods over which these would occur, impacts and mitigation measures
- Specific notifications provided to receivers where the ground-borne noise levels are predicted to exceed the night-time thresholds.

Although tunnel activities would be medium-long term, the duration of impact at any one receiver would be short term. The severity of impact would be a small alteration to the baseline conditions. The likelihood of impact to would be possible and the consequence of impact slight. With consideration of all of these factors, the overall impact on the socio-economic environment would be minor negative.

Construction traffic noise impacts

Construction traffic also has the capacity to result in noise impacts on local amenity. In most cases, construction traffic is unlikely to significantly increase due to the relatively high existing traffic volumes on roads.

The presence of construction traffic would last for a medium-long duration, would affect an LGA extent, however would have no discernible change to the baseline noise condition. The consequence of construction noise is neutral, with a low likelihood of occurrence. As such, the significance of construction traffic noise on the socio-economic environment is negligible.

Airborne noise impact summary

Overall, the presence of construction noise would result in a medium change from the existing environment. These impacts would generally respond to management and mitigation measures. The incorporation of noise barriers, acoustic sheds and other standard and additional mitigation measures would assist in alleviating the extent of impact on local amenity and the socio-economic environment.

Assuming the suggested additional mitigation measures outlined in **Appendix J** (Technical working paper: Noise and vibration) of the EIS are implemented, the severity of impacts on receivers would be reduced. The implementation of the Community Communication Strategy that continues to inform and notify residents and businesses about potential noise exceedances and the anticipated duration of these activities is recommended. This would assist in reducing annoyance, anxiety and stress regarding the noise exceedances, as individuals would feel more informed and know that the impact has an end date.

Noise effects on local amenity would be intermittent in nature however would extend for a medium-long duration. The severity of impact on individual receivers would vary depending on their proximity from the construction sites. The severity of impact would be significant and highly likely at a locality level resulting in a large alteration to the baseline conditions. The likelihood and consequence of impact would however dissipate the further the receiver is from the construction site. With consideration of these factors, the overall impact on the socio-economic environment would be moderate negative.

Vibration

Surface work construction activities such as bored piling, jackhammering, rock-breaking and work associated with tunnelling have the potential to generate vibration. **Appendix J** (Technical working paper: Noise and vibration) of the EIS) measures the impacts of vibration against two criteria, cosmetic damage and human comfort.

Cosmetic damage

The operation of large rock-breakers has the potential to generate some of the most substantial construction vibration impacts. Generally, the separation distances between the proposed works and the nearest receiver(s) would be sufficient to prevent cosmetic damage, though in some circumstances there may be instances where vibration-generating construction activities are required to be undertaken within the minimum working distance where cosmetic building damage may occur.

The assessment identified that up to 229 buildings in the vicinity of works may be within the minimum working distance of vibration intensive equipment under these scenarios.

Households, businesses and social infrastructure providers that are identified as being within the minimum working distance for potential cosmetic damage may experience heightened levels of stress and anxiety during construction activities. This may be caused through the uncertainty of duration for impacts and concern for their properties. Property owners potentially affected by tunnelling activities (within an identified distance to tunnelling alignment) would be offered pre and post condition surveys. If any cosmetic damage did arise due to construction activities, the contractor would need to assess and 'make good' any damage.

Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS determined that 25 heritage listed items have been identified as having the potential to be within the minimum safe working distances should a large rock-breaker be used at the outer extents of the project footprint. Potential vibration impacts on heritage items would be managed in accordance with the recommendations of **Appendix J** (Technical working paper: Noise and vibration) of the EIS. As the conservation and protection of heritage items is a value held highly by the community, any cosmetic damage to these items would be a concern. A suitably qualified and experienced acoustic and vibration advisor would be engaged during the construction period to monitor vibration and ensure management measures are effectively applied.

Cosmetic damage vibration effects would be confined to localities, would be intermittent and would be short term. During worst-case situations, the change from the baseline condition would be large. The likelihood of the worst case situation occurring would be low. The consequence of socio-economic effects would be moderate. With consideration of these factors, the overall impact on the socio-economic environment would be minor negative.

Human comfort

As identified in **Appendix J** (Technical working paper: Noise and vibration) of the EIS, people may observe vibration levels well before those likely to cause damage to building contents or affect the structural integrity of buildings. These vibrations would affect human comfort with people potentially inconvenienced or possibly disturbed by the vibrations. This may elevate a person's stress and anxiety levels. These vibration effects may also effect businesses, particularly those that require concentration or precision operations such as optometrists, medical equipment (eg x-rays), or fine detail machinery (eg laser printers).

Across the study area, 676 receivers would fall within the nominated minimum working distance for human comfort vibration. This is, however, a worst-case scenario and it is unlikely that all receivers would be affected by human comfort vibration impacts with the proposed mitigation and management measures in place.

Impacts upon human comfort would be intermittent across the duration of the project and would only occur over short periods (generally up to one week at any one location). The effects on the socio-economic environment of disturbances to human comfort level are likely, however would be small and confined to receivers in the locality. Although vibrations effects may cause annoyances and in some instances human discomfort, the consequence on the socio-economic environment would be slight. With consideration of these factors, the overall impact on the socio-economic environment would be minor negative.

Vibration summary

Vibration impacts are likely to respond well to mitigation measure proposed in the EIS. These would include the implementation of a Construction Noise and Vibration Management Plan (CNVMP) and ongoing consultation with the community as part of the Community Communication Strategy.

Although a large number of people may experience vibration, the implementation of mitigation measures would reduce the likelihood of cosmetic damage effects. The roadheader also moves through the tunnel at a rate of 20 to 25 metres per week, so the potential effects on individual receivers would be short-term.

Vibration effects on local amenity would be intermittent in nature and short-term at any particularly receiver. The severity of impact on individual receivers would vary depending on the proximity from

the vibration source. The severity of impact would be a medium change from the baseline condition. The likelihood of effect would be possible at a locality level resulting in a moderate consequence. The likelihood and consequence of impact would however dissipate the further the receiver is from the construction site. With consideration of these factors, the overall impact on the socio-economic environment would be minor negative.

7.2.2 Changes to visual amenity

Visual amenity may be described as the pleasantness of the view or outlook of an identified receptor or group of receptors (eg residences, recreational users). Visual amenity is an important part of an area's character and offers a wide variety of benefits to the community in terms of quality of life, wellbeing and economic activity.

During construction, visual amenity throughout the study area has the potential to be affected by factors such as the removal of established vegetation, the installation of construction hoardings, installation of acoustic sheds, construction equipment and/or the visual appearance of construction sites. Other factors may include the alteration of view corridors to heritage items or places, open space, water bodies or the city skyline. **Appendix O** (Technical working paper: Landscape and visual impact) of the EIS provides an assessment of the visual impacts associated with the construction of the project.

During construction, extended disturbances to visual amenity may affect the enjoyment of an environment, business revenue (**section 7.9**) and human health and the well-being of individuals (**section 7.4.2**). The sensitivity of receptors to visual changes and the overall variance in the receiver's outlook is also relevant in determining the significance of impacts. In some instances, residential views or in other instances, privacy is affected due to the removal of vegetation. **Appendix O** (Technical working paper: Landscape and visual impact) of the EIS assessed the magnitude of these changes and has deemed the overall landscape character and visual impact of the whole project during construction to be moderate to high.

Changes to visual amenity during construction of the project, would be expected to affect the socio-economic environment. The level of impact may alter the way people use space, the value of a property or its subsequent rental return or the appeal and function of businesses or social infrastructure.

Residents likely to experience substantial visual impacts are those that have views of the construction sites, acoustic sheds and ancillary construction infrastructure from internal and external living spaces. Residential properties expected to experience visual impacts include residents along:

- Northcote Street, Wattle Street, Walker Avenue and Ramsay Street, Haberfield – visual impacts from construction infrastructure (Option A). There are already construction sites for the M4 East at this location. Although the visual impacts would not substantially change from the existing use as a construction site, the ongoing use of these sites introduces construction fatigue risks with these residential properties likely to be more sensitive to ongoing impacts
- Alt Street, Bland Street and Parramatta Road, Haberfield – visual impacts from construction infrastructure (acoustic shed), loss of solar access to a number of adjoining residential properties and the removal of two rows of trees (Option B). These impacts would only occur if the Option B outcome progresses instead of Option A. There is also an existing construction site adjoining this location with the capacity to introduce construction fatigue risks
- Darley Road, Charles Street, Hubert Street (south of Darley Road), Francis Street (south of Darley Road) and James Street, Leichhardt – visual impacts from construction infrastructure, machinery and equipment and the increase in construction traffic using Darley Road and the construction of the motorway operations complex
- Foucart Street and Cecily Street, Rozelle – visual impacts from the removal of trees along sections of Lilyfield Road resulting in direct views to the construction fencing and hoarding and larger elements of the construction site such as the acoustic shed and ventilation facilities
- Lilyfield Road near Denison Street, Rozelle - visual impacts from the removal of the majority of mature trees on Lilyfield Road (adjoining the norther boundary of the Rozelle civil and tunnel site (C5)), which would provide direct views to fencing and hoarding, and larger elements of the

construction site. Some residences may experience an alteration of views out across the city due to the installation of the acoustic shed, construction machinery and equipment and ventilation facility

- Bayview Crescent and Johnston Street, Annandale - visual impacts from the removal of some mature trees within the project footprint and the construction of the pedestrian bridge, which would result in some residences experiencing a permanent alteration in views to Rozelle Bay
- Hornsey Street and Quirk Street, Rozelle – the existing commercial building with shop top housing would be demolished and replaced with temporary site offices, laydown areas, car parking, fencing and hoarding. Neighbouring properties would have both direct and extensive views to the Victoria Road civil site (C7)
- Callan, Springside, Toelle and Clubb streets, Rozelle - visual impacts from the demolition of existing buildings along Victoria Road which would expose a number of residential properties to both Victoria Road and construction elements including temporary noise barriers and hoarding, construction machinery and equipment, and the construction of the portals, ventilation facility and substation
- Pyrmont Bridge Road, Annandale – visibility of the construction site, ancillary works and construction traffic would be high for residents within close proximity. Residents adjoining or adjacent to the site would have views of the noise walls, acoustic shed, fences and hoardings
- Booth and Mallett streets, Annandale – two 15-storey apartment buildings are located near the construction site on the northern and southern sides of the intersection of Booth and Mallett streets. Both buildings have balconies and windows that overlook the site with direct views of construction infrastructure, noise walls, acoustic shed, fences and hoardings
- Campbell Road, St Peters – residential properties at the eastern end of Campbell Road would have visibility to fencing/hoarding and large construction elements including the acoustic shed and ventilation facility and associated infrastructure. Although residents already overlook the New M5 construction site and the visual impacts would not substantially change from the existing environment, the ongoing use of these sites introduces construction fatigue risks with these residential properties likely to be more sensitive to ongoing impacts
- Barwon Park Road and Campbell Street, St Peters – residents would have visual impacts from views of an acoustic shed, ventilation facility and associated infrastructure. Although residents already overlook the New M5 construction site and the visual impacts would not substantially change from the existing environment, the ongoing use of these sites introduces construction fatigue risks with these residential properties likely to be more sensitive to ongoing impacts.

These impacts would affect the appeal of external and internal living spaces and reduce the overall amenity of an environment. Residential properties that have the amenity of their living and entertaining spaces reduced may be less inclined to entertain or interact with other household members as the appeal or privacy has declined. The removal of trees and the introduction of construction sites would reduce the privacy of some properties and reduce screening of construction activities. The introduction of temporary or permanent infrastructure may also affect the value of the property or the ability for the property to be rented, without a rent reduction, during the construction period. This would have both financial and social consequences on households.

The pedestrian and social infrastructure environments are also expected to be affected by visual impacts associated with the project. High (or high-moderate) visual impacts have the potential to reduce both the amenity and perceived safety of an area and may result in people avoiding open spaces or pedestrian footpaths. This could influence the amount of time people spend outdoors exercising or enjoying public spaces and may trigger a reduction in community cohesion and social interaction. Areas expected to experience high or high-moderate visual impacts include the following:

- Large areas of Easton Park which would have unimpeded views of the construction site including the construction hoardings and other facilities that extend above the hoardings
- Glebe Foreshore Parklands, where views would be altered by construction works extending around the western end of Rozelle Bay from The Crescent to Anzac Bridge.

The effects on business from changes to visual amenity would be dependent upon on the nature of the business and its dependency on amenity and aesthetics. For example, pleasant views and vistas

may attract customers to a restaurant, however a smash repairs is unlikely to be effected by view alterations. As such, the impact on business revenue would vary. Business impacts are discussed in more detail in **section 7.9**.

Night-time construction works are likely to affect residential amenity. In particular, residential areas around the tunnelling sites are likely to experience high or high-moderate night-time visual impacts. This includes construction lighting impacts due to the operation of the construction sites for 24 hours a day. Although lighting would be designed to minimise light spill, residual impacts upon local amenity and sleep disturbance may occur.

Some visual impacts likely to occur during construction are less likely to respond to mitigation measures. This would include some long-term impacts such as the removal of mature vegetation. This would result in inevitable adverse impacts upon the overall visual amenity of an area.

It is recommended that construction hoardings around project sites are of high visual quality and are used to convey key project information and expected timeframes.

Visual impacts on local amenity would be medium-long term in nature. The severity of impact on individual receivers would vary depending on the proximity from the construction site. The severity of change from the existing environment would be medium and generally confined to locality level. Construction effects would result in a moderate alteration to the baseline conditions. The likelihood of the impact occurring is possible and of a moderate consequence. With consideration of these factors, the overall impact on the socio-economic environment would be moderate negative.

7.2.3 Changes to air quality

Construction activities such as demolition, earthworks, construction and track-out activities have the capacity to increase dust, air emissions and odour. This has the potential to affect human health, reduce the amenity of an area and generate nuisance dust impacts due to the increase in dust deposition (dust soiling) potentially deterring people from using spaces, visiting businesses or enjoying residential amenity.

The dissemination of unpleasant odours is not anticipated during construction as no landfilled areas require excavation or disturbance. Any unexpected finds (eg localised contamination etc.) would be dealt with in the Construction Air Quality Management Plan in relation to odour. The anticipated impact of odour on the socio-economic environment is likely to be negligible.

An assessment of the impacts of construction traffic has been undertaken in **Appendix I** (Technical working paper: Air quality) of the EIS. The assessment determined that exhaust emissions from on-site plant and site traffic would be unlikely to have a significant impact on the local air quality and was not further assessed in the report.

Air quality from construction activities, including spoil haulage and construction traffic was identified as a significant concern during public consultation. An increase in dust as a result of the project would adversely affect human receptors and the function and operating costs of businesses. Nuisance dust generated from construction activities commonly affects dwellings through soiling. This may reduce the cleanliness of an environment and would require residents to spend more time cleaning, which are an annoyance and an additional household expense. Higher levels of dust in residential properties would also potentially heighten the incidence of allergies, asthma and other respiratory issues.

Construction dust would also affect other sensitive premises that require a cleaner and/or sterilised environment, such as food service, manufacturers and processing, electronic manufacturers, vehicle showrooms and medical practitioners. Increased dust on and around social infrastructure, particularly active recreation spaces, would also reduce the capacity of the community to enjoy the environment and/or may increase health risks for participants. This would be a particular concern for community members and visitors with respiratory and health issues such as asthma and allergies.

Appendix I (Technical working paper: Air quality) of the EIS assessed the risk of construction dust impacts, assessing the potential for construction activities to generate dust and the sensitivity of the area (proximity and number of receptors) to dust. The high-risk assessment in this appendix indicated potential impacts on sensitive receivers around:

- Compounds C1a, C2a and C3a (Options A and B) which may generate dust soiling from track-out activities
- Compounds C1b and C3b (Option B) which may generate dust from the demolition of existing buildings
- Compound C4 which may generate dust soiling and human health effects during demolition and dust soiling during track-out activities
- Compounds C5, C6 and C7 which may generate dust soiling during all construction activities and human health effects during demolition
- Compound C8 which may experience dust soiling during earthworks, the demolition of buildings and construction
- Compound C9 which may generate dust soiling from all construction activities and human health effects during demolition
- Compound C10 which may generate dust soiling from earthworks, construction and track-out.

Mitigation measures to manage dust would be incorporated into the Construction Air Quality Management Plan. On this basis, the residual impact of dust on local receptors was deemed in the air quality impact assessment to be low. As construction dust generation is influenced by weather conditions, there is a risk that nearby receptors may still experience some occasional dust soiling impacts, despite mitigation measures being in place. These would be temporary and short-lived.

Demolition of buildings has a greater capacity to trigger human health impacts due to the potential release of asbestos fibres, heavy metals, or fungal spoils during the demolition of certain buildings or objects. **Appendix I** (Technical working paper: Air quality) of the EIS, however, considers a worst-case scenario and deems that significant impacts on human health may generally be avoided or minimised through appropriate and commonly applied mitigation measures.

As construction dust impacts may generally be managed through appropriate mitigation measures, the changes in air quality as a result of the project would likely be small. There may be a higher likelihood of nuisance dust at a locality level around construction compounds on dry weather days with the wind blowing towards a receptor. Any effects would be temporary and short-lived, with the significance of impact on the socio-economic environment negligible.

7.3 Property acquisitions

The nature of direct property impacts, including details of property acquisitions, temporary occupation of land and settlement and subsidence impacts are detailed in **Chapter 12** (Land use and property) of the EIS. This section identifies the socio-economic consequence of these direct property acquisitions on residential properties, businesses and social infrastructure.

The project would predominantly be a sub-surface project, with the mainline tunnel running from Haberfield through to St Peters and the majority of the Rozelle interchange being underground. The project has been designed to minimise the need for surface property acquisition. This has been done by:

- Locating road infrastructure in tunnels
- Where possible, using areas within the footprint of the M4 East and New M5 projects for construction activities
- Where possible, using government owned land for construction and operation of the project, including land already owned by Roads and Maritime, minimising the need for property acquisition.

In order to facilitate the project, however, a number of property acquisitions are required for:

- Construction of new structures, including tunnel portals and ventilation facilities
- Construction compounds for the operation and storage of machinery, construction activity coordination and construction parking

- Widening of existing arterial roads or construction of new motorway connections.

7.3.1 Residential

Twenty-six residential properties are proposed to be acquired as part of the project. Multiple strata titles may exist within each parent lot to be acquired.

The social risks related to land acquisition for both property owners and tenants may include:

- Inaccessibility of equivalent housing at a comparable cost. If compensation does not allow property owners and tenants to access similar housing in the local area, acquisition may result in resident's relocation to other more affordable areas or incurring increased levels of debt to remain in the area.
- Relocation health risks. Relocation may be emotionally and physically taxing process. Vulnerable members of the community, including the frail, elderly, people with a disability or poor health and those with low English language skills may be most at risk of stress and in need of support when relocation.
- Altered access to social infrastructure. If acquisition results in households needing to move to other areas, this may affect continuing access to social services, family and local social networks.

As identified in **section 5.1.2**, the proposed residential acquisitions are not within areas that are considered socially disadvantaged. These areas also have a low proportion of persons needing assistance (1.2 per cent). Fifteen per cent of the population across the precinct are however children, with acquisition potentially requiring children to move schools if families cannot relocate into the same school catchment.

These impacts may be reduced and/or managed through the application of a process of consultation and compensation that is designed to be equitable to existing property owners. As stated in **Chapter 12** (Land use and property) of the EIS.

All acquisition required for the project would be undertaken in accordance with *the Land Acquisition (Just Terms Compensation) Act 1991* (NSW), the *Land Acquisition Information Guide* (NSW Government 2014) and the land acquisition reforms announced by the NSW Government in 2016[36].

Overall, the number of acquisitions proposed to facilitate the project is relatively low for an infrastructure project of this scale. The impact upon individual residents would be major, however somewhat mitigated by the implementation of a detailed consultation and advice process, as per the abovementioned NSW property acquisition reforms. Residential property acquisitions are generally determined early in the process with property owners and tenants notified at this stage. Affected households are offered support during the acquisition process and are normally re-established in their new homes within the short-medium term.

Considering this, acquisitions would result in a short-medium term change to the existing baseline environment. The severity of change to the overall environment is medium and confined to a locality. The likelihood of these effects occurring is high, with a moderate consequence. Considering this, the overall impact of construction activities on the socio-economic environment is a moderate negative.

7.3.2 Businesses

Businesses have specific and individual needs, including but not limited to the location of the business premises, access to the business by employees and customers and the ability to deliver and receive goods and services. The acquisition of properties, including cessation of leases, and subsequent relocation or closure of businesses has the potential to result in:

- Disruptions to business operation
- Loss of revenue

[36] see: https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf. Relocation and some other categories of expenses would be claimable under this Act

- Relocation and re-establishment costs
- Employee training expenses for new employees
- Trade catchment alterations
- Business closure.

The significance of property acquisition or lease cessation on businesses would vary in scale across the study area, depending on the number of business properties to be acquired, their associated contribution to the local economy and the ability of the remaining local business catchment to absorb the change. Although the impact on individual businesses may be significant, the compensation process has been designed to reduce this impact.

To enable construction of the project, 24 commercial or industrial zoned properties and one mixed-use property, containing 48 businesses are required to be acquired. Businesses would need to cease operation, to either relocate to another location or permanently close. The breakdown of properties containing commercial or industrial uses by location and trade catchment is included in **Table 7-4**. Note that each property parcel may contain more than one business.

Table 7-4 Commercial and industrial acquisition requirement for the project

Location	Use (type)	No. of total property acquisitions[37]	Likely trade catchment
Parramatta Road West and East civil and tunnel sites	Mixed use	1	Local
Darley Road surface works	Commercial	1	Local
Rozelle interchange surface works	Commercial/industrial	4	District
Iron Cove Link surface works	Commercial/industrial	10	Local
Pyrmont Bridge Road tunnel site	Commercial/industrial	9	District

The magnitude of impact on the local economy from a business closing would be dependent on worker productivity, number of employees, the size of the trade catchment it serves (ie manufacturing may serve a larger catchment than a coffee shop), and the ability for the business to remain within their existing trade catchment.

Businesses required to close or relocate due to the project are predominantly light industrial or speciality services. These businesses would service a wider area and would likely employ a small number of workers. Due to the orientation of these businesses and the fixed supply of alternative industrial zoned land in the surrounding area, it is likely that these businesses would relocate to another trade catchment. This would result in relocation and establishment costs with potential loss in trade and revenue during this time for individual businesses.

The relocation or closure of businesses due to property acquisition or lease cessation would also disrupt the character of business areas and effect the productivity of local economies. The impact upon the character of these areas may be partially returned should some businesses be able to re-establish in the same location post-construction. This would most likely be seen at the Darley Road, Pyrmont Bridge Road and Parramatta Road construction ancillary facilities, which would retain future opportunities for the land to be redeveloped, post-construction, consistent with the current land zoning.

There are circumstances where a community may develop a strong tie and connection to a business and its employees, with changes affecting the business leading to disruptions to routine, social networks, and economic productivity. The loss of such ties would be a negative socio-economic impact.

[37] Note, that this column reflects the acquisition of properties that contain business uses, not the number of businesses.

The area to where a business relocates may also have different locational attributes, such as reduced passing trade or business visibility. This may result in a loss of revenue for the business or may require the business to relocate again to an alternative area, to maintain viability.

Of the businesses affected by property acquisitions, there are limited co-dependencies or synergies between those that would be acquired and those that would remain operational in the surrounding catchment. Therefore, the operation of remaining businesses would not be substantially affected by these changes. With respect to wholesale businesses along Lilyfield Road, it is noted that some of these businesses supply specialist materials that are not readily available in the surrounding area. Tradesmen and others more dependent on these businesses would be required to travel further to access similar supplies. Of the remaining businesses affected, the provision of similar goods and services remains adequate and readily available within the local area and broader catchment.

A key mitigation to reduce the severity of impact on businesses would be the implementation of the acquisition and compensation process in line with the *Determination of compensation following the acquisition of a business*[38] guideline (NSW Government, date unknown). This guideline provides direction to all NSW acquiring authorities in determining compensation for a business conducted on land that is acquired in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). It is acknowledged in the guide that each case for business interest compensation should be considered on its individual merits. The business interest may be in the same ownership as the "land" or may be a non-related party.

A proportion of businesses required to cease operation, which provide a unique service to the broader LGA, may not be able to relocate into the same area. This would result in a potential loss of this service to the broader trade catchment. In most instances however, there would be sufficient capacity in the broader trade catchment for a business to relocate or enough similar businesses remaining within the local area.

Overall, the number of acquisitions and businesses required to cease operation to facilitate the project is relatively low for an infrastructure project of this scale. The impact upon these businesses would be somewhat mitigated by the implementation of a detailed consultation and compensation process.

Although the acquisition process is likely to be a significant change for individual businesses directly affected by the project, the compensation process should help to alleviate the severity of impact on individual business interests. In regards to the broader socio-economic environment, the business closures are anticipated have a slight effect on the baseline condition, with the economy projected to normalise and business expected to be re-established in a short-medium term. The spatial extent of impact would generally be confined to a suburb level. The likelihood of these changes occurring is near certain. Considering this, the overall impact of construction activities on the socio-economic environment is a moderate negative.

7.3.3 Social infrastructure

The construction of the project would result in temporary or permanent impact upon social infrastructure facilities and open spaces at specific locations within the study area.

It should be noted that several areas previously intended to be affected by construction as part of the concept design have now been avoided in the reference design. This has resulted in fewer and less severe impacts on social infrastructure and open space. The reference design has avoided direct impacts upon Easton Park, Algie Park, Blackmore Park and the Sydney Secondary College (Leichhardt campus), which were all previously proposed for construction activities.

Direct impacts on social infrastructure facilities and open spaces that would be permanently acquired or temporarily leased by the project include:

- Buruwan Park – 0.35 hectares permanently acquired to facilitate the new alignment of The Crescent

[38] See: https://www.finance.nsw.gov.au/sites/default/files/Guidelines_determination_compensation_business.pdf

- King George Park – permanent acquisition of 0.08 hectares and temporary acquisition of 0.05 hectares of the park (adjacent to Byrnes Street) to facilitate the Iron Cove Link portals and associated widening of Victoria Road, as identified in **Chapter 12** (Land use and property) of the EIS.
- King George Park – temporary acquisition of the informal area (0.18 hectares) of the car park at Manning Street, which is within the boundary of King George Park, to formalise the car park and provide a bioretention facility.

Buruwan Park

Buruwan Park is a passive open space area forming part of the active transport link through to Rozelle Bay. The link runs from Railway Parade through to The Crescent and also provides access to Rozelle Bay light rail stop. The park is predominantly utilised by pedestrians and cyclists. The park currently has poor surveillance with evidence of anti-social behaviour in the form of graffiti. The park has no permanent outdoor furniture and has limited grass area for people to relax or play. The landscaping within the park and its position adjoining Whites Creek does provide visual amenity, however the park is affected by traffic noise from City West Link and The Crescent. Due to the presence of more substantial parks nearby and the creation of the new open space at Rozelle Rail Yards, there remain, and will exist in the future, other options for the community in terms of open space if the park is removed.

King George Park

King George Park offers a variety of active and passive recreation spaces. The park is heavily utilised by local residents and visitors from the broader district due to its high amenity value and park facilities. The park also contains a section of the Bay Run, which is a highly valued pedestrian and cyclist connection.

Land adjacent to Byrnes Street and Victoria Road in King George Park would be required for construction. As identified in **Chapter 6** (Construction work) of the EIS only a small portion of the park near Victoria Road would be required. This portion of land is currently occupied by the Bay Run path and landscaping and other than the path connection, the area does not appear to be used for passive recreation purposes.

The Bay Run connection to Iron Cove Bridge would be slightly altered but maintained during the construction period.

The informal car park on Manning Street, would be reconfigured as a formal car park and a bioretention facility. There may be a slight increase in the demand for parking in surrounding residential streets during construction. This would be alleviated as soon as the formalised car park is established. The bioretention basin would however occupy a proportion of this land long-term. This would have limited effect on the socio-economic environment.

Summary

Acquisitions would result in a medium-term change to the existing baseline environment. The severity of change is however small and confined to a suburb. There is a high likelihood of these changes occurring, with slight consequences. Considering this, the overall impact of construction activities on the socio-economic environment is a minor negative.

7.4 Community values

Community values across the study area may be categorised under neighbourhood identity and character, community health and safety and community cohesion. The socio-economic impacts associated with each of these elements are outlined in the following sections.

7.4.1 Neighbourhood identity and character

The preservation of neighbourhood identity and character was raised as being an item of high community importance during consultation. This included the protection of established vegetation and heritage items, the preservation of public art and monuments and the protection of the amenity and accessibility of open space and recreation areas.

As identified in **Appendix S** (Technical working paper: Biodiversity) of the EIS, vegetation removal would be required to facilitate construction, including street trees. Trees contribute to the identity of a neighbourhood, provide protection from the elements and provide intermittent or consistent screening and privacy. As such, the clearing of established vegetation is likely to be of concern to the community, particularly those where the visual amenity and landscape character of the area or property is altered due to a reduction in landscape screening.

As outlined in **Appendix O** (Technical working paper: Landscape and visual impact) of the EIS, the removal of trees would expose residents, pedestrians and motorists to direct views of fencing and hoarding and other large elements of construction. This would result in a reduction in the amenity and character of affected environments, which are considered a high community value.

Public art and monuments contribute to neighbourhood identity and character, holding sentimental value for the community. Only two items of public art have been identified within the project footprint – the statues of soldiers on the approaches of Anzac Bridge and the mural along The Crescent between City West Link and Johnston Street. These items of public art would be retained and protected during construction of the project, resulting in negligible effects.

The heritage places of NSW not only reveal the story of Australia's past; they safeguard and enrich our present and future. For communities, heritage plays a major role in the appeal and life of neighbourhoods[39]. The community consultation process identified that preserving the heritage character of an area was a high priority for residents.

Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS identifies that the project directly affects five listed heritage items across the study areas, which are:

- Demolition of three statutory heritage items of local heritage significance, being:
  - Stormwater canal at Rozelle
  - 'Cadden Le Messurier' at Rozelle
  - Former hotel at Rozelle
- Partial demolition of one statutory heritage item of local heritage significance, being the Whites Creek Stormwater Channel No. 95
- The project temporarily encroaches into the south western boundary of the curtilage of the White Bay Power Station which is a State Heritage Register (SHR) listed item. The minor encroachment occurs during the construction phase of the project as a result of the alignment of the temporary Victoria Road bridge. However, the works would be some distance from the Power Station building itself and the building would not be physically impacted by the project.

Twenty-one other statutory heritage items of State or local heritage significance and heritage conservation areas (HCAs) would be subject to indirect impacts through potential vibration, settlement and visual setting. The project also directly affects nine individual buildings/structures assessed as being potential local heritage items which would be fully demolished. One landscape feature assessed as being a potential local heritage item would be partially demolished, being the sandstone cutting at Rozelle Rail Yards.

One structure assessed as being a potential heritage item of State significance would be indirectly impacted through vibration which is the southern penstock associated with the White Bay Power Station. Six other individual buildings/structures assessed as being potential local heritage items would be subject to indirect impacts through potential vibration, settlement and visual setting.

Appendix U (Technical working paper: Non-Aboriginal heritage) of the EIS concludes that the overall impact of the project on heritage would be moderate. As heritage is of high value to communities

[39] Heritage listing explained What heritage means for you, Heritage Council of New South Wales viewed at: www.environment.nsw.gov.au/resources/heritagebranch/heritage/HeritageListing2010final.pdf on 10th October 2016.

within the study area, the loss of heritage items may diminish the sense of place and neighbourhood identity valued by the community. Various management measures would be implemented to reduce the loss of heritage, including photographic archival recordings and salvaging historic fabric and features to be partially re-instated upon completion. Considering the nature of some of the heritage items being of less visual prominence and the project intent to implement various mitigation measures, the extent of impact on sense of place and neighbourhood identity is moderate negative.

The preservation of the accessibility and amenity of open space and recreation areas was also raised during consultation as an important community value. Access to open space and recreation areas provides the opportunity for numerous community-scale health benefits including improved overall cardiovascular health, reduced stress levels and reduced recorded instances of depression[40]. Maintaining the accessibility and amenity of open space and recreation also increases opportunities for social interaction and provides an area to break away from the urban environment to relax, play, exercise and congregate, hence contributing to the overall mental health of local communities.

An increase in construction activity in or around open space and recreation areas has the potential to reduce the amenity and accessibility of these areas. This may deter people from using such facilities and may increase user demand and crowding at other locations. Community consultation identified Easton Park, Blackmore Park, the Bay Run, King George Park, Sydney Park, the Glebe Foreshore parks (including Federal and Bicentennial parks) and Whites Creek Reserve as open space areas that hold particular community value. There would be some impacts to limited areas of King George Park and all of Buruwan Park during construction. There would not be direct impacts to other open space areas during construction. As identified in **section 5.2**, there are a number of other parks and recreation spaces located in proximity to the construction compounds that may be indirectly affected by the project. The direct and indirect impacts on social infrastructure have been assessed in **section 7.10**.

Overall, construction of the project would directly affect values held by the community around neighbourhood identity and character. Although the impacts would generally be confined to localities around construction compounds, they would be medium-long term and reflect a medium change to the existing baseline environment. The likelihood of impacts occurring ranges from possible to highly likely and the consequence on the socio-economic environment would be moderate. As such, the overall significance of impact upon the socio-economic environment would be moderate negative.

7.4.2 Community safety and health

Community safety and health were identified as being of high community value during consultation (see **Chapter 6**). If unmanaged, the construction impacts of noise, light spill, dust and vibration may affect this core value. This impact would be felt more explicitly by residents and building occupants that work, live or participate in recreation in areas closest to construction sites.

Fifty-one per cent of the business survey respondents stated their business would be negatively affected by disturbances (such as noise, dust and vibration). Businesses raised human health concerns arising from the potential reduction in local air quality due to the construction phase of the project. **Appendix K** (Technical working paper: Human health risk assessment) of the EIS has considered the risks associated with construction of the project on the health of the immediate and wider community. Specifically, the assessment identifies potential health risks associated with following consequences of construction:

- Noise and vibration
- Air quality
- Traffic congestion
- The property acquisition process.

[40] Healthy Spaces and Places, 2009, '*Design Principles - Parks and Open Space',* viewed on 20th June 2017, https://www.healthyplaces.org.au/site/parks_and_open_space_full_text.php

Overall, the **Appendix K** (Technical working paper: Human health risk assessment) of the EIS found that without mitigation, extended elevated levels of noise, vibration and construction dust could result in adverse health effects across the community. These health effects may include disturbance of sleep, reduced capacity for concentration, interference with speech and other activities, potential effects on cardiovascular health, annoyance and increased stress levels.

As discussed in **section 7.2.1** (Noise and vibration) increased levels of noise and vibration may affect human comfort and cause sleep deprivation if noise exceedances persist. Structural damage to properties as a result of vibration was also a concern for some residents. Impacts resulting in sleep disturbance or direct impacts on property were considered likely to trigger higher levels of anxiety and stress resulting in direct impacts on health and wellbeing.

Dust generation from construction activities was raised as a concern due to the potential impacts on the health of some sections of the community who may be more sensitive to changes in air quality. This may include people with pre-existing medical conditions such as asthma or other respiratory difficulties. This impact is likely to be relevant for works within the Pyrmont Bridge Road tunnel site in particular, where a special purpose school is adjacent to the construction site. A number of childcare centres and education facilities are also in close proximity to construction sites (see **section 7.10**). These facilities may be subject to reduced amenity which may affect concentration and learning ability.

Without mitigation, noise, vibration and dust levels would result in a major impact on communities surrounding the project. Consequently, the management and mitigation measures outlined in the EIS, CNVMP and Construction Air Quality Management Plan (contained within the CEMP) would be essential to reducing these levels and the subsequent health effects in local communities. Despite these measures, a small number of people may still experience adverse health impacts from these project-related sources.

An increase in construction traffic and heavy vehicles within the study area, changed traffic conditions and the introduction of construction sites, may affect community safety around roads and active transport connections. A reduction in safety may be experienced:

- In proximity to construction compounds where there may be limited lighting, reduced casual surveillance or where construction hoardings may reduce sightlines
- Near community facilities that are in close proximity to construction sites, particularly facilities that are used by children such as schools, out of school care, childcare centres, playgrounds and sporting facilities
- At at-grade intersections where pedestrian crossings have been established to compensate for the loss of a pedestrian underpass or overpass
- On local or arterial roads with higher traffic volumes than would normally be experienced, as a result of the presence of construction traffic and construction worker's vehicles
- On local roads due to a potential increase in traffic volumes as a result of route re-direction (rat-running)
- Along pedestrian and cyclist routes that have been diverted and may not accommodate the pre-existing level of lighting, casual surveillance or general activity.

Without mitigation, the traffic impact of construction activities would result in a moderate negative impact upon the safety of local streets. Environmental management measures, including the CTAMP, would be prepared as part of the CEMP to identify traffic management measures with a view to maintaining safety for pedestrians, cyclists and other road users near construction works and on haulage routes.

Traffic congestion and loss of parking has the potential to contribute to health impacts (such as stress and anxiety) due to reduced air quality, increased noise, reduced amenity and safety. **Section 7.1.1** (road network) has evaluated impacts on traffic congestion during the construction phase of the project and **section 7.1.2** has evaluated parking impacts.

The community consultation process identified high levels of concern relating to the property acquisition process necessary for construction. As outlined in **section 7.3**, the process may trigger anxiety and stress through:

- Uncertainty with respect to why the property in question is, or may be, acquired
- Timing of acquisition
- The amount of time in which existing users and services are allowed to relocate
- The need to find suitable alternative accommodation, at an affordable price and in an appropriate location, ie participating in the property market
- Implications to social or business networks
- The cost and inconvenience associated with relocation.

Overall, construction of the project would directly affect values held by the community around community safety and health. Although the impacts would generally be confined to localities around construction compounds, they would be medium-long term and reflect a small change to the existing baseline environment. The likelihood of effects on health and safety is possible. As such, the overall impact upon the socio-economic environment would be minor negative.

7.4.3 Community cohesion

Infrastructure that creates a physical or psychological barrier between communities may produce a real or perceived barrier, reducing the capacity for community cohesion, including social and economic interaction. Community consultation identified community cohesion as a core community value, particularly within the Leichhardt-Glebe precinct. The business survey reported that 48 per cent of customers work or live within the local area, indicating a strong dependence on community connections.

A number of the larger arterial roads, including City West Link, Victoria Road, Parramatta Road and the Princes Highway currently operate as physical and psychological barriers between communities. These roads carry large volumes of traffic, with motor vehicles generally prioritised over pedestrian and cyclist connections. Rozelle Rail Yards, City West Link, the light rail corridor and Whites Creek act as a substantial physical barrier between the communities of Annandale, Rozelle and Lilyfield.

Community severance may be substantially increased by the presence of major construction projects. Impacts typically arise as a result of local road detours, changes to active and public transport routes, and increases and decreases in the amount of traffic on connector roads. Community severance may lead to short or long term changes to people's behaviour patterns, affecting established community networks and an area's character and sense of place. The full extent of changes to access and connectivity are discussed in **section 7.1**.

During construction, temporary changes to the road network, particularly along City West Link, Victoria Road, The Crescent, and Lilyfield Road, may contribute to community severance and disconnection.

Any temporary or permanent changes in access to or safety of social infrastructure, community resources or to other desirable locations (such as employment, study, friends and family) may cause community severance, potentially affecting the durability of community networks.

Consultation with the community highlighted that access to water and open space was highly valued by the community. This included access to the Glebe foreshore walkways and the Bay Run. Although minor amendments are proposed to the Bay Run footpath, access is proposed to be maintained throughout construction, with limited effect on community cohesion.

As outlined in **section 7.1.4**, a number of pedestrian and cyclist links are proposed to be altered as a result of construction of the project. This would include the removal of two pedestrian bridges across Victoria Road and another across City West Link which are popular for both recreational and commuter pedestrian and cyclist traffic. These connections also provide important access to Rozelle Bay and through to the Glebe foreshore walkways. The removal of these bridges, despite the presence of temporary alternatives, may reduce community cohesion and perception of access to a place.

At all times during construction, access to the Glebe Foreshore walkways, the waterfront and the marina facilities at Rozelle Bay would be retained. The presence of the civil site at The Crescent would reduce the amenity for pedestrians and cyclists along the Rozelle Bay walkways. This reduced amenity may deter people from participating in community activities or active transport, potentially reducing the connection to an environment and the general feeling of community cohesion.

While physical and psychological community severance would be increased during construction of the project, these changes would result in only slight variation from the existing socio-economic environment. Mitigation measures would be put in place during construction, including the transitioning of pedestrian and cyclist connections to alternative routes prior to the removal of the former. Impacts would generally be confined to suburbs around the project footprint and would extend for a medium-long term duration. The likelihood of effects on community cohesion is possible. As such, the overall impact upon the socio-economic environment would be minor negative.

7.5 Population and demography

Population and demography may be influenced by project-related factors, generally relating to the acquisition of properties (see **section 7.3**).

The acquisition of 26 residential properties for construction and operation of the project would be required within the Leichhardt-Glebe precinct. Based on the average household size of 2.2 persons and ABS residential dwelling statistics showing that 39 per cent of households in this area are couples with children and 28 per cent are lone person households, it is estimated that around 60 people would be affected by property acquisitions in this precinct. This calculation would likely be a minimum, as multiple strata titles may exist within some parent lots. No residential property acquisitions are proposed for the Ashfield-Haberfield precinct or the Alexandria-Erskineville precinct.

The potential permanent relocation of residents as a result of acquisitions makes up a very small proportion of the overall population within the LGA (potentially 60 people out of around 182,000 living in the Inner West LGA). Although likely to be felt at a locality level, these changes are not expected to affect the population and demography of the precinct or study area as a whole. As may be seen in **section 5.1**, the study area is projected to experience significant growth in the population over the next 20 years, driven by urban renewal programs and infill development projects. The expected population changes as a result of construction are likely to be negligible in comparison to the associated changes from other local and regional urban development factors.

The workforce for construction of the project would be expected to be sourced from across the broader Sydney region. Due to its location and accessibility, it is unlikely the project would result in the need for workers to relocate to live in the study area. As such, the presence of construction workers would have a minimal effect on local residential population and demographics. The severity of impact of the project on the population and demography of the study area is expected to be neutral with the likelihood of change possible. Considering this, the overall impact of construction activities on the socio-economic environment is a negligible.

7.6 Economy

7.6.1 Employment and construction expenditure

Construction activity, including utility works, directly benefits the economy, injecting economic stimulus benefits into the local, regional and state economies. The economic benefit of construction is multi-dimensional, including:

- Increased expenditure at local and regional businesses through purchases by construction workers
- Direct employment through on-site construction activities
- Direct expenditure associated with on-site construction activities
- Indirect employment and expenditure through the provision of goods and services required for construction.

The direct and indirect employment benefits of the construction may be quantified based on the following assumptions:

- A base year of 2018 for the project start-up
- A five-year construction period (from 2018 to 2023)
- The complete project opening to traffic in 2023.

The number of direct and indirect jobs generated as a result of the proposed five-year construction period has been estimated in this assessment. Direct jobs are defined as those relating to the project's development throughout construction, commissioning, operating and managing the facility. Direct jobs that would be generated include onsite labour, supervision, professional services and project managers.

Indirect jobs are defined as jobs (within Australia) that support the project through the provision of goods and services such as offsite manufacturing and equipment hire.

Major infrastructure projects may also have flow-on benefits to job generation through the raw material supply chain and jobs created as a result of new infrastructure. Secondary indirect jobs are not however included in job generation calculations.

It is estimated that based on a five-year construction period, around 14,300 direct (onsite) job years would be created between 2018 to 2023, which is equivalent to around 2,800 jobs per annum. Furthermore, about 42,300 indirect (off-site) job years would be generated, equivalent to around 8,400 jobs per annum based on the project period.

As a commitment of the project, the WestConnex Training Academy has been established. As outlined in the WestConnex Sustainability Strategy, the entire WestConnex project aims to deliver 500 apprenticeships/traineeships during the life of the project. A portion of this number would be trained on the M4-M5 Link project. In addition to offering new opportunities for employment, the WestConnex Training Academy is providing training, resulting in accreditation or certification, in tunnelling to people who have transferrable skills from other industries, like the natural resources sector. This would allow people with experience from other sectors, like mining and heavy industry, to join the workforce.

The WestConnex Sustainability Strategy also incorporates initiatives to improve Aboriginal and Torres Strait Islander participation in construction and provide opportunities to Aboriginal and Torres Strait Islander enterprises. Under the Aboriginal Participation in Construction Policy a percentage of the total estimated value of the contract must be directed to Aboriginal related employment and education activities, procurement of goods or services from recognised Aboriginal businesses or other programs. The targeted project spend is currently 1.5 per cent of the total estimated value of the contract.

Overall, construction of the project would produce medium-long to long-term job opportunities, skill development and economic benefit to the region. There is a high likelihood of these benefits occurring with potential major consequence on the socio-economic environment. As such, the overall impact upon the socio-economic environment would be major positive.

7.6.2 Value add

The construction industry is a significant component of the Australian economy, accounting for 7.7 per cent[41] of Gross Domestic Product (GDP) and employing over one million workers across the country[42]. The industry has strong linkages with other sectors, so its impacts upon the economy go further than the direct contribution of construction.

In calculating the flow-on economic benefits of a particular project, it is common practice to employ economic multipliers. Multipliers refer to the level of additional economic activity generated by a source industry. There are two types of multipliers:

- Production induced, which is made up of:

[41] ABS, 2012 '1301.0 – Year Book Australia, 2012 – Construction Industry', latest issues released 24/05/2012, accessed at: www.abs.gov.au/ausstats on 19/08/2016

[42] IBIS World, 2016, 'Construction Market Research Report', ANZSIC E, May 2016

- First round effects: which is all outputs and employment required to produce the inputs for construction
- An industrial support effect: which is the induced extra output and employment from all industries to support the production of the first round effect

· Consumption induced: which relates to the demand for additional goods and services due to increased spending by the wage and salary earners across all industries arising from employment.

The consumption effects comprise the increase in output required to satisfy the additional demand generated by increased wages, salaries and supplements resulting from all increased output, ie direct and indirect employment.

The estimated total project cost as detailed in the Business Case and Budget Papers is $7.245 billion. For the purposes of this assessment, the estimated hard construction costs of the proposed M4-M5 Link was assumed to be around 85% of this total project cost. Using ABS multiplier tables and HillPDA's industry knowledge, the economic multipliers indicate that construction would generate around $5.8 billion of activity in production induced effects and around $7.7 billion in consumption induced effects. Total economic activity generated by the construction of the proposed development would be about $19.7 billion. These multipliers are based on both the building and non-building industries and therefore the effects are an approximation only.

It is important to note, however, when reviewing these estimates that multiplier effects have a national impact and not necessarily a local impact. Care is required in interpreting multiplier effects; which have been applied on a theoretical basis to produce estimates of the potential flow-on effects of construction activity to the rest of the economy.

Overall, construction of the project would long-term, economic benefit to the region. There is a high likelihood of these benefits occurring with potential moderate consequence on the socio-economic environment. As such, the overall impact upon the socio-economic environment would be moderate positive.

7.7 Utilities

Communities and businesses are dependent on public utilities, particularly the supply of electricity and water, for the conduct of a wide variety of daily activities. The disruption of these services, even for short periods of time, may result in substantial inconvenience to daily life, business operation and revenue generation. Such disruption, arising from accidental or planned shutdowns to enable construction, was a concern raised during the community and business consultation process.

The following utilities may be disrupted during construction including:

· Communication infrastructure outages (ie internet and phone line use)

· Water or sewer connection outages

· Disruptions to electricity and gas connections.

During construction, public utilities and services may be temporarily disrupted while they are temporarily or permanently relocated, or for safety reasons. Disruptions for safety reasons could arise when construction activities involve relocating power lines or operating machinery in close proximity to power lines.

As outlined in **Appendix F** (Utilities Management Strategy) of the EIS, existing utility services would be avoided or protected wherever possible. However, utility relocations and works would still be required both inside and outside the project footprint. Preliminary information regarding utilities that are required to be relocated or redundant utility services required to be removed is provided in **Appendix F** (Utilities Management Strategy) of the EIS.

The socio-economic consequences of disruption to public utility services may affect individuals, businesses, emergency services and community group operations, and economic viability generally. Examples of socio-economic disruptions arising from utility outages include:

- Businesses that are reliant on the purchasing of goods and services electronically and through the internet (ie Eftpos machine) would be required to limit purchases to a cash only system
- Business operations that are reliant on electricity and telecommunication networks to run computers, machinery or communication systems would likely have to pause operation
- Business operations such as restaurants and cafes that are reliant on clean potable water, electricity and gas for the preparation and operation of food and beverage services would be required to alter and/or reduce their service offering during offline periods
- Residential households may need to alter or limit daily activities such as showering, cooking and cleaning
- Interruptions to scheduled night-time sporting activities due to lack of lighting
- Emergency services and hospitals may require utilisation of backup electricity, water and communication arrangements.

Such disruptions may result in an economic loss for a business and could affect business viability if disruptions continue for extended periods. This may also affect employees who may experience an economic loss if employment is temporarily placed at risk, particularly those employed on a casual basis. Residents would also feel these disruptions as they create inconvenience, require a change in routine and have the capacity to reduce the productivity of individuals and increase household costs. Individuals that are reliant on home-based medical equipment (eg dialysis) may also be more vulnerable to changes in utilities.

When utility works commence, there may a reduction in property access, reduced visibility of businesses, and amenity impacts on sensitive land uses. These impacts, however, would be temporary and localised.

In most instances, impacts on utilities would be temporary and may be managed through standard management measures, as outlined in **Appendix F** (Utilities Management Strategy) of the EIS. A Utilities Coordination Group (UCG) with representatives from other concurrent projects and asset providers operating in the same locality, would be established to ensure a coordinated approach to adjustments, relocations and protection works. This UCG would include a community engagement team and Council representatives to ensure the community is appropriately notified in advance wherever possible. Accidental events would be more difficult to manage. All reasonable endeavours would be undertaken by SMC and its contractors to avoid the latter, in accordance with the Construction Management Environmental Plan.

Extended utility outages are unlikely however short term outages to facilitate utility works are highly likely. The consequence on the socio-economic environment would generally be limited to a locality or suburb, be short term and have only a slight effect on the baseline condition. The overall impact on the socio-economic environment from planned utility outages would be a minor negative.

7.8 Construction fatigue

Construction fatigue relates to receivers that experience construction impacts from a variety of projects over an extended period of time with few or no breaks between construction periods. Construction fatigue typically relates to traffic and access disruptions, noise and vibration, air quality and visual amenity and social impacts from projects that have overlapping construction phases or are back to back.

Construction fatigue from cumulative construction projects or multiple construction effects of a single project may be felt by residents, businesses and social infrastructure users around Haberfield, Rozelle and St Peters, where extensive construction work is already being undertaken for other projects. Such considerations are most relevant to properties surrounding the New M5 and M4 East construction ancillary facilities, as well as at Rozelle where the light rail maintenance depot works and the site management works have already exposed people to construction impacts over an extended period. The study area is also subject to ongoing urban development, with many of the LGAs in the study area projected to have significant population growth (see **section 5.1**).

Where construction timeframes overlap or are proximal to other project activities for longer durations of time, individuals and communities may experience effects on mental health through stress and

anxiety. Health effects associated with construction fatigue are further discussed in **Appendix K** (Technical working paper: Human health risk assessment) of the EIS.

Construction fatigue has the capacity to extend the construction effects on businesses and the economy. As identified in **sections 7.6** and **7.9**, these effects could be both positive or negative depending on the type of construction impact. As the sensitivity of businesses varies, according to the level of service they provide (ie serve a local, district or regional trade catchments) and how sensitive the businesses are to changes in amenity and accessibility, the ability of a business to adapt to an environment would affect business viability and turnover. The vulnerability of businesses to an impact may deteriorate or be enhanced more rapidly depending on the duration and severity of exposure to construction activities. For example, a convenience retail business that is located in close proximity to multiple construction activities and projects, may experience an extended duration of strong passing trade. Whereas, a business that is dependent on pleasant amenity may experience an extended reduction in trade that may require the business to relocate or close.

7.9 Business and industry

The following section provides an overview of the socio-economic impacts that may be experienced by businesses within the study area during construction of the project. It draws on the comments and information gathered by the business impact survey, along with an appreciation of the existing study area.

Businesses across the study area may experience impacts from construction activities, such as reduced efficiency of the road network, loss of parking and changes to delivery arrangements. These impacts would be an inconvenience for businesses affected, although they would be temporary in nature. The extent of impact on individual businesses would vary depending on the proximity to construction works and the duration of construction activities.

A business impact survey was undertaken at certain locations across the study area to gauge the perception of business impacts associated with construction (see **section 3.4** for business survey methodology and **Annexure A** for the survey report). When asked about how construction may affect their overall trade and revenue, 49 per cent of respondents anticipated that there would be no obvious change in trade as a result of construction activities. Twenty per cent of respondents believed that they would experience a loss in trade, and 12 per cent believed they would experience a significant loss in trade. Conversely, 17 per cent of respondents predicted construction would be positive for businesses. Of the respondents that believed construction would be a positive for trade, over 70 per cent were food and beverage business types and 10 per cent were retail operations.

An exploration of the potential impacts on businesses is provided below.

Passing trade

Passing trade may be defined as those pedestrians, cyclists and motorists who choose to patronise a business because they see it when walking/riding/driving past, not because they planned to go there. Of the businesses surveyed, 37 per cent identified that they rely on passing trade, 22 per cent suggested that they partially relied on passing trade and 41 per cent stated they did not rely on passing trade.

The construction phase of the project would result in changes to vehicle and pedestrian flows that could influence the level of passing trade. Some businesses could benefit as passing trade is re-directed towards their business (ie through pedestrian or traffic diversions) while others might not, as traffic is diverted away or construction hoardings reduce the ease of access to/visibility of their business.

The majority of businesses clusters that offer retail and convenience services would experience an increase in construction workers in the area, which may generate increased passing trade. As identified in Chapter 6 of the EIS, the total peak workforce would be around 1,500 personnel across the study area. This would be particularly beneficial for the smaller local business clusters such as Ramsay Street Convenience, Lilyfield Neighbourhood, Norton Street North, Catherine Street Convenience, Victoria Road and Darling Street due to the additional 950 workers around the Rozelle area and 250 workers around the Haberfield area. Increased passing trade would generate increased

business revenue, directly benefiting the socio-economic environment. It is unlikely that any centre would experience a noticeable loss in passing trade due to construction.

Employee and customer access and travel time

Businesses may also be affected due to delayed or hindered access to workplaces or servicing areas owing to local traffic construction constraints and congestion. As identified in **section 7.1.3**, road network performance is expected to be affected during construction with a number of temporary road closures, increased construction traffic and an expected worsening of intersection performance at some intersections. These changes may have a discernible effect on employee and customer travel time and the efficiency of servicing and deliveries.

A number of business survey respondents suggested that traffic congestion or delays would act as a disincentive for customers visiting the local business area and would therefore affect business turnover. The survey results indicated that 42 per cent of respondents anticipated the project would have an adverse impact on customer access, during the construction phase, while 46 per cent identified no impact, seven per cent were unsure and five per cent identified a potential benefit.

There is also the potential that customers may not return to an area due to the accessibility challenges experienced, resulting in a potential loss of trade for some businesses. If there are competing centres in more easily accessible locations that offer similar goods or services, access difficulties and delays may result in long-term changes to consumer behaviour and significant permanent economic impacts for certain local businesses.

The productivity of employees may also diminish due to construction traffic or travel delays. Employees may arrive late to work or need to leave earlier in response to changes in traffic conditions. Twenty-five per cent of business survey respondents suggested that construction activities would have a negative or significant negative impact on employee travel times, while 69 per cent believed employee access would remain consistent and four per cent suggested that there might be an improvement in travel times during construction.

The ease of access to a place of employment may also be a factor in attracting or deterring existing or potential employees from remaining in a job or applying for a job. If a place of work becomes too difficult to access it begins to jeopardise the time an individual has to spend with family and friends or undertaking non-work related activities and may cause individuals to seek alternative employment options. As such, employers may have difficulty attracting or retaining staff, which may affect business productivity and function. **Section 7.1** details the accessibility and connectivity impacts associated with construction of the project.

A number of business clusters would experience a potential decline in nearby road network efficiency. Specialised retailers may experience a greater decline in their customer base, as clients seek to avoid traffic delays, travelling instead to more accessible business centres that offer similar products. Business clusters including Chapman Road business cluster in Annandale, Annandale-Camperdown business cluster near Pyrmont Bridge Road and Parramatta Road, Annandale and Roberts Street business cluster in Rozelle may be more vulnerable to these changes.

Although employee travel time may increase slightly, there is adequate provision of public transport in most locations around the business clusters that provide alternative commuting options.

The State Transit centre (bus depot) at Leichhardt would be heavily dependent on efficient transport connectivity and access. Although there would be minimal direct access impacts, a reduction in the efficiency of the road network overall may result in adverse effects on the transit centre.

Customer and employee parking accessibility

The removal or increased competition for car parking was identified as having a potential impact on convenience for workers, clients and customers. These changes have the potential to influence decisions by customers/clients to use a certain business. The business survey results identified that 60 per cent of employees were driving to work with 55 per cent of businesses having off-street parking available. Of this off-street parking, 31 per cent had less than five spaces, five per cent had between five and ten spaces and 15 per cent had more than ten spaces. The remainder of respondents indicated no off-street parking was available or did not respond to the question.

Concerns relating to a worsening of customer car parking accessibility during the construction phase were raised by 39 per cent of business survey respondents. Fifty per cent of businesses surveyed did not think that construction would have any impact on customer parking. These results were similar to the results of questions relating to employee parking accessibility, where 70 per cent of businesses did not believe that construction would have adverse impacts on employee parking. Twenty-six per cent of businesses believed that construction activities would adversely affect employee parking and accessibility. A limited number of respondents (less than 5 per cent) thought that construction activities would have a positive effect on employee or customer parking. Changes to parking accessibility as a result of the project are identified in **section 7.1.4**.

The business clusters of Parramatta Road Haberfield, Canal Road, Lilyfield Road, James Craig Road, Victoria Road, Annandale-Camperdown and Euston Road may all experience increased competition for car parking in the surrounding area. As the majority of these business clusters would have their own private parking, it is unlikely that a reduced supply in car parking would have a substantial impact on employee or customer access.

Servicing and deliveries

Businesses rely on deliveries to support the sale of products and/or services, as well as relying on services from other businesses such as refuse collection. These activities are often required to occur daily, and in some cases, multiple times per day. It therefore follows that temporary street closures, the relocation/removal of car parking along street frontages, and the location of construction sites could collectively or individually hinder servicing and delivery opportunities, resulting in time and vehicle related costs as well as lost revenue for businesses. **Section 7.1** discusses changes in access and connectivity as a result of construction.

Some business types are likely to be more affected by changes to access than others, particularly those that rely on efficient deliveries or distribution. Ninety-one per cent of business survey respondents stated that they received deliveries for their business, with 58 per cent of these businesses stating that they relied on loading zones or on-street parking for deliveries. These results suggest that changes to the ease of access to on-street parking or loading zones would affect the operation of a large percentage of businesses in the study area.

Heavy traffic due to construction activities or alterations to road networks may also create challenges for servicing and deliveries. Any change that results in potential disruptions to travel/route redirections and extended travel times may incur an increase in vehicle operating costs and delivery delays for customers or businesses. This would be a particular issue for service and delivery based businesses (ie couriers or distributors) that operate on a time and cost basis or rely on efficient service provision as a core component of their business offering.

Road alterations and traffic delays are anticipated during for construction phase of the project. These changes would have a network impact on the efficiency of servicing and deliveries across the broader region. All of the business clusters would be dependent on servicing and deliveries as part of normal business operation. The construction of the project, is however, not anticipated to remove loading zones or parking that would affect the business clusters.

Although the efficiency and condition of access routes may alter, such as for businesses along Lilyfield Road, James Craig Road and potentially Roberts Street, it is unlikely that this would have a substantial impact on business revenue, overheads or productivity.

Ambience

The ambience of a business is defined by its character and atmosphere. Construction activities have the potential to alter the ambience of an environment due to the generation of dust, pollution, noise, vibration and visual impacts, potentially affecting the function of a business or the ability to attract and retain customers. Concerns regarding noise, vibration and dust impacts were raised by 60 per cent of business survey respondents.

Noise and vibration due to construction activities have the capacity to adversely alter the amenity of the existing urban environment and affect business revenue. The degree of construction noise and vibration impacts on individual businesses would vary dependent on the existing noise levels, distance from the construction activities, the nature of works and the time of day or night that work take place.

Construction noise impacts are discussed in **section 7.2.1**. Businesses that are reliant on the external ambient environment to some degree, such as beauty salons, restaurants or cafes, may experience a decline in customers due to negative customer experiences potentially encouraging them to travel to more amenable locations that offer similar services. This change in consumer behaviour would directly affect business viability as trade and customer expenditure would reduce.

Vibration impacts are provided in **section 7.2.1,** with a detailed assessment of noise and vibration impacts provided in **Appendix J** (Technical working paper: Noise and vibration) of the EIS. Vibration impacts may impede businesses that rely on sensitive instruments or manufacturing processes (ie medical and dental facilities, printers, mechanical manufactures). This may potentially incur additional costs to businesses or require businesses to cease operation during times of high vibration activities.

Construction related activities also have the potential to generate increases in dust and reductions in air quality, which may result in potential increased operating costs (including cleaning and maintenance costs), reduced hygiene of food preparation or increased instances of respiratory issues for employees or customers. **Section 7.2.3** identifies that construction activities would affect air quality, with a detailed assessment of impacts provided in **Appendix I** (Technical working paper: Air quality) of the EIS.

Thirty-four per cent of business survey respondents perceived that the air quality disturbances related to construction would cause negative impacts on their business, with a further 17 per cent considering that it would be significantly negative. Construction vehicles and spoil haulage were also raised as a concern by businesses during the survey, with a preference that these activities only occur outside peak periods and to predominantly use arterial roads. Numerous food preparation companies and hospitality services raised air quality as an issue, with specific reference to dust impacts. Traffic related air pollution was also raised by a number of businesses who voiced concerns around the amenity of the environment and ability for patrons to enjoy footpath dining. These factors have the capacity to increase business expenditure and reduce customer interest and product sales, therefore affecting business revenue.

During construction, the visual amenity of businesses has the potential to be affected by factors such as the removal of established vegetation, the installation of construction hoardings and/or the visual appearance of construction sites. **Section 7.2.2** identifies construction impacts on visual amenity, with a detailed assessment undertaken in **Appendix I** (Technical working paper: Air quality) of the EIS.

The visual attractiveness of an environment may be important to businesses that rely on customer attraction to the pleasantness and quality of an environment, such as retail, personal service providers, cafes and restaurants. These businesses are more dependent on access to natural light and clear sight lines of the street to enhance the attraction of their business. This is particularly important for businesses that provide outdoor dining. Decreased visual amenity may result in a reduction in customer sales and repeat clients, affecting business revenue in both the short and long-term.

Business clusters that have higher dependency on amenity to attract and retain customers, would be more susceptible to changes in amenity as a result of construction activity. The Annandale-Camperdown business cluster is likely to have the highest sensitivity to vibration and noise impacts due to the large number of medical, industrial and service accommodation businesses in proximity. These businesses may be more susceptible to the effects of construction activities.

Employee productivity and communication capacity

Whilst the background noise levels in the study area are consistent with an urban environment, construction of the project would potentially increase these noise levels in certain areas. This has the potential to adversely influence employee productivity and capacity to interact with colleagues and clients.

Construction may generate high noise levels that may impede communication. This may affect the function of businesses that require interaction between customers and employees. Businesses such as retail, food and beverage services or telecommunication may experience communication difficulties during high noise periods, reducing the ability for employees to hear orders or conduct conversations, potentially increasing the instances of errors or reducing the number of sales.

High or ongoing noise exceedances may reduce employee productivity as staff may have greater difficulty concentrating on a task or experience a reduction in their health and wellbeing (ie headaches, increased stress and anxiety). This may potentially affect the productivity, efficiency and revenue capacity of businesses, particularly if the construction activities continue for extended periods. As presented in **section 7.2.1**, construction activities are anticipated to exceed noise levels in some locations. The **Appendix J** (Technical working paper: Noise and vibration) of the EIS provides specific information on where these exceedances are predicted to occur and how they would be managed and mitigated.

Medical and education businesses within the Annandale-Camperdown business cluster near Parramatta Road and Pyrmont Bridge Road intersection are at a greater risk of being affected by construction activities that produce vibration and noise. The commercial office businesses along Lilyfield Road may also have heightened noise and vibration impacts due to the close proximity of these uses to the Rozelle civil and tunnel site (C5). Any impacts are likely to be more of an annoyance impact and would be unlikely to result in significantly reduced productivity.

Business visibility

Businesses that rely on storefront exposure to attract customers may be affected by the presence of construction hoardings or reduced visibility of business advertising during construction. This has the potential to directly affect business revenue and turnover as customers do not see or are less inclined to enter a business due to construction activity.

A change in pedestrian or vehicle routes and traffic volumes may also affect the exposure of businesses to potential clients. Although people may not be inclined to access a business on the day they see it, they may remember a business and travel to it in the future. A reduction in business exposure due to construction hoardings or detours may reduce the number of future customers, affecting business revenue.

Business clusters may experience a slight reduction in business visibility due to people avoiding highly congested areas, however this variance in likely to be negligible. Construction hoardings and compounds are unlikely to block sightlines to any of the business clusters.

Demand for services

Construction activity also generates regional demand for services such as construction recruitment agencies, construction companies and resource suppliers. Although potentially not benefiting businesses in the local business precincts, construction activities do stimulate the broader economy, creating more employment opportunities both within and outside the precincts.

Summary of business impacts

As the sensitivity of business clusters varies dependent on the level of service provision they provide (ie serve a local, district or regional trade catchments) and how sensitive the businesses are to changes in amenity and accessibility, the ability of a business to adapt to an environment may affect business viability and turnover. The businesses vulnerability to an impact may deteriorate more quickly dependent on the duration and severity of exposure to construction activities.

Businesses repeatedly exposed to construction activities may be more susceptible to construction fatigue, which may have direct social and economic consequences, particularly if the business is already struggling to remain operational. Although numerous business clusters are likely to experience a change to the baseline socio-economic condition, in terms of the spatial extent of business impact across the broader region, construction effects are relatively localised. A number of convenience and food and beverage businesses, in close proximity to the construction sites, may in fact benefit from increased passing trade due to the additional construction workers in the locality.

To minimise the consequence and likelihood of impacts on businesses, a Business Management Plan is recommended to manage, minimise and avoid potential construction effects. The duration of construction effects on businesses would be for a medium-long term with the severity of change from the existing baseline condition medium. Effects on businesses are generally localised or limited to a suburb extent. The likelihood of construction effecting business operations is possible, with the consequence minor. Considering this, the overall impact of construction activities on the socio-economic environment is a minor negative.

7.10 Social infrastructure

Social infrastructure that is more sensitive to changes in the baseline condition include, educational institutions (including preschools, schools, universities, TAFE colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching) and active recreation areas (including parks and sports grounds).

As outlined in the above sections, changes in access and amenity for some social infrastructure facilities are anticipated during construction. This may arise from the introduction of construction sites to a locality or modifications to the transport network. The impacts of construction upon access and connectivity are outlined in **section 7.1.** An overview of the construction impacts on local amenity is provided in **section 7.2.**

Changes in amenity may affect how users interact with, or enjoy an environment, or their ability to participate and concentrate. The sensitivity of a social infrastructure user to a construction impact would vary dependent on proximity to the construction activity, the individual's sensitivity to the construction impact (ie noise, dust, vibration) and the duration of the activity.

The consequence of changes to access would vary across the spectrum of social infrastructure users, depending on what service or activity is undertaken at the facility. For instance, active sporting facilities, schools and hospitals may require good vehicle access to sustain these facilities. Access to these facilities during construction may be affected by delays or diversions and a reduction in the availability of car parking. A reduction in the convenience of access to social infrastructure may also deter users and potentially affect community participation levels, which would have an indirect impact on community values (see **section 7.3**).

Table 7-5 details the social infrastructure that has a higher likelihood of experiencing multiple effects of construction activity. The consequence of an impact on social infrastructure would vary dependent on the severity of change from the existing environment and the sensitivity of use types to construction effects. For instance, education facilities and childcare centres would be more sensitive to noise impacts as they may affect the capacity of students to hear and concentrate during lessons.

Social infrastructure users exposed to multiple construction activities may also be more susceptible to construction fatigue, which may have direct social and economic consequences.

Table 7-5 Social infrastructure likely to experience multiple construction effects

Construction site	Use type	Social infrastructure facility	Change to environment	Potential socio-economic effects
Haberfield Option A Haberfield and Ashfield Option B	Place of worship	Kingdom Hall of Jehovah's Witnesses at 12 Wattle St, Haberfield	· Day and night-time noise exceedances anticipated (>11 dBA) · Increased construction vehicles (Wattle Street) · Visual amenity reduction · Construction dust	· Reduced amenity and access, particularly when services and events are occurring · Competition for street parking
Haberfield Option A	Outdoor recreation	Timbrell Park at Henley Marine Drive, Five Dock	· Reduced access due to a decline in intersection performance (AM and PM peak)	· Access delays, particularly when grounds are used for PM sports
Haberfield and Ashfield Option B	Childcare centre	The Infants Home at 17 Henry St, Haberfield	· Day-time noise exceedances anticipated (>11 dBA) · Increased construction traffic on Alt Street	· Road safety · Reduced concentration · Reduced amenity during outdoor play and sleep times

Construction site	Use type	Social infrastructure facility	Change to environment	Potential socio-economic effects
Haberfield and Ashfield Option B	Educational facility	Juvenile Justice – Yasmar training facility	· Day-time noise exceedances anticipated (>11 dBA) · Vibration effects	· Disturbance of concentration and productivity
Haberfield and Ashfield Option B	Childcare centre	Chaya's Family Day Care 12/111 Alt Street, Ashfield	· Day-time noise exceedances anticipated (>11 dBA) · Vibration effects · Increased construction traffic on Alt Street · Construction dust	· Road safety · Reduced concentration capacity · Reduced amenity during outdoor play and sleep times
Haberfield and Ashfield Option B	Childcare centre	Nurjahan's Family Day Care, 12a/115 Alt Street Ashfield	· Day-time noise exceedances anticipated (>11 dBA) · Vibration effects · Increased construction vehicles on Alt Street · Construction dust	· Road safety · Reduced concentration capacity · Reduced amenity during outdoor play and sleep times
Haberfield and Ashfield Option B	Educational facility	Haberfield Public School - 24-26 Denman Avenue, Haberfield	· Increased construction vehicles on Bland Street	· Road safety for students · Access delays, particularly at school pick up time (pm) · Competition for parking
Darley Road civil and tunnel site (C4)	Childcare centre	Explore and Develop, 372 Norton Street, Lilyfield	· Day-time noise exceedances anticipated (>11 dBA)	· Reduced amenity during outdoor play and sleep times
Darley Road civil and tunnel site (C4)	Childcare centre	Billy Kids learning, 64 Charles St, Lilyfield	· Day-time noise exceedances anticipated (>11 dBA)	· Reduced amenity during outdoor play and sleep times
Victoria Road civil site (C7)	Childcare centre	Rosebud Cottage Child Care Centre at 5 Quirk Street, Rozelle	· Day-time noise exceedances anticipated (>11 dBA) · Changes in local road access · Increase construction vehicles on Quirk Street	· Road safety for students · Access delays, particularly at school pick up time (pm) · Competition for parking · Reduced amenity during outdoor play and sleep times
Rozelle civil and tunnel site (C5)	Outdoor recreation	Easton Park, Lilyfield Road, Rozelle	· Day-time noise exceedances anticipated (>11 dBA) · Vibration effects · Construction dust · Increased construction vehicles on Lilyfield Road	· Reduced road safety particularly around playground · Competition for parking · Reduced amenity

Construction site	Use type	Social infrastructure facility	Change to environment	Potential socio-economic effects
The Crescent civil site (C6)	Outdoor recreation	Glebe Foreshore Parks, Chapman Road, Glebe	· Vibration effects · Visual amenity changes (views to construction compounds across Rozelle Bay) · Local and arterial road alterations (Chapman Road and The Crescent)	· Reduced amenity · Reduced accessibility due to local and arterial road alterations
Iron Cove Link civil site (C8)	Educational facility	Rozelle Public School, 663 Darling St, Rozelle	· Day-time noise exceedances anticipated (>11 dBA) · Increased construction vehicles on Victoria Road	· Road safety for students · Student concentration capacity and productivity
Iron Cove Link civil site (C8)	Childcare centre	Rozelle Out of School Hour Care, 663 Darling St, Rozelle	· Day-time noise exceedances anticipated (>11 dBA) · Increased construction vehicles on Victoria Road	· Reduced amenity during outdoor play · Road safety
Iron Cove Link civil site (C8)	Outdoor recreation	King George Park, Manning Street, Rozelle	· Vibration effects · Day-time noise exceedances anticipated (>11 dBA) · Local road alterations · Increased construction vehicles	· Reduced amenity · Access delays and competition for parking, particularly when grounds are used for sport
Pyrmont Bridge Road tunnel site (C9)	Educational facility	Bridge Road School at 127 Parramatta Road, Camperdown	· Day-time noise exceedances anticipated (>11 dBA) · Construction dust · Increased construction vehicles · Vibration effects · Arterial road alterations	· Road safety for students · Access delays, particularly at school pick up time (pm) · Competition for parking · Reduced amenity during outdoor play · Student concentration capacity and productivity
Campbell Road civil and tunnel site (C10)	Outdoor recreation	Sydney Park	· Day-time noise exceedances <11 dBA)	· Slight reduction in amenity

As identified in **section 5.2**, there are a number of other social infrastructure facilities (not listed in the above table) within close proximity to the construction sites. There is a possibility that these facilities may experience a small change to the baseline socio-economic environment. The possible effects may include:

· A slight reduction in accessibility due to the increase number or construction vehicles or temporary road alterations

· An increase in competition for parking, particularly around facilities that attract larger numbers of people for a longer duration of time, such as places of worship, schools and sporting facilities

- Small changes to amenity, mostly to do with changes in the visual landscape, noise or dust (dependent on wind direction).

To minimise the consequence and likelihood of impacts on social infrastructure, a Social Infrastructure Plan is recommended to manage, minimise and avoid potential construction effects. The Plan should to be prepared before construction with the following provisions recommended for inclusion:

- Identify social infrastructure that has the potential to be adversely affected by construction activities
- Develop, in consultation with the owners of the identified social infrastructure, measures that could be implemented to maintain appropriate vehicular and pedestrian access, management measures for noise exceedances and safety measures, particularly around areas where children are present.

The Social Infrastructure Plan is recommended to be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project.

Although 17 social infrastructure facilities are likely to experience a change to the baseline socio-economic condition, in terms of the spatial extent of construction impact, effects are relatively localised. The duration of possible effects would be for a medium-long term with the severity of change from the existing baseline condition medium for facilities in close proximity, to small for those further away. There is a high likelihood that construction effects would influence the operation of some social infrastructure facilities and the experience of users. The likelihood and consequence of potential impact on social infrastructure would reduce the further the facility is from the construction site. Considering this, the overall significance of impact on the socio-economic environment is a moderate negative.

8 Assessment of operational impacts

The following sections provide an assessment of the potential socio-economic impacts (positive and negative) likely to occur due to the operation of the project. The assessment determines the consequence, likelihood and significance for impacts to occur and to identify measures to mitigate the negative impacts and enhance the benefits. The assessment considers impacts on:

- Access and connectivity
- Local amenity
- Community values
- Population and demography
- Economy.

A number of significant changes have been made to the project design following early public consultation. Some of the significant design changes developed have made positive adjustments to improve the operational project outcome. These include:

- Inclusion of Iron Cove Link into the project design
- Refinement to the design of the Rozelle interchange to be located predominantly below ground and largely to the north of Rozelle Rail Yards. This has enabled the opportunity for the creation of a significant open space area and active transport links (north–south and east–west) as a result of the undergrounding of transport infrastructure
- Removal of Camperdown ramps and realignment of the mainline tunnels further west/south
- Adjustment of the mainline tunnel from three to four traffic lanes in each direction
- Selection of ventilation facility locations to minimise local air quality impacts on nearby receptors
- Adjustments to construction staging to enable the mainline tunnel to be operational one year ahead of the remainder of the project (ie the Rozelle interchange).

8.1 Access and connectivity

8.1.1 Road network

As identified in **section 5.3**, strategic, district and local centres are generally located near arterial roads. There are a number of reasons behind this concentration. Industries need to be located where they have a direct and easy access to their suppliers, customers and employees. As such, any alterations to the efficiency of the road network would have a noticeable impact on local and regional economic development (business location decisions etc.).

Strengthening the road network may also create and enhance equity, social cohesion and integration by giving a broader cross section of citizens access to the same opportunities. Efficient road networks may improve the ability for individuals to access education, employment, health care, entertainment or businesses.

Appendix H (Technical working paper: Traffic and transport) of the EIS identified the changes to the efficiency and connectivity of the road network, intersection performance and travel times that would occur across the study area, upon operation. This working paper has assessed the impacts of an operational project scenario at opening in 2023 and at ten years after opening in 2033, in accordance with *Roads and Maritime Traffic Modelling Guidelines 2013*.[43] This section utilises the findings from

[43] Includes NorthConnex, M4 Widening, M4 East, New M5 and the M4-M5 Link but assumes no Sydney Gateway, Western Harbour Tunnel, Beaches Link or F6 Extension.

the 2033 traffic scenario[44] to identify socio-economic impacts that would likely occur due to the operation of the project.

From a network productivity perspective, the addition of the M4-M5 Link would provide a significant overall benefit. As shown in **Table 8-1** an overall increase of 499,000 daily vehicle kilometres travelled (VKT) and a reduction of 46,000 daily vehicle hours travelled (VHT) on the road network are forecast. This means that more trips could be made on the network in a shorter time. The increase in VKT and reduction in VHT is mainly due to traffic using the new motorway, with reductions in daily VKT and VHT forecast on the non-motorway roads.

Table 8-1 Comparison of daily VKT ('000 km) and VHT ('000 hours) for metropolitan Sydney under future 2033 scenario

	2033 Without the project		2033 With project		Change	
	VKT ('000 km)	VHT ('000 hrs)	VKT ('000 km)	VHT ('000 hrs)	VKT ('000 km)	VHT ('000 hrs)
Motorway	31,029	592	32,014	603	985	-11
Other	**101,901**	**4,670**	**101,415**	**4,613**	**-486**	**-57**
Total	132,930	5,262	133,429	5,216	499	-46

Table 8-2 identifies the percentage changes in daily VKT, VHT and average speeds in 2033, with and without the project, within the LGAs that are closest to the project. All LGAs, apart from the former Botany Bay LGA, would benefit from reduced traffic on surface roads. The increase in VKT and VHT in the former Botany Bay LGA are likely to be due to forecast increases in daily traffic on surface roads between the St Peters interchange and Sydney Airport.

Table 8-2 Change in daily travel distance, time and average speed by LGA in 2033

LGA	Daily VKT	Daily VHT	Daily Average Speed
Former Botany Bay	5%	13%	-7%
Burwood	-2%	-3%	1%
Canada Bay	-1%	-1%	0%
Canterbury-Bankstown	-1%	-4%	3%
Inner West	-11%	-21%	14%
Former Rockdale	0%	-1%	1%
Strathfield	-1%	-4%	3%
City of Sydney	-2%	-2%	0%

Table 8-3 identifies socio-economic benefits of efficient road networks for individuals and businesses. Social infrastructure is also likely to benefit from the improved network performance, such as improved reliability for emergency services and improved access to community facilities.

Table 8-3 Advantages of good road networks

Businesses	Individuals
· Flexibility · Accessibility · Security · Reliability · Minimised transit time · Improved competitiveness · High quality transportation for premium goods	· Flexibility · Individual treatment · Personal security · Meets family needs · Minimised travel time · Essential in rural or peri-urban areas · Comfort and privacy

Source: European Automobile Manufacturers Association (ACEA), July 1999

[44] The 2033 scenario has been chosen as it is a requirement of the SEARs and the Roads and Maritime Traffic assessment guidelines A traffic impact analysis has been undertaken to assess the impact of a project only scenario at opening (2023) and ten years after opening (2033), as required in the Roads and Maritime assessment guidelines,

The effect of the project would be long-term and have the capacity to affect a large number of people and businesses across the Greater Sydney Region. The change from the existing baseline environment would be large. The consequence would be major and likelihood would be near certain. Therefore, the significance of effect is considered to be major positive.

In relation to interchange performance, **Table 8-4** identifies the percentage change (without project vs with project) to the network performance at Wattle Street, Rozelle and St Peters interchanges, in 2033 for the AM and PM peak periods between the with and without project scenarios. These interchanges would provide new connectivity with existing roads.

Table 8-4 Wattle Street, Rozelle, St Peters interchange network performance (percentage change for 2033 without project vs 2033 with project scenarios)

Average per vehicle in network	Wattle Street interchange network		Rozelle interchange network		St Peters interchange network	
	AM	PM	AM	PM	AM	PM
Average vehicle kilometres travelled in network (km)	-20%	-8%	14%	20%	11%	-1%
Average time travelled in network (mins)	-46%	-33%	-9%	-25%	-36%	58%
Average number of stops	-43%	-47%	-23%	-47%	-30%	39%
Average speed (km/h)	47%	38%	26%	59%	73%	-38%

The project is forecast to improve overall road network performance, with lower average travel times, fewer number of stops and higher average speed. This means a higher number of vehicles would reach their destination in less time and experience less congestion. These improvements are expected to be experienced at the Wattle Street and Rozelle interchange in both AM and PM peak and St Peters in AM peak.

Despite overall network improvements, St Peters interchange and surrounds are forecast to experience increased congestion and delays during the PM peak. The forecast in traffic growth for the St Peters interchange and surrounds is expected to cause delays and increase congestion for users. Negative socio-economic impacts associated with delays and congestion include reduced safety, health impacts, reduced amenity and community cohesion.

The associated socio-economic impacts at St Peters would be medium-long term and would have the capacity to affect a large number of people and businesses across the Greater Sydney Region. Variances from the existing baseline environment would be large and socio-economic impacts would be possible. Therefore, the significance of effect is considered to be moderate negative.

To mitigate the project impacts at the Wattle Street, Rozelle and St Peters interchanges, Roads and Maritime would undertake a Road Network Performance Review after 12 months of operation, in consultation with Transport for NSW and relevant councils. Strategies would also be developed to investigate and identify traffic management measures on the Frederick Street/Milton Street corridor, capacity improvements in the network, project staging options and demand management measures in the areas surrounding the Rozelle interchange. In addition, improvements would be expected when the proposed future Sydney Gateway and proposed future Western Harbour Tunnel and Beaches Link are completed.

Arterial and local road impacts

Table 8-5 identifies the local and arterial routes that are forecast to experience changes in traffic volumes due to the operation of the project in 2033. Changes to travel times along these roads would alter travel, local amenity and the amount of time individuals spend at business premises or recreational facilities. The screenline analysis refers to the boundaries set by the traffic and transport modellers to analyse directional and two-way traffic volumes, details of which are presented in **Appendix H** (Technical working paper: Traffic and transport) of the EIS.

The project would result in direct alterations to amenity (discussed in **section 8.2**), travel time and the amount of time individuals spend at business premises or social infrastructure facilities.

Table 8-5 Estimated traffic volumes (two way) on arterial and local roads as a result of the project (average weekday traffic)

East-west	2033 'without project'			2033 'with project'			Change	
	Volume of vehicles	Heavy vehicles	% Heavy vehicle	Volume of vehicles	Heavy vehicles	% Heavy vehicle	% of change all vehicles	% of change heavy vehicles
Ashfield-Haberfield precinct								
Lyons Rd	41,100	1900.00	5%	34,100	1360.00	4%	-17%	-28%
Leichhardt-Glebe precinct								
Norton Street	11,300	500.00	4%	9,700	120.00	1%	-14%	-76%
City West Link	66,000	4750.00	7%	53,600	2910.00	5%	-19%	-39%
Darley Rd	19,200	740.00	4%	19,400	740.00	4%	1%	0%
Marion St	7,700	110.00	1%	4,600	40.00	1%	-40%	-64%
Balmain Road	7,300	490.00	7%	5,900	380.00	6%	-19%	-22%
Catherine Street	9,500	400.00	4%	10,200	510.00	5%	7%	-28%
Johnston Street	16,000	600.00	4%	17,900	690.00	4%	12%	15%
Booth Street	8,500	80.00	1%	8,300	50.00	1%	-2%	-38%
Alexandria-Erskineville precinct								
Ross Street	14,300	800.00	6%	17,100	810.00	5%	20%	1%
Stanmore Road	38,300	2320.00	6%	32,700	1320.00	4%	-15%	-43%
Addison Road	8,700	400.00	5%	6,900	230.00	3%	-21%	-43%
Marrickville Road	18,100	890.00	5%	16,300	420.00	3%	-10%	-53%
King Street	24,100	990.00	4%	19,500	720.00	4%	-19%	-27%
Wyndham Street	25,600	1310.00	5%	24,600	1060.00	4%	-4%	-19%
Botany Road	35,200	1520.00	4%	34,800	1270.00	4%	-1%	-16%
All three precincts								
Parramatta Road	66,100	4130.00	6%	48,500	2110.00	4%	-27%	-49%
Outside of study precincts								
Elizabeth Street	24,000	730.00	3%	23,000	660.00	3%	-4%	-10%
Eastern Distributor	171,900	14270.00	8%	165,600	12630.00	8%	-4%	-11%
Gladesville Bridge	93,800	-	-	98,500	-	-	5%	
Sydenham Road	31,500	2590.00	8%	29,000	2010.00	7%	-8%	-22%
Sydney Harbour Bridge	206,400	-	-	208,100	-	-	1%	
Sydney Harbour Tunnel	122,600	-	-	120,400	-	-	-2%	
M4-M5 Link	-			169,400			-	

As identified above, the majority of roads are forecast to experience a reduction in vehicle volumes reflecting the overall road network improvements. This would result in direct and indirect socio-economic benefits for a large number of residents, businesses and social infrastructure facilities and users across the Greater Sydney Region. Reduced vehicle traffic speeds and volumes on local and arterial roads tend to:

- Make walking[45] and cycling[46] safer, more comfortable and more convenient. Improved walking and cycling conditions are particularly important for people with disabilities, the elderly, and children, who are more dependent on non-motorised travel, and often have difficulty crossing busy traffic
- Improve safety and reduce the severity of vehicle crashes, particularly those involving pedestrians and bicyclists[47]
- Increase the attractiveness and amenity of an environment
- Reduce business visibility, which may impact business revenue
- Increase neighbourhood interaction and in turn improve community connectivity and social cohesion.

Reduced traffic volumes and traffic speeds along local and arterial roads would have a varying effect on businesses, dependent on their sensitivity to amenity and dependency on passing trade. For example, a café that is likely to benefit from increased amenity, however, a service station may be more sensitive to a loss in passing vehicles.

The socio-economic effects of improvements to the arterial and local road network would be medium-long term and would have the capacity to affect a large number of individuals, social infrastructure and businesses within the Greater Sydney Region. Variances from the existing baseline environment would be moderate and socio-economic benefits would have a high likelihood of occurring. Therefore, the significance of effect is considered major positive.

While the overall network is expected to improve the project may negatively affect the amenity and accessibility of a number of residential properties, businesses and social infrastructure facilities where traffic volumes are predicted to increase. These are located within Annandale (Johnston and Catherine streets), Camperdown (Ross Street), Leichhardt (Darley Road) and north of the Iron Cove Bridge (Victoria Road/Gladesville Bridge).

Reduced localised network performance would not only directly affect properties along these streets, they may also result in some 'rat running' along surrounding streets as motorists seek alternate routes to avoid congested areas. Although these locations may be affected by increased traffic it would be likely to only affect a small of number of residential and business properties in the study area. **Appendix H** (Technical working paper: Traffic and transport) reports that while these roads are negatively affected on operation of the project, it is forecast that traffic volumes would ease when the WestConnex program of works and the proposed future Sydney Gateway, Western Harbour Tunnel and Beaches Link are completed. As such, the change from baseline conditions would be small, medium-long term, and confined to the suburbs of Annandale, Camperdown and Leichhardt. The consequence would be moderate with a low likelihood. Therefore, the significance of this impact is considered to be minor negative.

[45] Ellen Vanderslice, Portland Pedestrian Design Guide, Pedestrian Transportation Program, City of Portland (503-823-7004; www.trans.ci.portland.or.us), 1998.

[46] David L. Harkey, Donald W. Reinfurt, J. Richard Stewart, Matthew Knuiman and Alex Sorton, The Bicycle Compatibility Index: A Level of Service Concept, Federal Highway Administration (www.hsrc.unc.edu/research/pedbike/bci), 1998

[47] C.N. Kloeden, A.J. McLean, V.M. Moore and G. Ponte, Travelling Speed and the Risk of Crash Involvement, NHMRC (Adelaide; http://plato.raru.adelaide.edu.au/speed/index.html), 1998; Jack Stuster and Zail Coffman, Synthesis Of Safety Research Related To Speed And Speed Limits, FHWA No. FHWARD-98-154 (www.tfhrc.gov/safety/speed/speed.htm), 1998; "Pedestrian Safety," Oregon Bicycle and Pedestrian Plan, Oregon DOT (www.odot.state.or.us/techserv/bikewalk/planimag/pedestrn.htm).

Local road alterations

Road alterations may result in driver frustration and confusion by having to use unfamiliar roads or because the use of alternative roads may increase travel time. However, these effects are usually temporary as drivers become familiar and accustomed to new routes.

The Iron Cove Link surface works would create a permanent local road change, where Clubb Street would be closed at the intersection with Victoria Road. Despite this, property access would be maintained with efficient alternative routes available through Toelle, Manning and Callan streets.

Residents along Toelle, Manning and Callan streets are likely to experience minor increases in vehicles using these streets as an alternative to Clubb Street. The increase in the number of vehicles is small and unlikely to result in any discernible adverse impacts.

Road alterations would be long-term and localised. The change from the existing baseline environment would be small. The consequence of change would be moderate and with a low likelihood to result in socio-economic effects. As such, the significance of road alterations related impacts would be minor negative.

Heavy vehicle movements

Table 8-5 identifies the forecast travel patterns for heavy vehicles. Overall, the project would result in a reduction in the number of heavy vehicles on surface roads, as heavy vehicles utilise the M4-M5 Link. This would result in a major change from baseline conditions and with a high likelihood to improve amenity and community safety, health and well-being. The effects would be medium-long term and would benefit residents, businesses and community facilities located in the Inner West and City of Sydney LGA. The change from the existing baseline environment would be medium. The consequence of change would be moderate and the likelihood high. As such, the overall significance of impact on the socio-economic environment would be moderate positive.

Businesses along Parramatta Road, King Street, Marrickville Road and Sydenham Road are forecast to experience significant reductions in heavy vehicles of 20-50 per cent, which would result in improved amenity, shopping experience and in turn business revenue. The effects would be long-term, and would affect the local and regional economy. The change from the existing baseline environment would be medium. The consequence of change would be slight and the likelihood high. As such, the overall significance of impact on the socio-economic environment would be moderate positive.

While there is an overall decrease in daily heavy vehicle volumes on surface roads across the network, Johnston Street and Ross Street are forecast to experience an increase in heavy vehicles. This is likely to result in negative socio-economic impacts upon both residents and social-infrastructure users, Social infrastructure items that may be particularly sensitive negative amenity and safety impacts include:

- Health and age care facilities (eg Annandale Occasional Care, Annandale Nursing Home, St Basil's Sister Dorothea Village)
- Childcare centres (eg Toxteth Kindergarten) and Schools (eg Annandale Public School, Annandale North Public School and Forest Lodge Public School)
- Churches (eg Hunter Baillie Memorial Presbyterian Church, Village Church Annandale).

The project would result in a small, long-term change in baseline conditions and affect the suburbs of Annandale and Forest Lodge. The consequence of change would be moderate and the likelihood high. Therefore, the significance of effect on the socio-economic environment is considered moderate negative.

Summary of impact

Appendix H (Technical working paper: Traffic and transport) forecasts that the M4-M5 Link would improve network productivity across the Greater Sydney network. This means that more trips are expected to be made or longer distances travelled in the network, in a shorter time. This would also support the long-term economic growth of Sydney through improved motorway access and connections, linking Sydney's international gateways to key places of business. This effect on the

road network would be long-term and at a regional spatial extent. The consequence of change would be major and the likelihood almost certain. The significance of impact on the socio-economic would be major positive.

8.1.2 Pedestrian and cyclist network

A successful pedestrian and cyclist network provides infrastructure that enables convenient, safe and enjoyable walking and cycling trips. The socio-economic benefits from active transport networks include enhanced community connectivity, increased opportunities for social interaction and community cohesion, reduced car dependency and reduced cost of travel. Reducing car dependency may lower household costs (the average weekly cost of running a car in Sydney is $419 per week[48]), ease road congestion, and improves air quality, noise and health outcomes for individuals and the community.

A more active lifestyle results in numerous health benefits for the community, including maintaining a healthy weight and improved mental health. Improving the quality of the pedestrian and cyclist network encourages increased usage. Well designed, safe (eg separated from vehicles), well connected (eg to town centres, open space and other regional active transport networks) pedestrian and cycle routes are attractive to all members of the community. The Bays Run, which is a seven kilometres, shared pedestrian and cycle path around Iron Cove, is a case in point and is an extremely popular active transport route.

Community consultation identified that the protection and enhancement of the existing pedestrian and cycling network were key priorities. The following routes were considered to have major community value for commuter and recreational purposes:

- The Bay Run
- Glebe Foreshore
- Whites Creek to Buruwan Park
- Anzac Bridge cycleway
- Victoria Road shared path
- City West Link shared path.

The project has been designed to minimise impacts on existing recreational facilities. This is of particular note for the Glebe foreshore walks and the Bay Run which would be maintained or improved/extended upon operation.

Appendix N (Technical working paper: Active transport strategy) of the EIS identified that there is currently poor active transport connectivity:

- Between Rozelle and Balmain, as a result of Victoria Road, which is a highly trafficked arterial road
- Along the shared bike/pedestrian path on Victoria Road between the Iron Cove Bridge and Anzac Bridge. The path is of inadequate width, has an uneven surface and poor amenity due to proximity to traffic on Victoria Road. In addition, there is the potential for conflict between pedestrians and cyclists
- At Rozelle Rail Yards, which currently acts as a significant barrier between the communities of Annandale, Lilyfield and Rozelle. The barrier also includes City West Link and the light rail corridor.

In addition, the report highlights that the current active transport network is fragmented, planned by a number of agencies and has suffered from inadequate funding. Consequently, many gaps exist within the network. For example, there is a deficiency in regional north-south routes around the Rozelle Rail Yards and east-west routes around the Haberfield construction area.

[48] Australian Automobile Association, March to June 2016

The construction of the project would result in the removal of both the existing Victoria Road and City West Link pedestrian/cycle bridges. However, upon operation, as outlined in **Appendix N** (Technical working paper: Active transport strategy) of the EIS, these bridges would be replaced by two new pedestrian/cycle connections. This new infrastructure would not only preserve, but also improve the existing active transport connections, to be wider and not so close to the noise and pollution of traffic. Overall, the effect would be long-term at a suburb extent. The change from the existing baseline environment would be small. The consequence of change would be moderate and the likelihood low. As such, the overall significance of impact on the socio-economic environment would be minor positive.

Utilising existing plans, policies and outcomes of stakeholder consultation, **Appendix N** (Technical working paper: Active transport strategy) of the EIS makes recommendations in relation to additional active transport infrastructure required. **Table 8-6** identifies the active transport infrastructure that the project intends to deliver. The proposed cycle and pedestrian paths would form part of the operational program of works for both the SMC and other agencies[49], creating connections that have reasonable grades and widths and would be separated, where possible, from vehicular traffic.

Table 8-6 Active transport proposed to be delivered as part of the project

Route	Type	Approx. length	Benefits
Rozelle Rail Yards Link *Links the Bays Run, The Bays Precinct and the Greenway in the west to the Anzac Bridge and city in the east*	Shared underpass	150m	· Links the Anzac Bridge to The Bays Precinct to Lilyfield Road at the western end of Rozelle Rail Yards · Provides the junction connecting Rozelle Rail Yards and Victoria Road to The Bays Precinct · Provides north-south connectivity between Glebe and Annandale with Rozelle and Balmain · Provides a connection from Annandale and Leichhardt to The Bays Precinct via the Rozelle Rail Yards · Removes the need for an at-grade crossing at City West Link · Connects Lilyfield to the Rozelle Bay light rail stop · Designed to ensure crime prevention through environmental design and disability principles are met
	Shared path	1,000m	· Provides the link between Victoria Road and the Lilyfield Road at the Light Rail Depot
Victoria Road - Iron Cove Link *Links the northern suburbs of Drummoyne and Russell Lea and Chiswick to The Bays Precinct and the CBD*	Separated Cycle Way	250m	· Provides a separated shared path on the western side of Victoria Road from Iron Cove Bridge · Connects the eastern side of the Rozelle Rail Yards along Victoria Road to the intersection of Robert Street · Connects the existing retail centres on Darling Street and Victoria Road as well as social infrastructure and active and passive recreation facilities
	Separated Cycle Way	450m	· Links the intersection of Springside Street to the Iron Cove Bridge and the Bay Run
	Bridge	200m	· Connects Victoria Road to the Crescent over Rozelle Rail Yards · Connects to Rozelle Bay light rail stop · Provides north-south connectivity between Glebe and Annandale with Rozelle and Balmain
	Shared Path	400m	· Connects Victoria Road to The Crescent
	Shared	500m	· Connects The Crescent to James Craig Road existing

[49] Inner West Council, RMS and Sydney Water.

Route	Type	Approx. length	Benefits
	Path		shared path
Whites Creek Link *Links Parramatta Road to the Rozelle Rail Yards and onto Callan Park*	Bridge	200m	· Links the intersection of Brenan Street and Railway Parade over or under City West Link connecting to the Rozelle Rail Yards Link · Links residential communities in Annandale and Lilyfield · Addresses connectivity from Whites Creek to the Rozelle Rail Yards, crossing the existing light rail line and City West Link
Johnston Creek Valley Link *Extends the existing Johnston Creek pathway to connect Glebe Foreshore to Parramatta Road*	Bridge/Shared path	300m	· Connects Easton Park to The Crescent through the Rozelle Rail Yards · Addresses connectivity from Johnstons Creek to the Rozelle Rail Yards · Links Glebe Foreshore and parklands to the Rozelle · Rail Yards, Parramatta Road and The Bays Precinct
	Shared path	500m	· Connects The Crescent, Jubilee Park and the existing Glebe foreshore

The works outlined in the table above would provide substantial improvements to the existing active transport network, addressing important gaps. These improvements would directly benefit the residential communities of Rozelle, Lilyfield, and Annandale/Glebe, which are within the Leichhardt-Glebe precinct.

In relation to access and connectivity for pedestrian and cyclists, the project has the potential to positively affect the following socio-economic elements:

- Health outcomes
- Local amenity
- Social interaction/community severance
- Reduced travel costs and time.

This would occur through the facilitation of new or enhanced, safer movement patterns around the study area, linking pedestrians and cyclists to popular waterfront and open space areas, such as the proposed open space at Rozelle Rail Yards, Glebe foreshore, Easton Park, the Bays Run and King George Park in Rozelle. In addition, upgraded pedestrian and cyclist connectivity, as detailed in **Appendix N** (Technical working paper: Active transport strategy) of the EIS, would allow connectivity to, through and from The Bays Precinct Transformation Precinct. The active transport proposals to be delivered by the project would support the objectives within The Bays Precinct Transformation Plan to facilitate a world-class mass and active transport solution[50]. These improvements would encourage additional recreational and commuter users, benefiting all members of the community including persons with mobility impairments or families with young children.

The improvements would also have the potential to increase connectivity (and reduce community severance) between the communities of Rozelle, Balmain, Lilyfield, Annandale and Leichhardt as well as potentially providing increased patronage for businesses located on Victoria Road, Annandale Street and Darling Street. Walkers and recreational and commuter cyclists would enjoy improved amenity (reduction in noise and pollution) due to the location of routes further away from traffic, where possible.

Commuters would enjoy reduced travels costs and time savings to the Sydney CBD and other parts of the study area, benefiting from the provision of safer, well connected, dedicated pathways and

[50] UrbanGrowth NSW, October 2015, The Bays Precinct Sydney Transformation Plan

bridges, particularly along busy arterial roads such as Victoria Road, which is presently poorly serviced.

The proposed enhancements to the pedestrian and cyclist network would be long-term, benefiting the suburbs of Annandale, Leichhardt, Lilyfield, Rozelle and Balmain. In addition, such improvements would contribute positively to the regional active transport network with the potential to affect a wider catchment of people. The provision of these additional links may also act as a catalyst for improvements to other active transport networks further afield. The consequence of impact is major, with a high likelihood. Therefore, the significance of impact is considered a major positive.

8.1.3 Public transport network

A Plan for Growing Sydney[51] recognises the importance of ensuring housing is located in suitable locations with good access to public transport. This aims to minimise the impacts of travel on the environment, contribute to housing affordability, reduce travel costs, reduce congestion and improve quality of life for residents and workers.

This assessment concentrates on the bus network, as it is the public transport system most affected by the M4-M5 Link. However, it is recognised that access to the Rozelle light rail stop would improve upon operation of the project. The new/enhanced active transport routes through the Rozelle Rail Yards would provide access to a wider catchment, particularly to the residential areas to the north in Lilyfield.

Appendix H (Technical working paper: Traffic and transport) of the EIS identified that from a public transport network perspective the following changes in 2033 would be expected:

- The project demonstrates improvements in Parramatta Road bus travel times during the AM peak. This would be due to the forecast reductions in the surface road network traffic demand. In the PM peak, bus travel times along Parramatta Road are predicted to reduce, particularly for eastbound traffic, although it would also occur for westbound traffic. These improvements would reduce travel times and make a measureable change to baseline conditions, benefiting a large number of residents in Annandale, Leichardt and Camperdown
- In relation to the Rozelle interchange, longer city bound journey times in the AM peaks are forecast due to the congested traffic conditions over the Anzac Bridge, combined with increased demand to Bathurst Street and the Sydney Harbour Bridge. This would have a minor negative impact on the existing socio-economic environment. Mitigation measures for this impact have been addressed **Appendix H** (Technical working paper: Traffic and transport) and after implementation, the residual impact on the socio-economic environment would be negligible
- Outbound bus movements along Anzac Bridge/Victoria Road would improve in both the AM and PM peak periods. This improvement would reduce travel times and make a measureable change to baseline conditions, affecting a large number of residents in Lilyfield, Balmain and Rozelle.

Table 8-7 identifies the predicted long-term (2033) changes in travel times for buses due to the project.

Table 8-7 Changes to average travel time for buses predicted in 2033 due to the project (percentage change for 2033 without project vs 2033 with project scenarios)

Bus service/direction	AM peak hour average travel time minutes (approx.)	PM peak hour average travel time minutes (approx.)
Wattle Street interchange		
Parramatta Road (eastbound)	- 4.0	- 2.5
Parramatta Road (westbound)	0	- 1.0
Rozelle interchange		
Victoria Road/Anzac Bridge (city bound)	+ 1.5	-1.0

[51] NSW Department of Planning and Environment, 2014, *A Plan for Growing Sydney*

Bus service/direction	AM peak hour average travel time minutes (approx.)	PM peak hour average travel time minutes (approx.)
Anzac Bridge/Victoria Rd (outbound)	- 8.0	- 6.5
St Peters interchange		
St Peters	0	+ 2.5

The effect of operation on the public transport network would be medium term at an LGA extent. The change from the existing baseline environment would be small. The consequence of change would be slight and the likelihood possible. The significance of impact is considered minor positive.

The exception to this is the city bound route from Victoria Road across the Anzac Bridge and Western Distributor during the AM peak. The change from the existing baseline environment in this case would be small (+1.5 minutes). Effects would be medium-long term at a suburb extent. The consequence of impact would be slight and with a likelihood possible. The significance of impact is considered a minor negative.

8.1.4 Parking availability

Changes to parking availability may affect the daily routine of a resident or business, level of activity, passing trade or business operations. Permanent reductions in on-street parking may deter visitors from accessing a business or community facility due to an increase in travel time and lack of convenience and may affect the vibrancy of a centre. It may also affect convenience and accessibility for residents, particularly those who rely on on-street parking.

A notable number of businesses (18 per cent) identified concerns that the project, on operation, would have an adverse impact on customer and employee parking. This was a particular concern for businesses reliant on passing trade. The operation of the project would not reduce on street car parking in commercial centres.

The operation of the project would result in a permanent loss of 23 on-street parking spaces in Rozelle, including:

- Five at the north-east end of Byrnes Street
- Nine at the north-east end of Clubb Street
- Seven at the north-east end of Toelle Street
- Two at the north-east end of Callan Street.

The majority of parking spaces to be removed would be located outside of acquired properties and therefore would be unlikely to result in any negative impact on the socio-economic environment. The effect would be long-term and at a locality extent. The consequence would be would be moderate with a rare likelihood of resulting in socio-economic impacts. As such, the significance of residential parking related impacts would be negligible.

Whilst the project would formalise the currently informal parking spaces at King George Park in Rozelle it is not expected that the number of available parking spaces would change overall. Formalising the car park would however improve the safety and efficiency of car parking arrangements at this location.

Overall, the effect of operation on parking at King George Park would result in small changes to existing baseline conditions. The effects would be long-term and affect residents within the Inner West LGA. The likelihood of improving safety and efficiency would be possible. Therefore, the overall significance of impact would be minor positive.

8.2 Local amenity

The following section outlines the effect of the presence of the project upon local amenity during operation. This assessment draws upon other relevant sections of the M4-M5 Link EIS, including noise and vibration, air quality and visual amenity. These elements, together and separately, affect local amenity through their influence on the quality of a place, its appearance/character, ambience,

and the way the community (both residents and visitors) experience their environment. This subsequently affects how and where people choose to live, shop and spend recreation time.

8.2.1 Landscape character and visual amenity

The operation of the project would result in changes to landscape character and visual amenity due to the presence of new and enhanced infrastructure, landscaping and other urban design features. Changes to the landscape character or the visual amenity of a street or suburb may affect the sense of belonging and identity of its residents and visitors and consequently community cohesion.

Appendix O (Technical working paper: Landscape and visual impact) of the EIS provides an assessment of the landscape character and visual impacts associated with the operation of the project. The potential impact of landscape character upon local amenity is discussed below.

Landscape Character

Appendix O (Technical working paper: Landscape and visual impact) of the EIS identifies a total of 33 Landscape Character Zones (LCZs) that have the potential to be affected by the surface components of the project. The assessment found that, upon operation of the project, four LCZs would be subject to high-moderate impacts, and four would be subject to high-moderate impacts as identified in **Table 8-8.**

Table 8-8 Landscape Character Zones (LCZs)

Significance of Impact	Landscape Character Zones (LCZ)	Project effects	Sensitive receivers
High-Moderate	LCZ 13 – Easton Park residential precinct	While there would be no physical change or addition of project elements within this LCZ, the proposed ventilation facility and outlets would comprise a new and uncharacteristic element in the outlook in terms of scale, mass and form of the structures.	· Residents within the suburb of Rozelle, particularly those to the south towards Lilyfield Road · Recreational users of Easton Park, O'Connor Reserve and Rozelle Commons · Businesses along Victoria Road.
	LCZ 15 – White Bay Power Station precinct (State heritage listed item)	The existing Victoria Road bridge (identified as a potential local heritage item) would be demolished and replaced with a new structure. The Proposed planting of trees along Victoria Road south of power station would seek to minimise the visual impacts of the road infrastructure on the White Bay Power Station precinct. It is recommended that future planting in this area be undertaken in consultation with UrbanGrowth NSW to ensure a balanced outcome is achieved from a visual/landscape, heritage and active transport perspective.	· Future residents and visitors to The Bays Precinct · Pedestrians and cyclists along Victoria Road · Businesses along Victoria Road.
	LCZ 24 – Callan Park	The alterations of the	· Recreational users of

Significance of Impact	Landscape Character Zones (LCZ)	Project effects	Sensitive receivers
	residential precinct	'protective' built form edge (from the demolition of properties along the southern side of Victoria Road) which, currently provides visual and noise protection from the road corridor. Some residences may experience increased views to Victoria Road. Land in this location that is not required for the operation of the project would be subject to future landscaping as outlined in the Urban Design Landscape Plan (ULDP) to be prepared in consultation with the local community.	King George Park · Residents along Byrne, Callan, Springside and Toelle streets.
	LCZ 30 – Barwon Park Road precinct	The ventilation facility proposed as part of the M4-M5 Link project would contribute to a substantial change in the outlook and backdrop.	· Recreation users of Sydney Park · Residents along Barwon Park Road and Euston Road.

The suburbs of Rozelle and St Peters would experience the most noticeable change in the landscape character and visual amenity of the environment as outlined in the table above.

Visual Impact

Appendix O (Technical working paper: Landscape and visual impact) of the EIS assessed a total of 18 locations for visual impacts. The built form components of the project would result in alterations to existing views for a number of residential properties. Some of these views would be altered due to the addition of built components of the project to the environment, including:

- Ventilation facilities and outlets
- Water treatment plants
- Electricity sub stations
- Air intake facilities
- Tunnel portals.

Table 8-9 identifies the locations that would be subject to High and High-Moderate visual impacts as identified in **Appendix O** (Technical working paper: Landscape and visual impact) of the EIS.

Table 8-9 Receptors identified as having High and High-Moderate impacts

Significance of impact	Receptors	Project effects	Sensitive receivers
High	Free-standing dwellings located on Foucart Street near the corner of Lilyfield Road	A low and potentially moderate number of these visual receptors would have the potential for the city skyline view to be interrupted by the ventilation facility.	· Residents along Foucart Street near corner of Lilyfield Road
	Residences within the vicinity of	A low and potentially moderate number of these visual receptors have the	· Residents along Hutcheson street

Significance of impact	Receptors	Project effects	Sensitive receivers
	Hutcheson Street and Denison Street near Lilyfield Road	potential for the city skyline view to be interrupted by the ventilation facility.	and Denison Street near Lilyfield Road
High	**R5 - Rozelle Rail Yards** View looking south from Easton Park to the project	Alterations to current views in response to the height and scale of the ventilation facility. The residences most impacted are around 300 metres from the ventilation facility, and are separated by some of the land within the Rozelle Rail Yards, Lilyfield Road and Easton Park.	· Residents in close proximity to Easton Park
	R7 - Rozelle Bay light rail stop Views looking north towards the project	The operation of the project would result in a change in view to the north, where the project would introduce new visual elements associated with the scale and contrasting form of the ventilation facility in the background, and the new pedestrian bridge in the foreground. The ventilation outlets would be highly visible given the removal of existing trees adjacent to the light rail stop, which currently provide visual screening from this outlook. However, landscaping has been recommended around all fixed infrastructure within the new parkland, which would provide screening of night lighting impacts viewed from this location. Increased night lighting impacts are also anticipated due to removal of screening vegetation at intersection of The Crescent/City West Link as viewed from multiple locations within nearby streets such as Bayview Crescent and Railway Parade, in contrast to the existing generally well screened and visually contained environment of Annandale.	· Pedestrians and cyclists
	IC4 - Iron Cove Link View looking south along Terry Street towards project	The proposed ventilation outlet would encroach into the existing view seen from apartment balconies, partly obscuring distant views to Callan Park.	· Residents along the west side of Terry Street
High -Moderate	**R5 - Rozelle Rail Yards** View looking south from Easton Park to the project	Alterations to current views in response to the height and scale of the ventilation facility. Recreational users, while experiencing a change in view, are temporary visitors to the area and would have shorter viewing durations of the project.	· Recreational users of Easton Park

Significance of impact	Receptors	Project effects	Sensitive receivers
	R6 - Rozelle Rail Yards View looking north from Glebe Foreshore Parklands to the project	Visual impacts to recreational users are anticipated, with a change to the current view across Rozelle Bay. This view currently includes the existing City West Link and other significant infrastructure such as working port areas, White Bay Power Station, Glebe Island grain silos and Anzac Bridge. Visual impacts relate to the inability to screen a significant length of the project along the Victoria Road intersection, along the south side of City West Link between Anzac Bridge and James Craig Road. While the ventilation outlets would comprise of contrasting elements within the immediate context, the separation distance and the overall extent of this view, would increase the capacity for the landscape to visually absorb these elements.	· Recreational users of Glebe Foreshore Parklands
	R7 - Rozelle Bay light rail stop Views looking north towards the project	*See effects outlined for R7 above.*	· Residents at Bayview Crescent · Users of Rozelle Bay light rail
	IC4 (Iron Cove Link) View looking south along Terry Street towards the project	The proposed ventilation outlet would encroach into the existing view seen from apartment balconies, partly obscuring distant views to Callan Park.	· Residents – Nagurra Place: south side

The operation of the project would result in potential alterations to views of the city skyline and partial loss to Rozelle Bay or Glebe Point. These alterations to views may have direct impacts on the amenity of the location and quality of life. However, new transport infrastructure would improve views for numerous properties in Lilyfield who presently overlook the industrial buildings and the Rozelle Rail Yards.

Overall, the impact on views would be medium-long term and affect a small number of residents in Rozelle. The change from baseline conditions would be small. The consequence of impact would be slight and the likelihood possible. Therefore, the significance of impact on the local socio-economic environment would be minor negative.

In addition, **Appendix O** (Technical working paper: Landscape and visual impact) of the EIS outlines that a landscape and visual impact mitigation strategy would be provided for the project to avoid, reduce and manage identified potential landscape and visual impacts during operation. This would include:

- The provision of substantial mature and semi-mature street-tree planting for screening and shade, and mixed sizing of planting where stratification of the canopy is desired
- The provision of high quality finishes to buildings and vent facilities to facilitate long term durability of the design for effect with minimal maintenance, eg use of hard rock rather that concrete with a pigment which may fade over time
- Improvement of open space to offset additional infrastructure, eg provision of street trees to adjoining local streets affected by the project
- Improvement of active transport links to reduce reliance on motorway and local roads for short journeys.

The visual character and identity of Rozelle, Lilyfield and St Peters would be altered from the baseline condition. However, the project has considered design options and a landscape and visual impact mitigation strategy would be implemented to enhance the visual character of the most affected areas. The changes from baseline conditions would be large. The effects would be long term and affect the Inner West LGA. The consequence would be major. However, the likelihood of adverse socio-economic affects would be low. Therefore, the significance of impact on the socio-economic environment would be minor negative.

8.2.2 Noise and vibration

Community consultation identified key concerns regarding changes to environmental noise and vibration due to the operation of the project. Concerns regarding operational noise and vibration were raised by 14 per cent of business survey respondents.

Exposure to environmental noise from traffic-related sources is reportedly the most annoying of all urban pollution types, interfering with enjoyment of daily activities and potentially affecting sleep and rest patterns[52]. It may also affect the function of social and business services (both positively and negatively), especially those that are dependent on a quiet environment (such as beauticians, health centres or outdoor dining areas).

Appendix K (Technical working paper: Human health risk assessment) of the EIS identified the following short and long-term health impacts that may result from increased environmental noise:

- Sleep disturbance
- Annoyance
- Hearing impairment
- Interference with speech and daily activities
- Children's school performance (through effects on memory and concentration)
- Cardiovascular health (elevated blood pressure).

Other effects for which evidence of health impacts exist, but for which the evidence is weaker, include:

- Mental health (exacerbation of existing issues) (usually in the form of exacerbation of existing issues for vulnerable populations rather than direct effects)
- Tinnitus (which may also result in sleep disturbance, anxiety, depression, communication and listening problems, frustration, irritability, inability to work, reduced efficiency and a restricted participation in social life)
- Cognitive impairment in children
- Indirect impact on the immune system.

The World Health Organization (WHO) estimates that more than one million healthy life years are lost every year in western Europe due to noise exposure.[53] The transport sector is a contributor to society's noise problem with road traffic being the largest single source of noise in the transport sector. The combination of increasing traffic volumes and urbanisation means that the problem would increase if no measures were taken to mitigate it[54].

[52] Dinno A, Powell C, King MM. A study of riders' noise exposure on a bay area rapid transit trains. J Urban Health. 2011;88:1–13.

[53] Babisch W, Bäckman A, Basner M et al Burden of disease from environmental noise. Bonn: WHO European Centre for Environment and Health 2011

[54] Henrik Andersson, Lina Jonsson, Mikael Ögren. Benefit measures for noise abatement: calculations for road and rail traffic noise 2013

Noise issues in NSW are managed by the NSW Environment Protection Authority (NSW EPA). The NSW EPA issued the *NSW Road Noise Policy* (RNP) in 2011. The *Noise Criteria Guideline* (NCG) (Roads and Maritime, 2015) and *Noise Mitigation Guideline* (NMG) (Roads and Maritime, 2015) are consistent with the RNP and have been used to assess the operational road traffic noise. Noise from operation of proposed fixed operational facilities is assessed with guidance from the *NSW Industrial Noise Policy* (INP) (NSW EPA, 1999).

There is discussion in these policies of the need to balance the economic and social benefits of activities that may generate noise with the protection of the community from the adverse effects of noise. The noise assessment criteria adopted relate to levels of noise that may be tolerated or permitted above background before some adverse effect (annoyance, discomfort, sleep disturbance or complaints) occurs.

Appendix J (Technical working paper: Noise and vibration) of the EIS presents the NCG road traffic noise assessment criteria for residential land uses and social infrastructure. This is shown in **Table 8-10** and **Table 8-11** respectfully.

Table 8-10 Road traffic noise assessment criteria for residential land use

Road category	Type of project/land use	Assessment criteria (dBA)	
		Daytime (7 am - 10 pm)	Night-time (10 pm - 7 am)
Freeway/ arterial/ sub-arterial roads	1. Existing residences affected by noise from new freeway/arterial/sub-arterial road corridors	$L_{Aeq(15hour)}$ 55 (external)	$L_{Aeq(9hour)}$ 50 (external)
	2. Existing residences affected by noise from redevelopment of existing freeway/arterial/sub-arterial roads 3. Existing residences affected by additional traffic on existing freeways/arterial/sub-arterial roads generated by land use developments	$L_{Aeq(15hour)}$ 60 (external)	$L_{Aeq(9hour)}$ 55 (external)
	4. Existing residences affected by both new roads and the redevelopment of existing freeway/arterial/sub-arterial roads in a Transition Zone[1]	Between $L_{Aeq(15hour)}$ 55-60 (external)	Between $L_{Aeq(9hour)}$ 50-55 (external)
	5. Existing residences affected by increases in traffic noise of 12dBA or more from new freeway/arterial/sub-arterial roads	Between $L_{Aeq(15hour)}$ 42-55 (external)	Between $L_{Aeq(9hour)}$ 42-50 (external)
	6. Existing residences affected by increases in traffic noise of 12dBA or more from redevelopment of existing freeway/arterial/sub-arterial roads	Between $L_{Aeq(15hour)}$ 42-60 (external)	Between $L_{Aeq(9hour)}$ 42-55 (external)
Local roads	7. Existing residences affected by noise from new local road corridors.	$L_{Aeq(1hour)}$ 55 (external)	$L_{Aeq(1hour)}$ 50 (external)
	8. Existing residences affected by noise from redevelopment of existing local roads		
	9. Existing residences affected by additional traffic on existing local roads generated by land use developments		

Note 1: L_{eq} is the preferred method to describe sound levels that vary over time, resulting in a single decibel value, which takes into account the total sound energy over the period of time of interest.
Note 2: L_{Aeq} - It is common practice to measure noise levels using the A-weighting setting built into all sound level meters. In which case the term is properly known as L_{Aeq}.

Table 8-11 Social infrastructure criteria

Existing sensitive land use	Assessment criteria (dBA)[1]		Additional considerations
	Daytime (7.00 am – 10.00 pm)	Night-time (10.00 pm – 7.00 am)	
School classrooms	$L_{Aeq(1hour)}$ 40 (internal)	-	In the case of buildings used for education or health care, noise level criteria for spaces other than classrooms and wards may be obtained by interpolation from the 'maximum' levels shown in Australian Standard 2107:2000 (Standards Australia 2000).
Places of worship	$L_{Aeq(1hour)}$ 40 (internal)	$L_{Aeq(1hour)}$ 40 (internal)	The criteria are internal, ie the inside of a church. Areas outside the place of worship, such as a churchyard or cemetery, may also be a place of worship. Therefore, in determining appropriate criteria for such external areas, it should be established which activities in these areas may be affected by road traffic noise.
Open space (active use)	$L_{Aeq(15hour)}$ 60 (external) when in use	-	Active recreation is characterised by sporting activities and activities, which generate their own noise or focus for participants, making them less sensitive to external noise intrusion.
Open space (passive use)	$L_{Aeq(15hour)}$ 55 (external) when in use	-	Passive recreation is characterised by contemplative activities that generate little noise and where benefits are compromised by external noise intrusion, eg playing chess, reading.
Childcare centres	Sleeping rooms $L_{Aeq(1hour)}$ 35 (internal) Indoor play areas $L_{Aeq(1hour)}$ 40 (internal) Outdoor play areas $L_{Aeq(1hour)}$ 55 (external)	-	Multi-purpose spaces, eg shared indoor play/sleeping rooms should meet the lower of the respective criteria. Measurements for sleeping rooms should be taken during designated sleeping times for the facility, or if these are not known, during the highest hourly traffic noise level during the opening hours of the facility.
Aged care facilities	-	-	Residential land use noise assessment criteria should be applied to these facilities.
Hospital wards	$L_{Aeq(1hour)}$ 35 (internal)	$L_{Aeq(1hour)}$ 35 (internal)	-

Appendix J (Technical working paper: Noise and vibration) of the EIS discusses operational noise modelling undertaken to assess the impact of the project. The assessment evaluated impacts on the community 600 metres either side of the project alignment, as well as the community adjacent to a number of collector roads, sub-arterial and arterial roads associated with Victoria Road, City West Link and The Crescent.

The project upon operation is expected to reduce the number of receivers with an exceedance of the NCG criteria within the study area, in both the day and night-time periods. This is mainly due to the displacement of traffic from surface roads into the new tunnels.

These reductions are identified along sections of Victoria Road in Rozelle where the project is forecast to reduce traffic numbers. This section of road is predominantly commercial. The reduced noise levels would likely improve the ambiance of the outdoor and indoor environment, therefore potentially increasing the number of visitors and passing trade.

Similarly, residents and businesses located adjacent to a number of other surface roads, particularly City West Link, Parramatta Road and The Princes Highway would benefit from the anticipated reduction in traffic volumes, resulting in improvements in the noise environment and in turn, health outcomes (eg less sleep disturbance).

While there is an overall decrease in noise volumes across the network, **Appendix J** (Technical working paper: Noise and vibration) of the EIS has identified that 200 individual buildings within the study area would be expected to have exceedances of operational road traffic noise criteria both in day and night times. These buildings would experience noise increases of over 2dBA and as a result would be eligible for noise mitigation measures.

Of these 200 properties, 173 are residential and the remaining 27 are businesses or social infrastructure. The majority of these properties already experience exceedances of acceptable noise levels due to the presence of existing road traffic.

Increases in noise have been identified in parts of the study area, such as parts of Johnston Street, where traffic volumes are expected to increase. Increases were also identified in Iron Cove, to the south of Victoria Road (Byrne Street, Clubb Street, Toelle Street, Callan Street and Springside Street), where the noise shielding effect of the row of buildings facing Victoria Road would be removed due to property acquisitions and subsequent demolition.

Residents in these locations would be more exposed to health risks associated with increased environmental noise. These would include general annoyance (eg having to keep windows closed), sleep disturbance, and interference with household activities (eg outside eating).

Mitigation measures, such as noise barriers, would be provided as part of the project, which would reduce noise impacts. **Appendix J** (Technical working paper: Noise and vibration) of the EIS has identified four barrier sections, located to the south of Iron cove and at The Crescent which may reduce noise for triggered receivers. These noise barriers would be subject to detail deign. In addition, at-property acoustic treatment would be considered for eligible properties where noise exceedances were still predicted.

The effect of operational noise would be medium-long term at a locality extent. The change from existing baseline environment would be small. The consequence of change would be slight and the likelihood possible. As such, the overall significance of impact on the socio economic environment would be a minor negative.

Social infrastructure facilities may be particularly sensitive to health and amenity impacts associated with noise exceedances. These would include health and age care facilities, childcare and educational facilities, places of worship and active and passive open space. The following facilities would be eligible for consideration for noise mitigation measures:

- Health and age care facilities (Balmain Sports Medicine, Well Adjusted Chiropractic)
- Childcare centres (Rosebud Cottage Childcare Centre, Ku Phoenix Preschool)
- Schools (St Scholastica's College, Rozelle Public School)
- Tertiary education facilities (Sydney Community College, Sydney College of The Arts)
- Place of worship (Sze Yup Temple)
- Active and passive open space (Bayview Crescent).

Although the existing background noise levels are generally high and dominated by existing road traffic noise, the increased noise levels may affect a person's capacity to concentrate in educational facilities. Increased environmental noise level at open space may also reduce person's desire or ability to exercise or engage in other recreational actives. This may result in adverse effects on cardiovascular health and community cohesion.

Summary of impacts

Once operational the project is predicted to result in a reduction in noise levels for around 60 per cent of the receivers within the study area and a reduction the number of receivers with an exceedance of the NCG criteria within the study area, in both the day and night-time periods. Effects would be medium-long term and would affect residents, businesses and social infrastructure in the Inner West LGA, and visitors to businesses and social infrastructure from across Greater Sydney Region. The change from the existing baseline environment would be small. This consequence would be slight and the likelihood high. As such, the impact is considered to be a moderate positive.

Only 200 buildings have been identified as likely to have exceedances of operational road traffic noise criteria both in daytime and night-time. These buildings currently experience exceedances of acceptable noise levels due to the presence of existing road traffic. Mitigation measures are expected to be implemented to reduce noise levels for these properties. The effect upon these buildings would be medium-long term and likely to affect residents, business, social infrastructure and visitors across Greater Sydney Region. The consequence of change would be moderate with a high likelihood. As such, the significance of impact is considered to be a moderate negative.

Vibration

Appendix J (Technical working paper: Noise and vibration) of the EIS has not identified any increased vibration impacts associated with the operation of the project. Operational ground-borne noise and vibration due to the movement of cars and trucks inside the tunnel is not expected to cause any noticeable impact at the surface level properties. Therefore, upon operation, the significance of impact on the existing socio-economic environment would be negligible.

8.2.3 Air quality and ventilation

Appendix I (Technical working paper: Air quality) of the EIS considers changes to air quality as a result of the project. The emission sources relevant to the project addressed in the air quality modelling included:

- Emissions from the traffic on the surface road network, including new roads associated with the project
- Emissions from proposed ventilation outlets.

The assessment identifies the net change in air quality as it relates to emissions from environmental pollutants such as polycyclic aromatic hydrocarbons (PAHs) and volatile organic compounds (VOCs) that may have a detrimental effect on air quality and therefore adversely affect community health, and local amenity.

Particulate matter from emissions has been linked to adverse health effects after both short-term exposure (days to weeks) and long-term exposure (months to years). The health effects associated with exposure to particulate matter vary widely (with the respiratory and cardiovascular systems most affected).

External Air Quality

Appendix K (Technical working paper: Human health risk assessment) of the EIS identifies the potential health impacts associated with changes in air quality due to the operation of the project. The human health assessment concluded that there no acute or chronic health risks to local communities that would arise as part of the project. Conversely, the project would be expected to result in a decrease in total pollutant levels within the study area due to the redistribution of vehicle emissions, specifically in relation to emissions derived from vehicles currently using surface roads. For much of the community this would result in no change or a small improvement to the existing environment. The significance of impact on the socio-economic environment would be negligible.

Internal Air Quality

The quality of air for people travelling within the tunnels was identified as a key concern during community consultation. The Human health risk assessment concluded that:

- Where windows are up and ventilation is on recirculation, exposure to nitrogen dioxide inside vehicles is expected to be below the current health based guidelines. In congested conditions inside the tunnels, it is not considered likely that significant adverse health effects would occur
- For motorcyclists, where there is no opportunity to minimise exposures through the use of ventilation, there is the potential for higher levels of exposure to nitrogen dioxide and particulates. These exposures, under normal conditions, are not expected to result in adverse health effects. When the tunnels are congested it is expected that motorcyclists would spend less time in the tunnels than passenger vehicles and trucks, limiting the duration of exposure and the potential for adverse health effects
- For individuals who regularly use tunnels for commuting or as part of their employment there is the potential for repeated exposures to higher levels of nitrogen dioxide and particulates during the day. While these exposures are not likely to be additive, in terms of potential health effects, it is important that these road users utilise ventilation on recirculation whenever they are using the tunnels
- Where advice is provided (and is followed) to place ventilation on recirculation when using project tunnels the levels of carbon dioxide inside vehicles are not expected to adversely affect the health of occupants.

During operation, changes to air quality both inside and outside of the tunnel would result in no discernible positive or negative effects to human health or local amenity. Therefore, air quality impacts on the socio-economic impacts would be negligible.

8.3 Future land use

All land that is required for construction and/or operation of the project is identified as project land in the EIS. This includes:

- Properties to be acquired
- Properties to be leased
- Government owned properties (already owned or would be acquired or leased). This includes Roads and Maritime owned land.

Land required for the construction of the project that is not required for operation would be identified following detailed design and construction planning and is termed ‘remaining project land’ and would then be broken down further into:

- Land to be retained for future (separate) road infrastructure projects
- Residual land – land required for the construction of the project that is not required for operation or for future (separate) infrastructure projects.

The uncertainty around this future land use may cause residents and business stress and/or anxiety. This speculation and uncertainty may affect where an individual or business chooses to live or operate. Remaining project land would be identified in the Residual Land Management Plan.

The Residual Land Management Plan would be prepared in consultation with the relevant council and would identify (and consider) but not be limited to:

- Identification and illustration of all remaining project land, including the location, land use characteristics, size and adjacent land uses
- Identification of feasible uses for remaining project land including justification for the selected use
- Timeframes for implementation of the actions in relation to the identified feasible uses.

Land subject to the Residual Land Management Plan includes Parramatta Road West civil and tunnel site (C1b), the Parramatta Road East civil site (C3b) and Pyrmont Bridge Road tunnel site (C9).

Future use would be decided by Roads and Maritime, and any future development would be subject to separate development assessment and approval. Of note is that the project would not rezone or consolidate remaining project land and therefore there would be no changes to land use zoning for future development.

As presented in **Appendix L** (Technical working paper: Urban design) of the EIS detailed landscape plans would be prepared as part of the Urban Design and Landscape Plan (UDLP) for the project. Land subject to the UDLP includes Darley Road surface works, Rozelle surface works, Iron Cove Link surface works and the land around the motorway operations complex at St Peters.

8.3.1 Darley Road surface works

A permanent land use change would occur at Darley Road construction ancillary facility, as the western portion of the site would be used for a motorway operations complex, including a water treatment plant and substation. The remainder of the site would be rehabilitated and its future use outlined in the Residual Land Management Plan.

The site is in close proximity to the existing transport infrastructure for the Inner West Light Rail and the Leichhardt North light rail stop. As such, this change would be consistent with surrounding transport infrastructure land use and unlikely to significantly alter the amenity and character of the area.

8.3.2 Rozelle surface works

To assess socio-economic impacts at Lilyfield and Rozelle, the Rozelle surface works have been broken down into three areas:

- Rozelle Rail Yards
- The Crescent and Whites Creek
- Victoria Road and Anzac Bridge approaches.

Rozelle Rail Yards

This area is presently a redundant industrial and transport infrastructure site and inaccessible to the public. Site management works are currently underway under a separate planning approval to remove rail and rail-related infrastructure including vegetation, buildings and stockpiles from the site. Upon operation of the M4-M5 Link, this site would contain permanent transport infrastructure associated with the project including portals, motorway operations complexes, water treatment plant and ventilation facilities and outlets. As outlined in **Chapter 12** (Land use and property) of the EIS.

The project would, on operation, deliver 10 hectares of new open space at the Rozelle Rail Yards as well as new and enhanced active transport links and allow the site to be used by the community at large. As outlined in Chapter 12 (Land use and property) of the EIS, the proposed location of the motorway infrastructure has been developed to maximise the area of land that could be used for social infrastructure. Final design plans would be outlined in the UDLP.

The socio-economic benefits of providing additional green space at this location include:

- Improved active and passive recreational opportunities
- Direct health and safety benefits (such as protection for water supply and groundwater recharge areas, cleansing of air, separation from hazards)
- Economic development including enhanced local real estate values
- Improving the amenity and character of the area
- Promote healthy lifestyles by facilitating improvements in physical fitness through exercise, and also by facilitating positive emotional, intellectual, and social experiences
- Improve mental health and feelings of wellbeing, particularly lower stress levels
- Improve opportunities for social interactions and community cohesion.

Open space in areas may also present some hazards, such as attracting antisocial behaviours (particularly in isolated areas). However, these may be mitigated through crime prevention through environmental design (CPTED) principles.

The Crescent and Whites Creek

The operation of the project would result in the permanent loss of Buruwan Park (0.3 hectares). Buruwan Park would be occupied by permanent operational infrastructure (including the new alignment of The Crescent). The loss of Buruwan Park however would be more than offset by the delivery of the new open space within the Rozelle Rail Yards and new grade-separated pedestrian and cycle connections in the local area.

Victoria Road and Anzac Bridge approaches

The rehabilitated Victoria Road civil site (C7) and reconstruction of Victoria Road for an operational purpose would result in the permanent loss of a small number of commercial buildings located on the western side of Victoria Road. The potential for future redevelopment of this land for commercial uses, in accordance with the existing land zoning, would be lost.

The design of the approaches to and from Anzac Bridge includes the delivery of new and enhanced active transport connections, including the reservation of space below the bridge to provide a route between the Anzac Bridge and the Rozelle Rail Yards. This route would also allow future connections into the future redevelopment areas of the White Bay Power Station and the wider Bays Precinct Transformation Precinct. Increased active transport routes wound increase opportunities for community cohesion and may result indirect health benefits associated with increased pedestrian and cyclist activity.

8.3.3 Iron Cove Link

During construction of the project, a construction ancillary facility would be located at Iron Cove civil site (C8), which would result in a change of land uses from residential and commercial to transport infrastructure. This change is due to the acquisition of properties south of Victoria Road to facilitate road widening and the Iron Cove Link transport infrastructure.

As shown **in Appendix L** (Technical working paper: Urban design) of the EIS the siting of operational project infrastructure such as the ventilation facilities and tunnel portals and entry and exit ramps have been developed in consideration of maximising areas of land that would be available for future landscaping and/or provision of community and social infrastructure.

A portion of land immediately south of the eastern Iron Cove Bridge approach would be permanently occupied for transport infrastructure purposes (including carriageways and pedestrian and cycle paths) during operation. This land is currently part of King George Park. The remaining project land not required for operation would be rehabilitated and returned for use for public recreation purposes in accordance with the UDLP. Following the completion of construction, the connection between the Bay Run and Victoria Road and the Iron Cove Bridge would be reinstated in generally the same arrangement as existing.

Bioretention facility and car park improvement works

A bioretention facility to treat stormwater runoff and car park improvement works would be constructed within an existing informal parking area adjacent to Manning Street within King George Park at Rozelle on land zoned for public recreation uses.

The location of the bioretention facility, which would provide an environmental benefit, is unlikely to impede redevelopment of this land as it zoned RE1 Public Recreation under the Leichhardt Local Environmental Plan 2013, which limits the potential for development. The formalisation of the car park to around 34 spaces would improve the safety and efficiency of the car park and is in accordance with the King George Park Plan of Management.

8.3.4 St Peters interchange

As outlined in Chapter 12 (Land use and property), the St Peters interchange is being constructed and delivered by the New M5 project. As this area is currently being used for motorway construction, the ongoing use for the construction of the project is consistent with present land use.

The M4-M5 Link project would construct a motorway operations complex within the St Peters interchange, including a ventilation facility and outlets. The area immediately surrounding this complex would be landscaped in accordance with the UDLP. The remainder of the site would be

landscaped and converted to open space in accordance with the conditions of approval for the New M5 project.

Summary of impact

Although the operation of the project would result in altered land use and character of locations within the study area, the benefits of additional open space and increased pedestrian and cyclist links would provide substantial socio-economic benefits. Effects would be long-term and benefit the Greater Sydney Region. The change from existing baseline environment would be large. The consequence of change would be major and the likelihood of effects is near certain. The significance of impact on the socio-economic environment would be moderate positive.

8.4 Housing and demography

Increased housing supply and urban renewal locations are supported in areas with good access and connectivity and on the public transport network. As identified in **Appendix H** (Technical working paper: Traffic and transport) of the EIS, the project would decrease road capacity constraints among the existing road network, which may result in future development and urban renewal opportunities within the study area. *A Plan for Growing Sydney* identifies the Parramatta Road corridor as a focus for increased housing, economic activity and social infrastructure.

The WestConnex project, which includes the M4-M5 Link, would provide the opportunity to transform Parramatta Road due to the reduction in traffic volumes in certain sections and the delivery of an alternative route for heavy vehicles. The Parramatta Road Corridor Urban Transformation Strategy was approved in November 2016 and provides a 30-year vision to deliver 27,000 homes and 50,000 jobs. The Implementation Plan[55] identified that planning for the transformation of the Parramatta Road Corridor must be done in consideration of the staged delivery of WestConnex and respond to the changed conditions along the Corridor. The Implementation Plan would be updated annually to allow it to respond to any changes in the program of delivery for WestConnex and other key infrastructure projects.

Transport for NSW is committed to delivering an on-road rapid transit system to support the shared vision for the growth of the Parramatta Road Corridor. The Parramatta Road Corridor's on-road rapid transit route, from Burwood train station to the Sydney CBD, would service five of the eight Precincts along the Parramatta Road Corridor (Burwood-Concord, Kings Bay, Taverners Hill, Leichhardt and Camperdown). Public transport journeys are forecast to become faster and more reliable through the operation of higher frequency and capacity services, additional on-road transit priority and the provision of high-quality and accessible transit 'superstops'.

Overall, the potential change to existing housing and demographics is expected to be long term and affect the Inner West and City of Sydney LGA. The change from the existing baseline environment would be small. The consequence of change would be moderate and the likelihood high. As such, the overall significance of impact on the socio-economic environment would be moderate positive.

8.5 Community cohesion

As identified is **section 6.2.3**, community cohesion refers to the connections and relationships between individuals and their neighbourhoods. The inverse of this concept is community severance, which refers to physical or psychological barriers between communities. The operation of the project has the potential to create or alleviate both of these effects.

Improvements to the road network often plays a significant contribution to local and regional cohesion, and has a prominent role in the geographic distribution and equity of economic growth. Road infrastructure may act as a catalyst in fostering development by creating sustainable, autonomous growth zones.

During the operational phase, project elements that could affect community cohesion, both positively and negatively, including alterations to the regional road network, local road closures at Clubb Street

[55] UrbanGrowth NSW 2016, Parramatta Road Corridor Urban Transformation Plan 2016-2023

in Rozelle), the widening of Victoria Road and increases and decreases in the amount of traffic on connector roads.

The operation of the project would deliver new and enhanced active transport connections, which would have the potential to increase social connectivity and community cohesion within the within the study area.

Once construction is completed, parts of the Rozelle Rail Yards would be redeveloped as public open space. This would provide substantially improved community access and transport linkages through this area.

The concept design identifies that the Rozelle Rail Yards would be developed as open space, including a constructed wetland and pedestrian and cyclist infrastructure. Open space areas created at this location would be developed and implemented in accordance with the UDLP for the project. This additional open space area would provide the community in Rozelle with increased access to active and passive recreation facilities and would increase opportunities for community cohesion.

Community severance

Community severance may lead to short or long-term changes to people's behaviour patterns, affecting established community networks and an area's character and sense of place.

Community severance effects often occur during major transportation projects due to detours in the local road network, changes to active and public transport routes, and connector roads receiving an increase or decrease in traffic movements (creating a barrier effect).

The widened Victoria Road carriageway has the ability to exacerbate the barrier effect and separation between the communities of Rozelle and Balmain. This effect would be somewhat mitigated by the improvement of pedestrian and cyclist accessibility between Toelle and Terry streets. The location of the portals would also reduce this impact, allowing a direct link between these streets. A pedestrian crossing would be provided, connecting over the two northbound lanes before linking with another signalised crossing over the two southbound lanes of Victoria Road.

The closure of Clubb Street is unlikely to cause community severance, given that other through roads in the immediate surrounding area would remain open.

The Rozelle Rail Yards currently act as a significant physical barrier between the communities of Annandale, Rozelle and Lilyfield. On operation, Rozelle Rail Yards would be transformed into public open space with a network of active transport links, north-south and east-west. The works at the Rozelle Rail Yards include a pedestrian and cycle land bridge that would provide a north-south connection between Bicentennial Park, the Rozelle Rail Yards and beyond to Easton Park.

In addition, it is expected that 2,000 heavy vehicles would be removed from Parramatta Road and that traffic would be reduced on sections of major arterial roads in the area, including City West Link, Parramatta Road, Victoria Road, King Street, Princes Highway, Southern Cross Drive and Sydenham Road. This forecast traffic reduction may lead to increased activation of these streets for residents, visitors and businesses.

The operation of the project is expected to increase community cohesion and reduce existing community severance issues for a large number of local residents in the Inner West LGA. The effects would be long term and the change in baseline conditions would be medium. The overall consequence would be moderate and likelihood would be high. The overall significance of impact on the socio-economic environment would be moderate positive.

8.6 Economy

8.6.1 Freight and efficiency costs

The freight industry is an important part of the NSW economy as an enabler of economic activity. Numerous industries are dependent upon efficient transport to service operational requirements by moving goods and products around the State and further afield. Transport for NSW estimates that freight and logistics contributed $58 billion to NSW State Gross Product (SGP) in 2011, which represented 13.8 per cent of NSW SGP. A large proportion of goods are imported and exported to

and from Port Botany, in Sydney. In addition, in 2012 Sydney Airport handled 615,000 tonnes of air freight. Sydney Airport Corporation in 2014 estimated that it contributed around $30 billion annually to the NSW economy[56].

The freight industry is expected to double by 2031 to 794 million tonnes compared to 2011. Over 60% of total freight, in 2011 was moved by road in heavy vehicles, and this is likely to continue. Increasingly, road freight is subject to congestion and capacity constraints, particularly on the M4 and M5 motorways in peak periods. Congestion is also predicted to worsen around Sydney Airport and Port Botany.

Delays in vehicle movements directly affect businesses expenditure and productivity. The NSW Long Term Transport Master Plan estimates Sydney's congestion costs around $5 billion per year – equivalent to an annual cost of $1,100 per capita within Sydney. Without action, these costs are forecast to rise to $8.8 billion per year by 2020[57].

In response, the WestConnex Updated Strategic Business Case (2015) has estimated that there would be significant road network improvements arising from the construction and operation of WestConnex. These improvements would benefit both light commercial and freight road users by reducing travel times to and from Sydney Airport and Port Botany as well as from the west and south west. The business case estimates that travel times from the west to Sydney CBD would improve by 15 to 20 minutes.

One of the objectives of the M4-M5 Link project is to encourage heavy and commercial vehicles to utilise the proposed tunnels over surface roads. The NSW Freight and Ports Strategy[58] states that WestConnex would *'reduce freight costs through increased travel speeds and reliability and reduce the distances travelled by freight vehicles. WestConnex has the potential to deliver time savings on the M4/M5 corridors in the order of 15 minutes to 35 minutes by 2031'.* Importantly, WestConnex is expected to deliver the following benefits to freight vehicle users (in discounted terms), including:

- Reliability benefits valued at over $633 million
- Vehicle operating cost benefits valued at over $2.9 billion
- Travel time savings valued at over $5.9 billion[59].

For freight road users the project this would deliver important improvements to the existing situation for a large number of businesses within the region. Effects would be long term, and benefit the Greater Sydney Region. This would result in a large change in baseline conditions. The consequence of impact would be major and the likelihood would be near certain. The significance of impact on the socio-economic environment would be major positive.

8.6.2 Employment Connectivity

Over twenty-five per cent of all Sydney jobs are located in the Global Economic Corridor, which presently extends from Norwest in the North through to Sydney CBD and to Port Botany and Sydney Airport[60]. Western Sydney is expected to deliver strong job growth over the next twenty years, however employment in the eastern part of the city would also continue to see solid growth. This means that people from western Sydney would continue to travel eastwards on a daily basis for employment opportunities. WestConnex would provide improved transport connections to the Global Economic Corridor and the eastern part of the city, as well as facilitating the future growth of Parramatta, Sydney's second CBD. The WestConnex Updated Strategic Business Case (2015) estimated that motorists would save 40 minutes on a typical journey from Parramatta to Sydney

[56] Sydney Airport Corporation Ltd, 2014, Sydney Airport Master Plan 2033

[57] Transport for NSW 2012, Long Term Master Plan

[58] Transport for NSW, 2013, NSW Freight and Port Strategy,

[59] NSW Roads and Maritime, November 2015, WestConnex Updated Strategic Business Case

[60] Department of Planning and Environment, 2014, A Plan for Growing Sydney

Airport. In addition, the reduction of traffic on surface roads would improve the road network and allow for enhanced bus services.

For commuters, the operational project would lead to a more reliable road network, reducing commuting time and lowering vehicle operating costs. Effects would be long term, and benefit the Greater Sydney Region, particularly residents and businesses in Western Sydney. This would result in a large change in baseline conditions. The consequence of impact would be major and the likelihood would be near certain. The significance of impact on the socio-economic environment would be major positive.

8.6.3 Road tolling

The socio-economic effects associated with road tolling may include alterations to travel times, reduced or redirected emissions, reduced traffic accidents, vehicle operation cost savings[61]. These benefits include improved operability within the network where greater connectivity enables current and potential users to reach their destinations more efficiently. In 2015, KMPG prepared a report on the Economic contribution of Australia's tolled roads[62] for TransUrban. KPMG estimated that NSW's toll roads have directly contributed $14 billion in economic, social and environmental benefits over 10 years ($ value derived using a seven per cent discount rate).

The WestConnex Updated Strategic Business Case proposes a distance based toll that would be implemented on operation of each component of the project. Distance based tolling means that motorists would only pay tolls for the sections of the motorway they use. Tolls for the entire WestConnex motorway would be capped at a maximum amount of $7.95 (2015 dollars) for cars and light commercial vehicles. Cars and light commercial vehicles would pay one third of the toll applied to heavy vehicles. Tolls would escalate up to a maximum of four per cent or the consumer price index (CPI) per year (whichever is greater) until 2040. After that, CPI only would apply.

Toll avoidance

One impact of implementing road tolling is the potential to increase congestion on surrounding non-tolled roads due to toll avoidance.

The WestConnex Road Traffic Model (WRTM) uses current best practice methods for representing drivers' behaviour with respect to their willingness to pay tolls for road travel time savings for multiple toll roads and routes through the Sydney metropolitan network. The toll choice model was developed for the WestConnex project as an augmentation of standard traffic route modelling procedures that are normally used in planning and assessment of untolled roads. The 'toll choice' model addresses private vehicle and commercial (truck) traffic behaviour, representing the different willingness of these vehicle users to pay for travel time savings in the context of total journey costs including tolls, travel times and distances available on competing routes.

To assess the values that differing vehicle users place on travel time savings, a project specific survey was designed and conducted in Sydney in 2013 asking road users questions about their willingness to pay tolls. Independent specialist peer reviewers provided oversight throughout the design and analysis of the survey. The survey yielded a distribution of estimates of the value that Sydney drivers are willing to pay in terms of tolls to reduce their travel time. These values were benchmarked against values from other studies in Australia and internationally. The survey results are used within the WRTM's route choice algorithm to represent the influence of a toll.

Appendix H (Technical working paper: Traffic and transport) of the EIS has predicted no major shifts in daily forecast traffic onto alternative, parallel routes as a result of the project.

[61] Ernst and Young 2008,The economic contribution of Sydney's toll roads to NSW and Australia, Report prepared for Transurban Ltd

[62] KPMG 2015, Economic contribution of Australia's toll roads, Report prepared for Transurban Ltd

Equity

In reviewing the literature on the socio-economic impacts of road tolling, there has been little empirical research on equity impacts. That is, the potential for tolled roads to influence travel patterns, and subsequently social and demographic patterns, according to ability or willingness to pay. The majority of the academic focus has been on the economic impacts of road tolling only[63]. Studies undertaken in Europe with respect to social impacts have produced different findings with no common themes or patterns being discernible. The research does however indicate that equity impacts are area specific[64]. That is, impacts depend upon where people live, where they work and their economic situation. Higher income earners are more capable of absorbing the cost of tolls than lower income households, whereas lower income households are more likely to travel longer distances and avoid tolls due to affordability constraints[65].

ABS 2011 Census data on taxable personal incomes highlights that Sydney's west, including Bankstown, Blacktown, Parramatta, Fairfield and Liverpool, are in the bottom 20 per cent of Sydney's income receivers[66]. The community consultation identified concern that despite the introduction of the M4-M5 Link toll-road, a proportion of the Greater Sydney population may not be able to afford to benefit from the increased efficiency and travel times that the M4-M5 Link project could offer.

However, the M4-M5 Link would enhance the benefits of the broader WestConnex project, particularly for travel between western Sydney and the Sydney CBD. For example, a person driving a car in 2017 from Penrith to the Sydney CBD (prior to the introduction of tolls on the M4) currently has the option of travelling along the M4 Motorway, which ends at Concord, and then would need to travel on the congested surface road network to the Sydney CBD.

An alternative route using the M4 Motorway, WestLink M7, the Hills M2 Motorway, Lane Cove Tunnel and the Sydney Harbour Bridge or the Sydney Harbour Tunnel would cost around $22.00 in tolls (in $2017) and is a distance of around 55 kilometres. After opening in 2023, the M4-M5 Link project would provide a journey using the M4 Motorway straight through to Anzac Bridge, via the M4-M5 Link, for a toll capped at $8.60 (in $2017) and a distance of around 40 kilometres. This would provide time and cost savings for motorists and increased access to employment centres.

The Iron Cove Link component of the project would enable toll free travel between Iron Cove Bridge and Anzac Bridge. This would assist in alleviating congestion on Victoria Road.

Although road tolling would be a cost to individuals, the benefits of tolling to the broader economy is a greater socio-economic consequence. Effects would be long-term and benefit the Greater Sydney Region. The change from existing baseline environment would be large. The consequence of change would be major and the likelihood of effects is possible. The significance of impact on the socio-economic environment would be moderate positive.

[63] Conference of European Directors of Roads, May 2009, The socio-economic impacts of road pricing

[64] Conference of European Directors of Roads, May 2009, The socio-economic impacts of road pricing

[65] Mokonyama, M 2012, 'The social impact of introducing a tolling scheme on a pre-existing urban network', Association of European Transport and Contributors.

[66] Phillip O'Neill 2013, Spreading the Wealth, University of Western Sydney

9 Assessment of cumulative impacts

9.1 Nature of cumulative impact

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of a project when added to other existing, planned, and/or reasonably anticipated future projects. The cumulative effect of multiple projects may decrease or intensify the socio-economic benefits or negative impacts on a particular receiver. Cumulative socio-economic impacts associated with transport and infrastructure projects include:

- Extended periods of construction impacting local amenity, disruption to traffic and pedestrian networks
- Incremental loss or severance of open space
- Economic effects including changes to business operation and revenues
- Construction traffic from multiple projects placing additional pressure on road networks and parking capacity
- Consultation and construction fatigue for local communities due to the concurrent or sequential planning and construction nature of the project.

Construction fatigue relates to receivers that experience construction impacts from a variety of projects over an extended period of time with few or no breaks between construction periods. Construction fatigue may be brought on through traffic and access disruptions, increased noise and vibration, reduced air quality, reduced visual amenity, increases in social impacts or any combination of these factors.

Appendix I (Technical working paper: Air quality) of the EIS has evaluated risk on the basis of the type and scale of activity and potential for dust to be generated during construction activities, and the location of sensitive receptors in the vicinity of these works. Dust management measures have been identified to minimise dust impacts and health risks during construction. **Appendix K** (Technical working paper: Human health risk assessment) of the EIS has identified that these measures would need to be in place through the duration of all construction projects, to minimise impacts in the long-term.

Appendix J (Technical working paper: Noise and vibration) of the EIS has included an assessment of noise impacts that may occur where there are construction activities from a number of road or other infrastructure projects that would occur consecutively and result in exposure to construction noise impacts for a longer period of time.

The key areas where construction fatigue would be expected are Haberfield, Ashfield, Rozelle and St Peters. These locations are discussed in more detail below.

9.2 Other WestConnex projects

The assessment of cumulative impacts includes the following WestConnex projects that may overlap with the timing of the construction of the M4-M5 Link project (**Table 9-1**).

Table 9-1 Projects included in cumulative assessment

Project	Description
M4 Widening Opened to traffic	· Widening the existing M4 Motorway from Parramatta to Homebush
M4 East Under construction	· Extension of the M4 Motorway in tunnels between Homebush and Haberfield via Concord. Includes provision for a future connection to the M4-M5 Link at the Wattle Street interchange.

Project	Description
New M5 Under construction	· Duplicating the M5 East from King Georges Road in Beverly Hills with tunnels from Kingsgrove to a new interchange at St Peters. The St Peters interchange would allow for future connections to the proposed future Sydney Gateway · The New M5 tunnels include provision for a future connection to the proposed Southern Connector (part of the proposed F6 Extension) and the M4-M5 Link.

9.2.1 Cumulative construction effects

The following tables outline duration of construction of other projects alongside construction for the M4-M5 Link at Haberfield and St Peters.

Haberfield

Table 9-2 Cumulative construction activities at Haberfield Option A

Construction activity	2018				2019			
M4 East - Northcote Street tunnel site (C7)								
Tunnel drainage and pavement works	■	■						
Mechanical and electrical fitout works	■	■	■					
Tunnel completion works				■	■			
Site rehabilitation and landscaping					■			
M4 East - Eastern ventilation facility site (C8)								
Shaft and structural works and ventilation building works	■	■	■					
Water tanks and pump rooms			■	■				
Mechanical and electrical fitout works	■	■	■					
Landscaping			■					
M4 East – Wattle Street and Walker Avenue civil site (C9)								
Road work	■	■	■	■	■			
Dive structures and cut-and-cover	■	■						
Mechanical and electrical fitout works	■	■	■					
Site rehabilitation and landscaping	■	■						
M4-M5 Link - Wattle Street civil and tunnel site (C1a)								
Initial road works and traffic management							■	
Site establishment and utility works							■	■
Below ground site set up								
Tunnelling								
M4-M5 Link - Haberfield civil and tunnel site (C2a)								
Initial road works and traffic management							■	
Site establishment and utility works							■	■
Below ground site set up								■
Establish temporary ventilation systems for Wattle Street and mainline								■
Tunnelling								
M4-M5 Link - Northcote Street civil site (C3a)								
Site establishment and utility works								■
Construct car park								■
Construct laydown area								■
Operation of car park and laydown area								

Table 9-3 Cumulative construction activities at Haberfield Option B

Construction activity	2018				2019			
M4 East - Northcote Street tunnel site (C7)								
Tunnel drainage and pavement works	■	■						
Mechanical and electrical fitout works	■	■	■					
Tunnel completion works				■	■			
Site rehabilitation and landscaping					■			
M4 East - Eastern ventilation facility site (C8)								
Shaft and structural works and ventilation building works	■	■	■					
Water tanks and pump rooms			■	■				
Mechanical and electrical fitout works	■	■	■					
Landscaping			■					
M4 East – Wattle Street and Walker Avenue civil site (C9)								
Road work	■	■	■	■	■			
Dive structures and cut-and-cover	■	■						
Mechanical and electrical fitout works	■	■	■					
Site rehabilitation and landscaping	■	■						
M4-M5 Link - Parramatta Road West civil and tunnel site (C1b)								
Site establishment and utility works				■	■	■		
Construction of temporary access tunnel						■	■	
Tunnelling								■
M4-M5 Link - Haberfield civil site (C2b)								
Initial road works and traffic management							■	
Site establishment and utility works							■	■
M4-M5 Link - Parramatta Road East civil site (C3b)								
Site establishment and utility works				■	■	■		
Use of car park and site amenities during construction						■	■	■

The local streets around the Haberfield construction ancillary facility that are most likely to be affected by consecutive construction activities include:

- Parramatta Road
- Wattle Street
- Walker Avenue
- Ramsay Street
- Bland Street
- Wolseley Street
- Northcote Street.

St Peters

Table 9-4 Cumulative construction activities at St Peters interchange

Construction activity	2018				2019			
New M5 – Canal road construction compound (C8)								
Cut and cover construction	■							
Tunnelling (including dive and excavation)	■	■	■	■	■	■		
Construction of the St Peters motorway operations complex (MOC4)	■	■	■	■	■			
Mechanical and electrical installation	■	■	■	■	■	■	■	■
Demobilisation and rehabilitation						■	■	■
New M5 – Campbell Road construction compound (C9)								
Demolition works	■	■		■	■			
Construction of the St Peters interchange	■	■	■	■	■	■	■	
Construction of local road upgrades	■	■	■	■	■	■	■	
Demobilisation and rehabilitation				■	■	■	■	■
New M5 – Landfill close construction compound (C10)								
Demobilisation and landscaping							■	■
New M5 – Burrows Road construction compound (C11)								
Construction of the St Peters interchange	■	■	■	■	■	■	■	
Construction of the Burrows Road motorway operations complex (MOC5)	■	■	■	■	■			
Demobilisation and rehabilitation							■	■
New M5 – Campbell Road bridge construction compound (C12)								
Bridge construction	■	■	■	■				
Construction of local road upgrades		■	■	■	■	■	■	
Demobilisation and rehabilitation							■	■
New M5 – Gardeners Road Bridge construction compound (C13)								
Bridge works	■	■	■	■	■	■		
Construction of local road upgrades	■	■	■	■	■	■	■	
Demobilisation and rehabilitation			■	■	■	■	■	■
New M5 – Sydney Park construction compound (C14)								
Site establishment		■						
Construction of shared path and bridge		■	■	■	■			
Demobilisation and rehabilitation					■			
M4-M5 Link – Campbell Road civil and tunnel site (C10)								
Initial road works and traffic management				■				
Site establishment and utility works				■	■	■		
Tunnelling						■	■	■

The local streets around the St Peter's interchange area that are most likely to be affected by consecutive construction activities include

- Campbell Street
- Albert Street.

The streets that are identified above in close proximity to the Haberfield and St Peters construction compounds and civil works, would be subject to construction impacts, over a number of years from both M4 East the M4-M5 Link. These projects, where they overlap, may lead to cumulative impacts relating to increased noise, reduced air quality, congestion on roads surrounding the construction activities, loss of on street car parking, and access disruption to both residences and businesses. There may also be a reduction in visual amenity due to the long term presence of noise barriers and hoardings, in conjunction with ongoing views of heavy plant and construction vehicles.

As outlined in **Appendix K** (Technical working paper: Human health risk assessment) of the EIS, the presence of impacts from multiple sources increases the potential for stress and anxiety. Such an

impact would be expected to result in a minor to moderate negative significance of impact on the socio-economic environment.

In addition to directly overlapping cumulative effects it is important to consider temporally consecutive impacts leading to construction fatigue. This relates to receivers that experience construction impacts from a variety of projects over an extended period with few or no breaks in between. Construction fatigue can be brought on through traffic and access disruptions, increased noise and vibration, and reductions in air quality or visual amenity. This may result in health impacts such as increased stress and anxiety due to uncertainty around timing and ongoing use of the sites. It can also cause financial hardship to businesses and industries as concentrated and ongoing construction effects reduce the efficiency of servicing and deliveries and/or the productivity of employees.

Conversely, businesses and the broader industry would benefit from consecutive construction activities with increased employment opportunities, potentially increased passing trade from construction workers and enhanced demand for construction related industries.

9.3 Major Roads and Maritime and other transport projects

The assessment of cumulative impacts includes the following major transport projects that overlap with the timing of the construction of the M4-M5 Link project at the Rozelle Rail Yards.

In particular, various sections of the Rozelle Rail Yards are likely to be used for an extended period as construction and management sites for the M4-M5 Link (Rozelle interchange), the CBD and South East Light Rail and the proposed future Western Harbour Tunnel and Beaches Link, as shown in **Table 9-5**.

Table 9-5 Rozelle Rail Yards

Construction activity	Indicative construction timeframe											
	2018				2019				2020			
CBD and South East Light Rail Rozelle maintenance depot												
Main construction works												
Proposed future Western Harbour Tunnel Beaches Link*												
Construction activity												
Rozelle civil and tunnel site (C5) indicative construction program												
Site establishment and utility works												
Traffic diversions and intersection works												
Construction of cut-and-cover and tunnel portals												
Tunnelling												
Construction of motorway operational ancillary infrastructure												
Civil and mechanical fitout												
The Crescent civil site (C6) indicative construction program												
Site establishment and utility works												
Surface road and intersection works												
Whites Creek widening and improvement works												
Drainage works including construction of the culvert below City West Link and upgrades to the drainage outfall to Rozelle Bay												
Construction of Whites Creek Bridge and demolition of existing bridge												
Victoria Road civil site (C7) indicative construction program												
Site establishment and utility works												
Support for the reconstruction of Victoria Road including construction of the new bridge												

Note: There is no overlap with Rozelle Rail Yards site management works

*No further detail available for proposed future Western Harbour Tunnel and Beaches Link construction

The local streets around the Rozelle construction ancillary facilities that are most likely to be affected by consecutive construction activities include:

- Lilyfield Road
- Bayview Crescent
- Hornsey Street.

The cumulative impacts would be comparable to those outlined in **section 7.2.2.** Additional negative impacts at this location would include disruption to active transport links and access to the Rozelle Bay light rail stop. Similar mitigation measures would be implemented.

9.4 Other projects

9.4.1 Parramatta Road Corridor Urban Transformation Program

This program is discussed in **section 4.3.7**. As the redevelopment of Parramatta Road is likely to occur over 30-year time frame the cumulative construction impacts of the project are considered minimal. In addition, the location, form and timing of development cannot be known with any certainty, so it is not possible to assess the potential cumulative impacts with any certainty.

9.4.2 The Bays Precinct Transformation Plan

The Bays Precinct is discussed in **section 4.3.8.** Planning for the precinct still in early stages and as such it is not possible to accurately assess the cumulative construction impacts may arise. It is clear however, the area would be subject to extended periods of construction disruption, which may lead to increased traffic around Victoria Road, the Rozelle interchange, City West Link and Anzac Bridge. This would include traffic, visual amenity, noise and air quality impacts in particular.

9.5 Cumulative operational impacts

Once operational, the M4-M5 Link, alongside the other major transport projects, is predicted to deliver beneficial cumulative impacts for the community.

These include:

- Supporting Sydney's long-term economic growth, through improved transport connectivity to western Sydney and key employment areas across the city. Of particular importance is the contribution of the project to the efficiencies of the freight industry
- Improved community connectivity on local roads through transferring traffic and heavy vehicles from surface roads, to underground. The project would deliver new and improved active transport routes particularly around Rozelle Rail Yards and would enable the enhancement of public transport along Parramatta Road and Victoria Road
- The project is expected to alleviate congestion and contribute to improved connectivity, speeds, reliability and safety of the broader road network
- Reduced traffic on local roads may lead to opportunities for urban renewal particularly along parts of Parramatta Road.

10 Management measures

10.1 Environmental management measures

Environmental management measures during construction and operation relevant to socio-economic impacts are outlined in **Table 10-1**.

Table 10-1 Environmental management measures – social and economic

Impact	No.	Environmental management measure	Timing
Construction			
Impacts on businesses	SE1	A Business Management Plan will be prepared and will include: · Identification of businesses that have the potential to be adversely affected by construction activities that will occur as part of the project · Management measures that will be implemented to maintain appropriate vehicular and pedestrian access during business hours and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained. These will be determined in consultation with the owners of the identified businesses.	Construction
Changes to community access and connectivity	SE2	A Community Communication Strategy will be prepared that details: · Procedures and mechanisms that will be implemented by the in response to the key social impacts identified for the project · Property acquisition support services that will be provided · Procedures and mechanisms to communicate to project stakeholders (including affected communities), the access and connectivity enhancements and new community and social facilities that will be delivered as part of the project through the Social Infrastructure Plan and to update stakeholders on delivery progress · Procedures and mechanisms that will be used to engage with affected business owners to identify potential access, parking, business visibility and other impacts to develop measures to address potential impacts on a case by case basis.	Construction
Property acquisition	SE3	Property acquisition will continue to be undertaken in accordance with the Land Acquisition Information Guide (Roads and Maritime 2014), the *Land Acquisition (Just Terms Compensation) Act 1991 (*NSW) and the land acquisition reforms announced by the NSW Government in 2016 (NSW Government, 2016). A property acquisition factsheet that outlines the process and provides further information for concerned residents will continue to be made available online and in hard copy at project information centres.	Construction
	SE4	Affected households will continue to have access to a counselling service that assists people through the property acquisition process.	Construction
	SE5	An independent service will continue to be provided to vulnerable households (eg elderly, those suffering an illness)	Construction

Impact	No.	Environmental management measure	Timing
		to assist with relocation. Assistance could include finding a suitable house for relocation, arranging removalists, disconnecting services and attending appointments with solicitors or other representatives.	
	SE6	A community relations support toll-free telephone line will be operated to respond to any community concerns or requests for translation services.	Construction
Operation			
Impacts on social infrastructure and facilities	OSE7	A Social Infrastructure Plan will be prepared that details: · Measures that will be delivered as part of the project to improve community connectivity in areas affected by the project, including pedestrian and cyclist access · Community and social facilities, for example open space, that will be delivered or enhanced as part of the project · Community initiatives and programs that will receive support as part of the project, including the manner in which support will be provided. · The Social Infrastructure Plan will be prepared by a suitably qualified and experienced person in consultation with the community and relevant councils and implemented as part of the project.	Construction and operation

10.2 Management of cumulative impacts

There are actions that will be put in place to manage the cumulative impacts associated with construction fatigue. **Appendix K** (Technical working paper: Human health risk assessment) of the EIS outlines the following measures:

- An Acoustic advisor will be appointed as an independent technical specialist whose role will be to review data collected and provide advice and recommendations to ensure noise and vibration impacts are avoided or minimised within the community. This may involve changes in work practices or the implementation of additional noise management/mitigation measures. This role will be undertaken for the duration of construction
- The Utilities Coordination Group, formed of representatives from concurrent projects and asset providers, will review the concurrent activities to manage and minimise impacts on utilities (relocation, adjustment or protection), where possible
- A Complaints Management System will be in place for the duration of construction. This system will include the recording of complaints and how the complaint was addressed (within a Complaints Register). A Community Complaints Commissioner, who is an independent specialist, would oversee the system and would follow-up on any complaint where the public is not satisfied with the response.

In addition, the CEMP would address, manage and reduce impacts on surrounding properties as much as possible.

Ongoing communication with residents, businesses and landowners will be equally as important. The Business Management Plan and the Community Communication Strategy will include information on how households and businesses (the most affected by cumulative impacts) will be kept updated. Keeping people informed will help alleviate uncertainty around the timing and activities within project construction sites and in turn reduce annoyance, stress and anxiety. Mitigation measures in this respect are detailed in **Table 10-2**. It will also be important for all agencies involved in these projects to collaborate and coordinate works to minimise disruption and the cumulative impacts. This will assist in consistent messaging to the community. For example, it will be important to ensure that the Rozelle interchange is properly integrated into the future plans for The Bays Precinct and that consultation between the relevant agencies continue.

Table 10-2 Management measures for cumulative effects

Management measure	Description
Community communication	The Community Communication Strategy should identify those households and the Business Management Plan, should identify those businesses and landowners that are the most affected by the cumulative impacts of construction and subject to construction fatigue. Measures should be included which seek to keep people well informed of the construction program and how they are likely to be affected. The Community Communication Strategy and the Business Management Plan will be prepared prior to the commencement of construction and implemented for the duration of construction.
Agency and stakeholder communication	The very nature of these projects involve a multitude of agencies and stakeholders. In order to minimise the cumulative impacts on the community from these projects, it will be important for the various agencies and stakeholders to collaborate and coordinate as much as practicable. Consideration will be given to the creation of a project working group, or equivalent to guide key stages of the several projects with the aim of managing impacts and disruptions and importantly keeping the community informed. Communication strategies across the various projects should be managed to be consistent in their messaging to the community to avoid confusion and annoyance.

11 Conclusion

Overall, this specialist assessment has found that the project would result in a range of positive and negative social and economic impacts on residents, businesses and social infrastructure. The impacts would vary in their distribution across the study area during the construction and operational stages of the project.

Whilst the construction of the project is likely to stimulate broader economic benefits by way of job generation and construction multipliers, at a more local level, residential, social infrastructure users, businesses and landowners would experience a degree of disruption and other temporary negative impacts. This would be particularly felt by people located within close proximity to the proposed construction compounds, within close proximity to the tunnel alignment and areas where utility works would occur. These impacts would need to be carefully and proactively managed with any mitigation measures monitored for their effectiveness and outcomes.

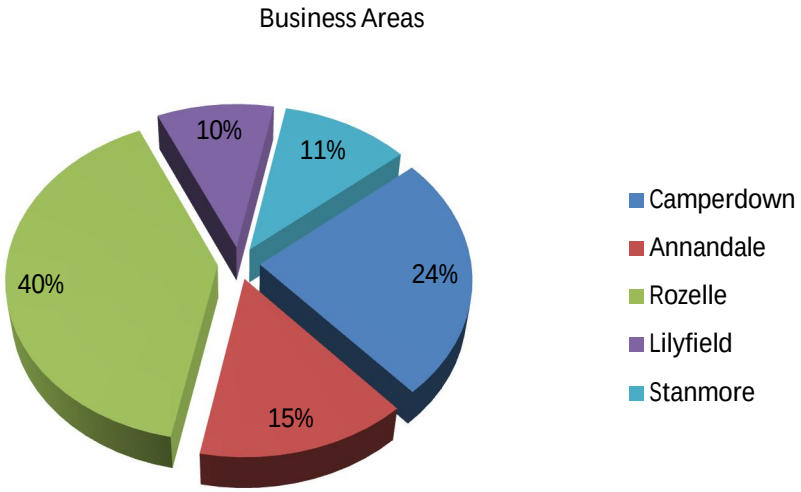
Upon operation, the project is likely to result in an overall major positive impact to the study area and broader region. This would result from an enhanced network capacity and connectivity between the inner city, inner west, south, south-western and western Sydney. The project would particularly support freight and commercial vehicle movements between the major economic regions of Sydney. At a local level, the new transport infrastructure would result in both positive and negative impacts for communities and businesses. Some communities would benefit from significant improvements in increased travel speeds, improvements to active transport network and from the delivery of new and enhanced open space areas. Other receivers may experience a slight reduction in the amenity due to alterations in views of new transport infrastructure and ancillary facilities, increased vehicles in the locality or the introduction of ventilation stacks to the environment, for example.

In summary, the implementation of appropriate mitigation measures by the proponent and a commitment to ongoing community engagement, monitoring and management would create a project that positively supports the economic growth of Sydney and broader NSW. This project would complement a range of federal, state and local objectives and strategies including those in *A Plan for Growth Sydney* (2014) and the *NSW Long Term Transport Master Plan* (2014). It would also support the opportunity for urban revitalisation and land use changes including the implementation of the Parramatta Urban Transformation Strategy and The Bays Precinct Transformation Plan.

Appendix A Business survey

In order to identify the impacts associated with businesses in the study area, a snapshot survey of 106 businesses located in the study area was undertaken. The methodology for undertaking the business surveys can be found in **section 3.4** of the main document. This annexure provides an overview of the core themes and responses to the business survey. The implications of the findings and how they relate to the project have been discussed in **Chapters 7**, **8** and **9**.

From the businesses that were surveyed, 40 per cent were located in Rozelle, 24 per cent were located in Camperdown, 15 per cent in Annandale, 11 per cent in Stanmore and 10 per cent in Lilyfield.

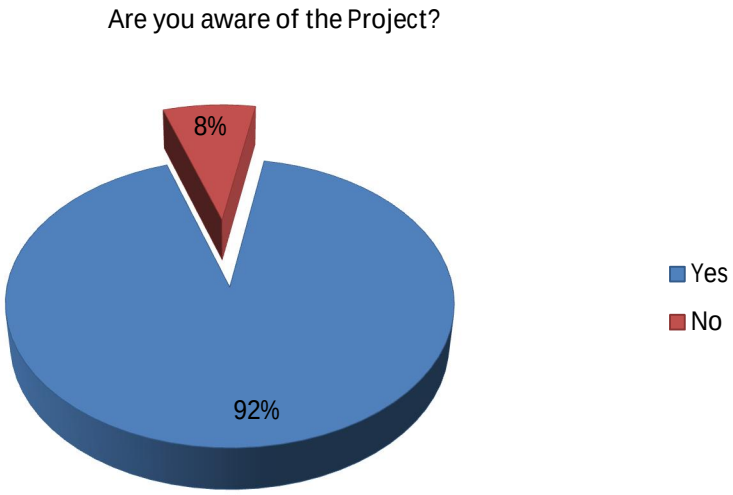


Business survey results

Questions regarding knowledge and perception of the project

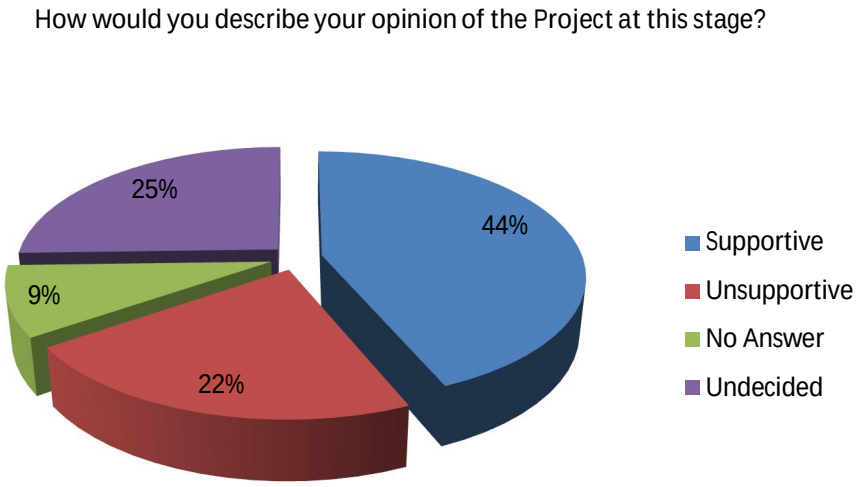
Q1. Are you aware of the project?

Of the businesses that responded, 92 per cent were aware of the project and only eight per cent had not heard of the project.



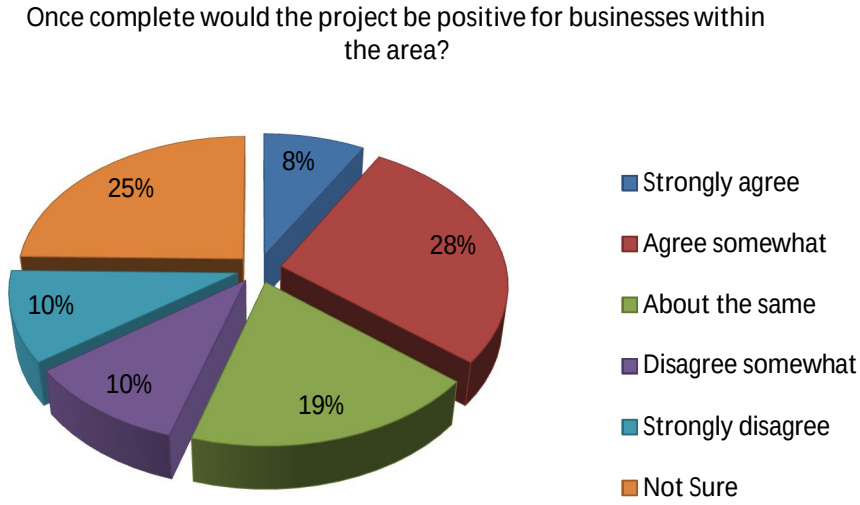
Q2. How would you describe your opinion of the project at this stage?

This question was open-ended when the survey was conducted. The following graph is a representation of the overall theme of the conversations conducted with business owners. Forty four per cent of the business owners surveyed were supportive of the project, 22 per cent were unsupportive, 25 per cent were undecided and nine per cent had no answer for the question.



Q3. Once complete would the project be positive for business within the area?

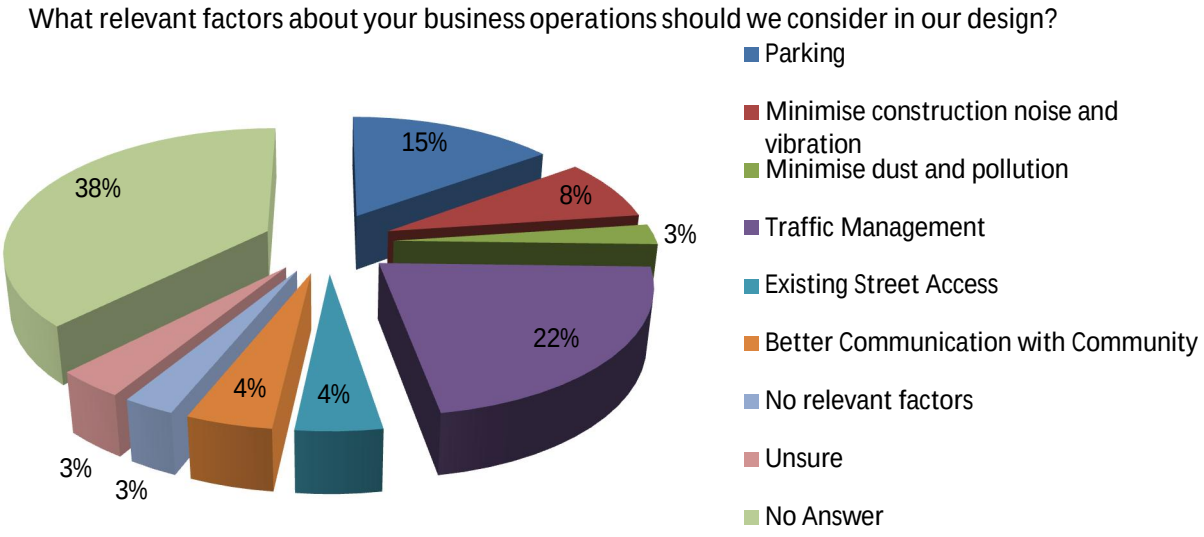
Of the businesses surveyed, 28 per cent agreed somewhat that the project would be positive for businesses in the area, with eight per cent strongly agreeing. Ten per cent disagreed somewhat and 10 per cent strongly disagreed. Nineteen per cent believed that business activity would be about the same and 25 per cent of business owners were unsure of the affects that the project would bring to local business.



Q4. What relevant factors about your business should we consider in our design?

Of the 106 businesses surveyed, the most common recurring theme that should be considered in the project design was traffic management. Twenty two per cent of the persons surveyed indicated that if any bottlenecking of traffic near the entry/exit points of the tunnel were to occur, it would be problematic for their business. In addition, construction vehicles that are removing spoil should operate outside of peak hour traffic to minimise any further congestion on the main roads. Fifteen per

cent of the persons surveyed, expressed concerns about the already limited parking and the effects that the construction workers would have by using customers' parking spots during their operational hours. Thirty-eight per cent of the respondents had no answer for the question.



Questions regarding impacts on businesses during construction

Q5. During the construction phase, what possible impacts (positive/negative) do you think this project could bring to your business?

From the 106 businesses surveyed, 44 per cent indicated that the construction would have a neutral/no effect on their business operations. Twenty-two per cent stated that they would be somewhat negatively impacted, with 10 per cent suggesting it would be significantly negative. Fifteen per cent said the construction would be positive for their business and one per cent said it would be significantly positive. Nine per cent of the business owners were unsure of the implications from construction.

Forty-six per cent of businesses stated that construction would have no effect on customer access, 29 per cent said it would be negative and 13 per cent said it would be significantly negative. Four per cent mentioned construction would be positive and one per cent said it would be significantly positive. Eight per cent of the respondents were unsure of the impacts on customer access.

The respondents had concerns about customer parking with 22 per cent suggesting construction would result in negative impacts and 17 per cent suggesting it would be significantly negative. Fifty-five per cent implied it would have neutral or no effect and five per cent were unsure. One per cent of businesses thought it would have a positive effect on customer parking.

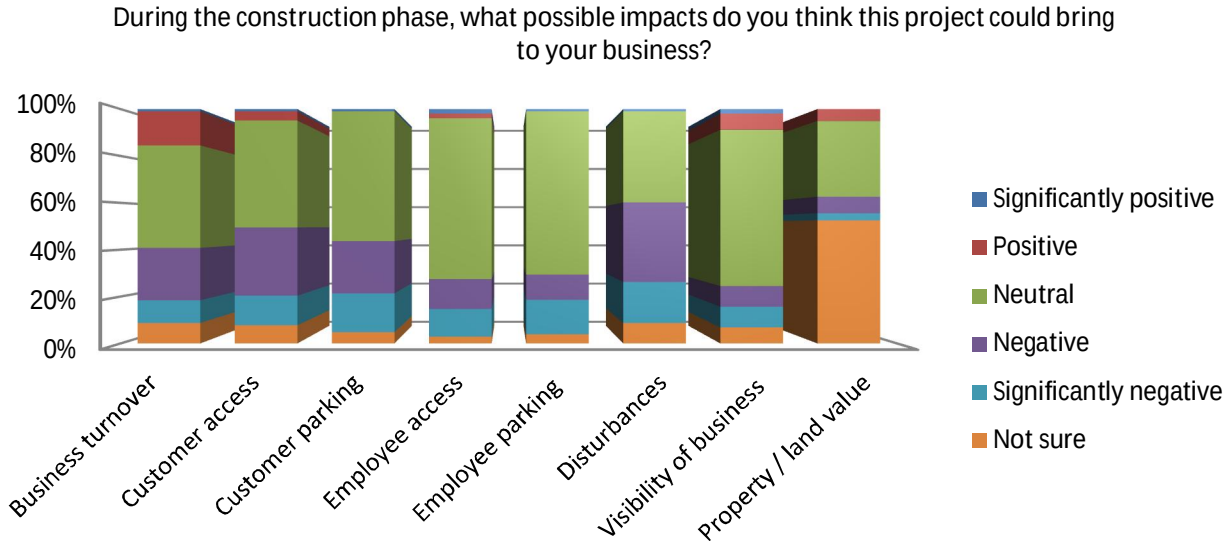
Employee access was seen as being relatively unaffected with 69 per cent stating there would be no impacts, although 13 per cent said it would be somewhat negative and 12 per cent stated it would be significantly negative. Three per cent were unsure but two per cent of the respondents said it would be positive and two per cent said it would be significantly positive.

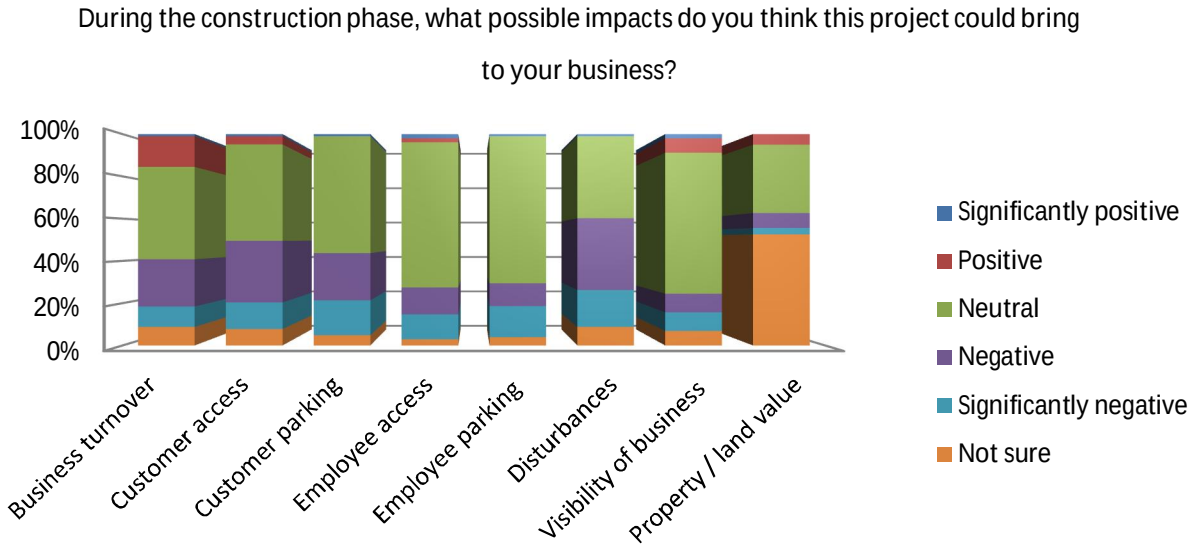
Seventy per cent said their employee parking would remain neutral, with only one per cent stating it would be significantly positive. Eleven per cent stated construction would be negative for employee parking, 15 per cent said it would be significantly negative and four per cent remain unsure of the effects.

Thirty four per cent perceived that the disturbances related to construction would cause negative impacts on their business, 17 per cent mentioned it would be significantly negative. Thirty nine per cent said they would remain unaffected. One per cent responded by saying it would be significantly positive but no owners said the disturbances would be positive. Nine per cent were not sure of the impacts.

Sixty-seven per cent of the respondents stated their business visibility would be unaffected by construction, seven per cent said the impacts would be positive and two per cent said it would be significantly positive. Nine per cent mentioned the impacts would be negative and nine per cent said it would be significantly negative. Seven per cent were unsure of the impacts brought on by construction.

The majority of the respondents (53 per cent) were unsure of the impacts on property/land values brought on by construction, three per cent said it would be significant negative and seven per cent stated it would be negative for the land values. Five per cent said it would be positive although no business thought it would be significantly positive.

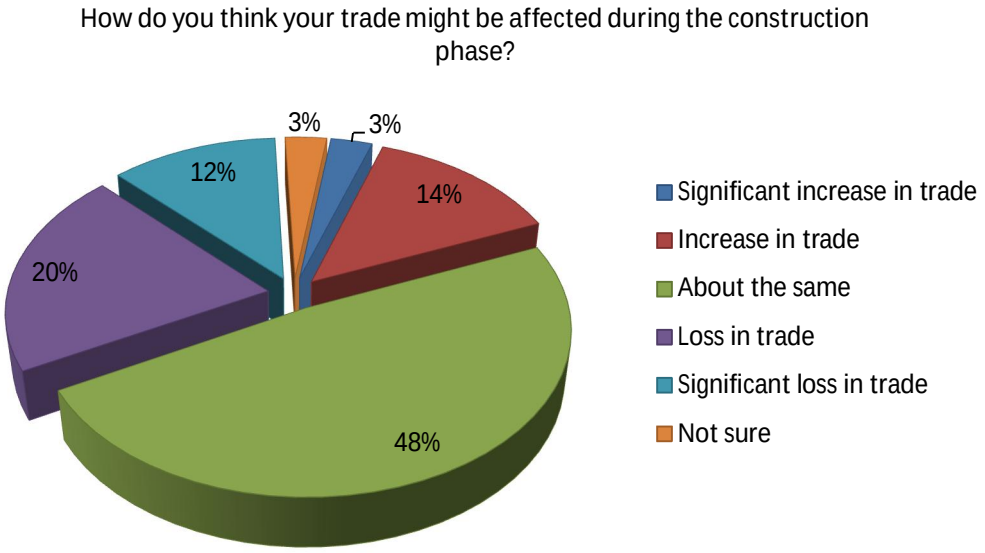




Q6. How do you think your trade might be affected during the construction phase?

Of the respondents that answered the question, the largest response at 49 per cent, stated that their trade during the construction phase would be about the same, 20 per cent of the respondents believed that they would have a loss in trade and 12 per cent believed that they would have a significant loss in trade. Seventeen per cent predicted construction would be positive for business with 14 per cent stating they believed they would have an increase in trade and three per cent would have a significant increase.

Of the 17 per cent that stated construction would have a positive impact on their trade, over 70 per cent were food and beverage business types and 10 per cent was retail.



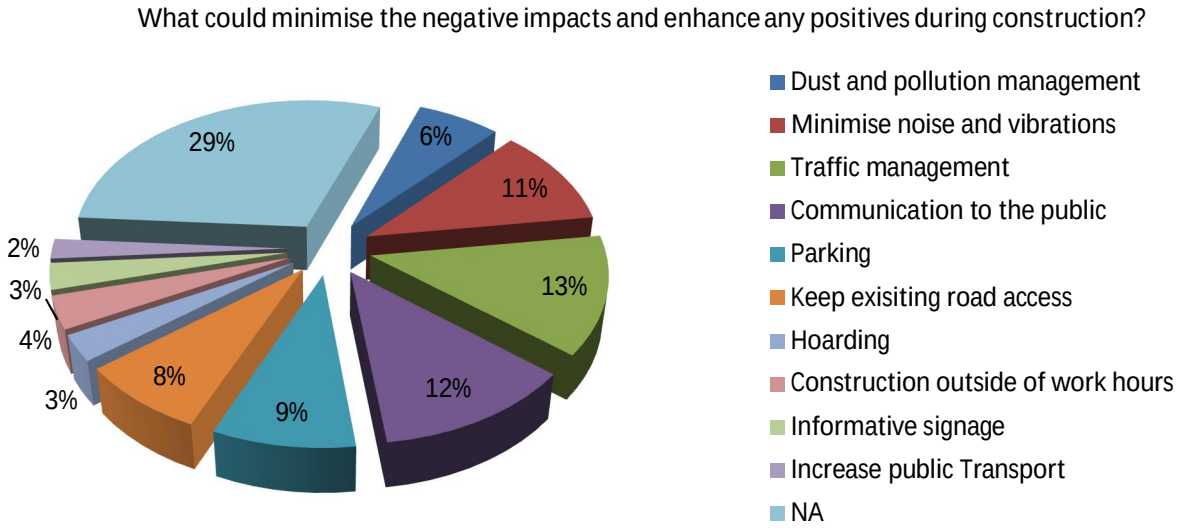
Q9. What could minimise the negative impacts and enhance any positives during construction?

Dust and pollution management was raised as a concern by respondents in relation to dust created during construction and the removal of spoil from sites. The pollution concerns relate to exhaust fumes created by the machinery used in construction. Six per cent of the respondents expressed that careful evaluation and management of these impacts would minimise negative impacts on their business.

Minimising noise and vibrations was identified by 11 per cent of the respondents with 13 per cent stating traffic management was vital to their business survival. Another similar factor was raised by eight per cent, who wanted to keep their current road access to their location and nine per cent were worried about parking access and availability once construction started. The majority of these concerns are about the construction workers using customer parking.

Transparency and communication from the project managers during construction was a recurring theme mentioned by the businesses with 12 per cent stating that awareness would help prevent negative impacts. In addition, construction work being done outside of work hours was favoured by four per cent of respondents. This includes the spoil being removed outside of peak hour traffic to reduce any further congestion.

Other methods to reduce negative impacts and enhance positives include hoardings which was suggested by three per cent of the respondents surveyed and informative signage mentioned by three per cent.



Questions regarding impacts during operation

Q7. During operation phase, what possible impacts do you think this project could bring to your business?

Of the businesses that responded, 28 per cent stated that turnover would be positive during operation, 49 per cent stated that there would be no effect, seven per cent stated that there would be negative impacts, four per cent mentioned significantly negative impacts and 13 per cent were unsure how their business would be affected.

Twenty nine per cent of businesses had the perception that customer access, once the project was in operation, was positive and two per cent mentioned it would be significantly positive. Neutral impact of no effect is perceived by 46 per cent and negative impacts were stated by seven per cent of businesses with three per cent being recorded for significantly negative. Fourteen per cent were not sure what impacts would occur to businesses in the local area following operation.

The availability of customer parking was said to improve once the project was in operation by 15 per cent of respondents, whereas 18 per cent stated that parking availability would be worse. Fifty-six per cent of respondents stated that customer parking availability would be no different to current levels and 12 per cent of respondents were unsure.

Employee access was seen as positive 15 per cent of the business survey, 68 per cent mentioned the project would be neutral, seven per cent stated that they would experience negative impacts from operations and 11 per cent mentioned they were unsure of the impacts of the project once operational.

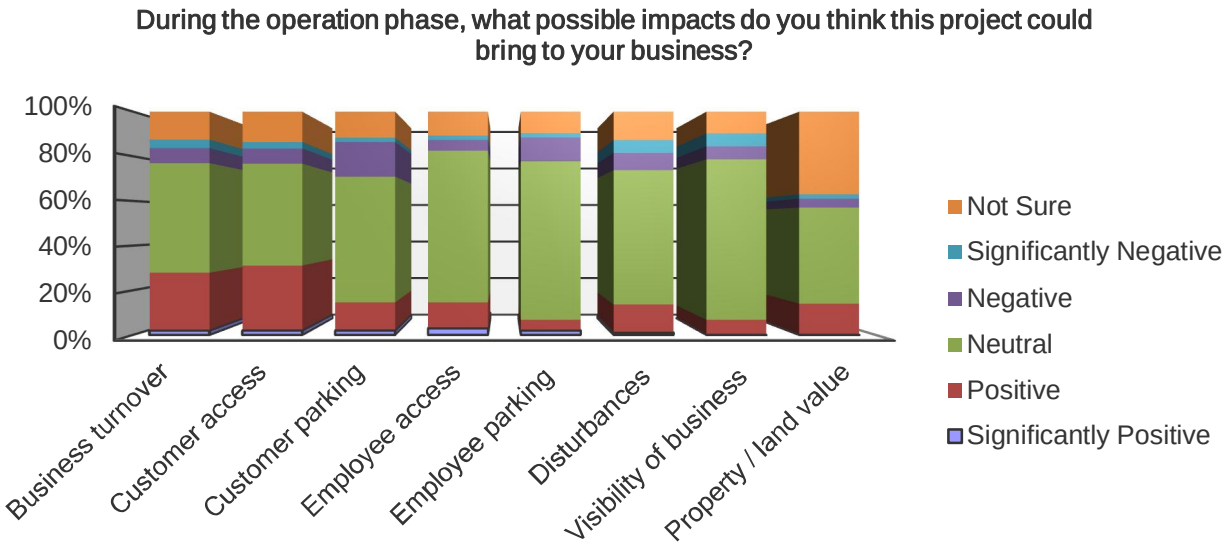
Seventy one per cent of the businesses mentioned that employee parking would experience neutral or no effect from the project once operational, five per cent said it would be positive and two per cent stated it would be significantly positive. Eleven per cent mentioned they would have negative impacts and two per cent stated it would be significantly negative. Ten per cent were unsure of the impacts cause by the completed project.

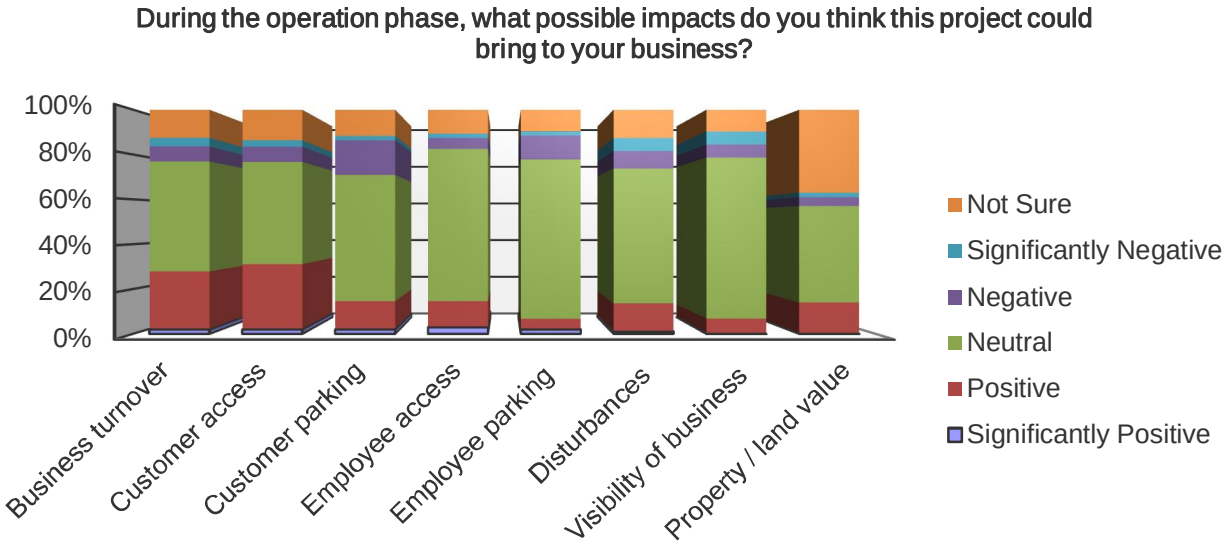
Disturbance was seen as having neutral effects by 60 per cent of the business owners, 13 per cent had the perception that they would have positive impacts and one per cent stated they would experience significantly positive impacts from having less cars on the road. Negative impacts were perceived by 14 per cent of respondents and 13 per cent were unsure of what impacts the project would have on their business.

Seventy two per cent of business owners had the perception that the visibility of their business would not be affected post construction, with seven per cent believing it would have positive impacts. A

combination of 12 per cent assumed that negative impacts would be the result of the project in operation and 10 per cent were not sure of the impacts.

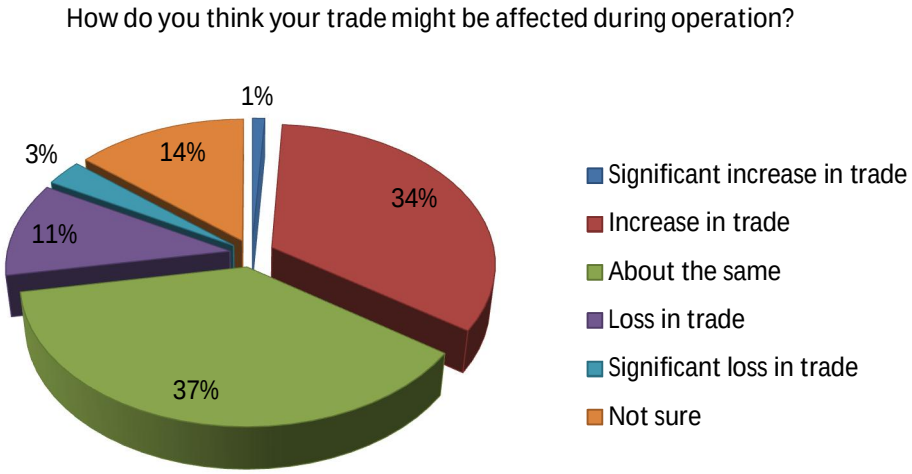
A completed project was believed to have neutral effects on property/land values by 43 per cent of the businesses with 37 per cent mentioning they were unsure of the impacts that the project would cause. Fourteen per cent saw it as being positive and four per cent saw it as negative with two per cent stating the completed project would be significantly negative.





Q8. How do you think your trade might be affected during operation?

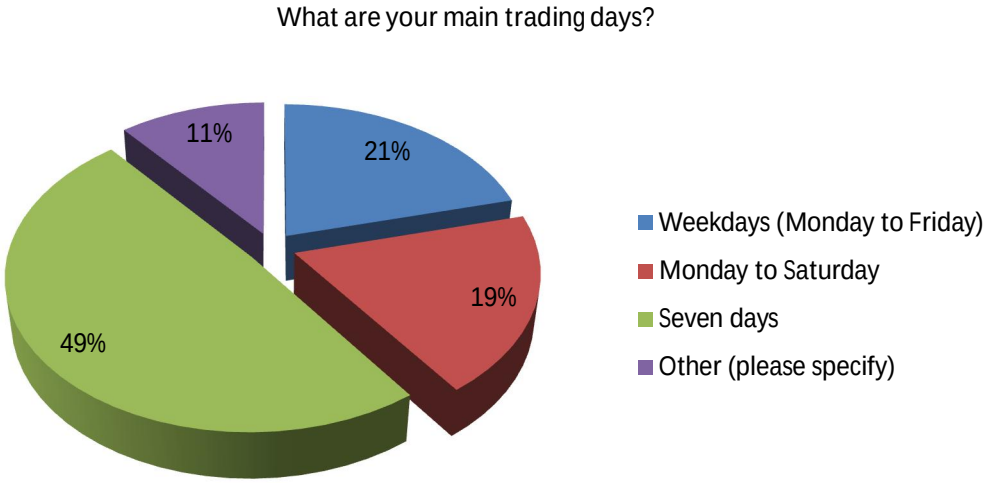
Of the businesses that responded to the question, 37 per cent perceived their trade would not be effected by the project in operation, 34 per cent believed they would have an increase in trade and one per cent thought they would have a significant increase in trade. A perception of loss in trade was mentioned by 11 per cent of respondents and three per cent stated their concerns for a significant loss in trade. Fourteen per cent were unsure of the ways the project, once operational, would affect their trade.



Questions regarding business information

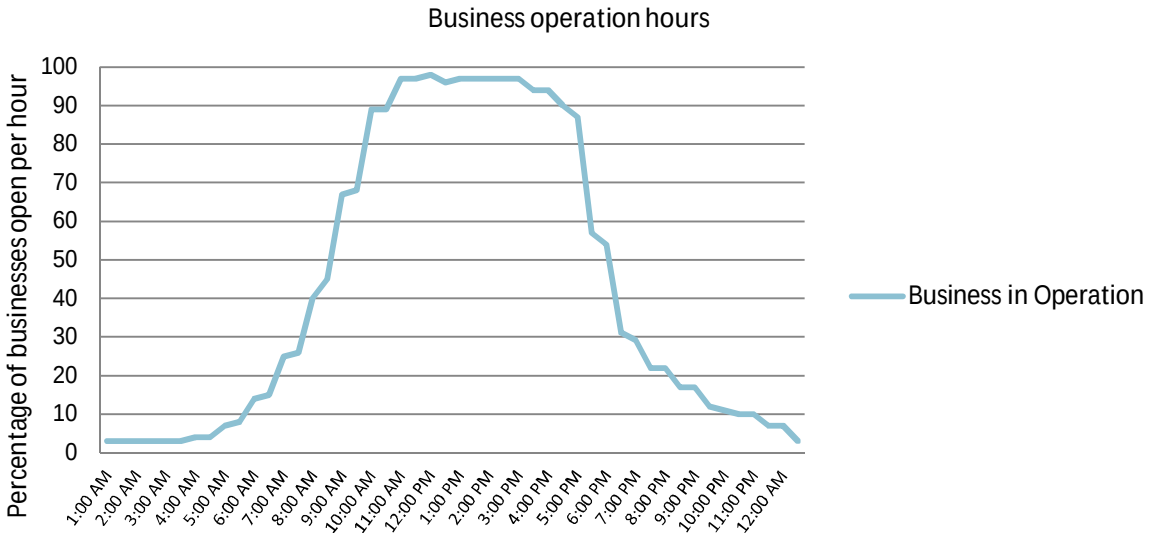
Q10. What are your main trading days?

Of the businesses surveyed, nearly half (49 per cent) the respondents suggested that their business was open every day, 21 per cent are open Monday to Friday, 19 per cent are open Monday to Saturday and 11 per cent are open on other day combinations.



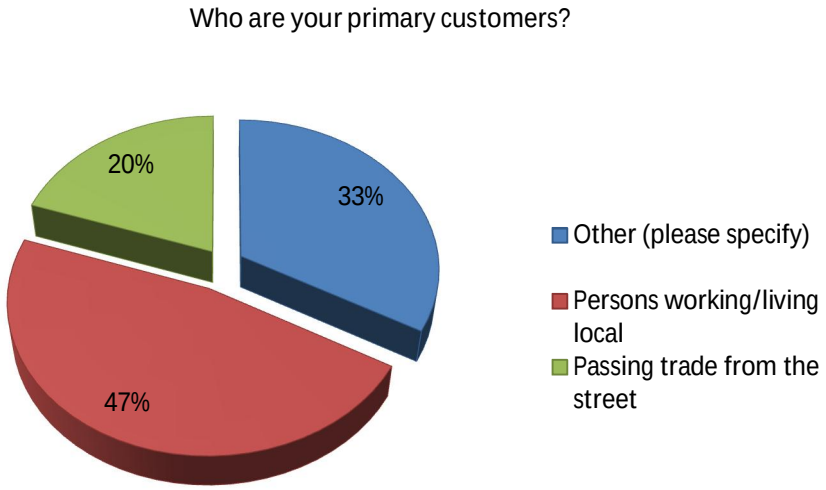
Q11. What are your general trading or opening hours?

The data from the respondents indicates that 69 per cent are operational between the hours of 10.00 am and 5.00 pm, 17 per cent operate between 1.00 am and 9.30 am and 15 per cent operate between 5.30 pm and midnight.



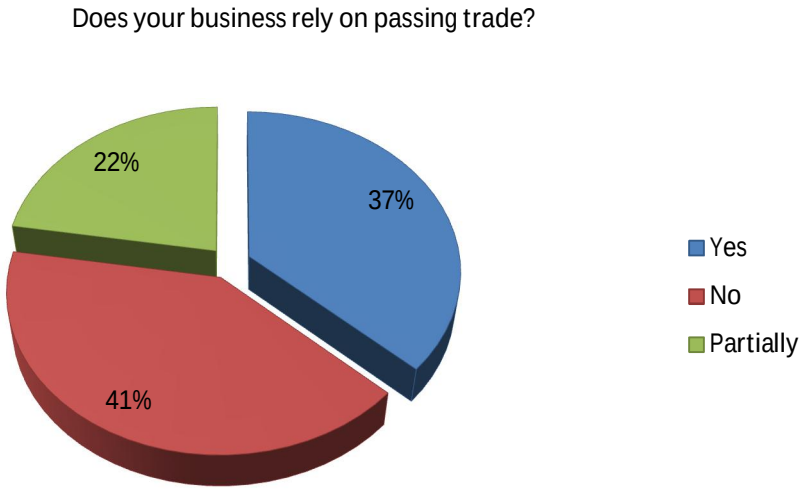
Q12. Who are you primary customers?

From the 106 businesses that were surveyed, 47 per cent indicated that locals were their primary customers, 20 per cent said passing trade and 33 per cent mentioned their primary customers were others, which include specific industries ie music and trades, repeat customers, customers from outside the area and online sales.



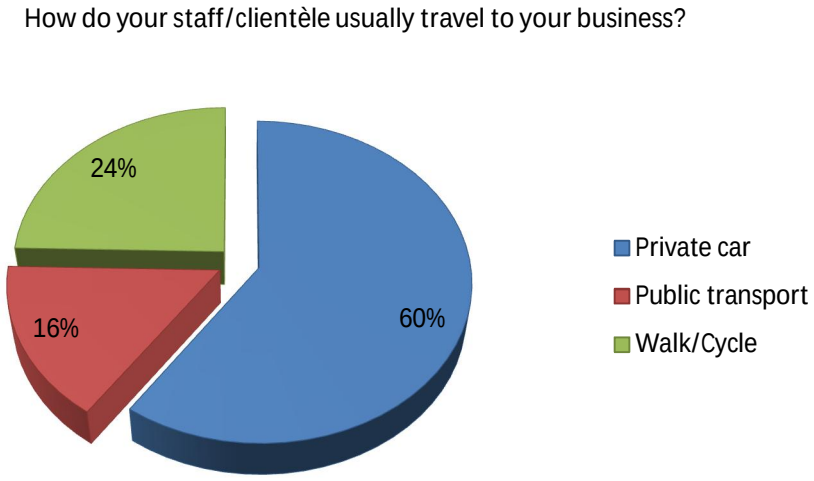
Q13. Does your business rely on passing trade?

The business owners that mentioned they rely on passing trade made up 37 per cent of the businesses surveyed, 41 per cent did not rely on passing trade and 22 per cent stated they partially rely on passing trade.



Q14. How do your staff/clientele usually travel to your business?

The findings from the surveys indicate that the majority of the business owners and their staff/clientele drive to the business, with 60 per cent stating that their primary mode of transport was private car, 24 per cent said that their staff/clientele walk or cycle to the business and 16 per cent use public transport.

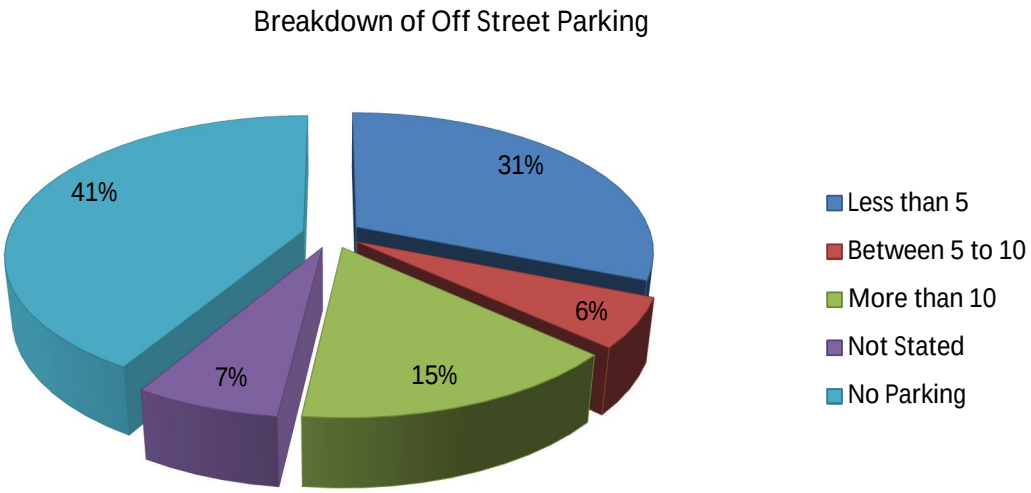


Q15. Do you have off street parking?

Of the businesses surveyed, 55 per cent have off street parking and 45 per cent do not have off street parking.

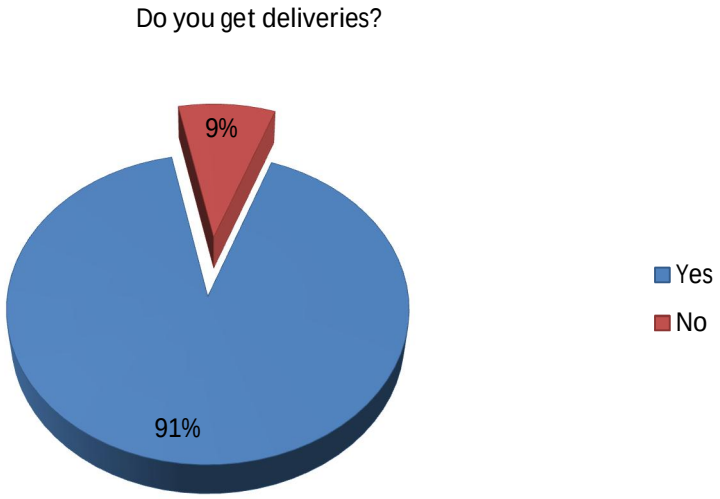
The following graph is a breakdown of the businesses that participated in the survey and are categorised into five groups based on the results received.

Thirty-one per cent of the businesses stated that they had less than five car spaces for off street parking, 15 per cent had more than 10 spaces and 5 per cent had between five to 10 car spaces. Six per cent stated they had off street parking but did not state how many spaces they had and 41 per cent did not have off street parking.



Q17. Do you receive deliveries?

Of the 106 businesses surveyed, 91 per cent stated that they receive deliveries. Fifty-eight per cent of the respondents stated that their deliveries are received on street, 36 per cent received their deliveries off street and six per cent have both options available in which to receive deliveries.



Q20. Business Types

From the businesses surveyed, the business type breakdown is as follows: retail at 33 per cent was the largest portion of business type, food and beverage was the second largest category with 31 per cent, followed by automotive with 13 per cent. Health care business made up 10 per cent, other services made up five per cent, professional services made up four per cent, wholesale business made up two per cent, construction industry made up one per cent and there was one business in the education industry making up one per cent.