

**WestConnex**



# M4 East

## Environmental Impact Statement

Appendices M-O

**Volume 2E**

**September 2015**

# Volume 2E

## Appendices

M .....	Social impact assessment
N .....	Economic impact assessment
O .....	Soil and water quality assessment

Appendix

M

Social impact assessment

WestConnex

# WestConnex Delivery Authority

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WestConnex M4 East

Social Impact Assessment

September 2015

**Prepared for**

WestConnex Delivery Authority

**Prepared by**

AECOM Australia Pty Ltd

GHD Pty Ltd

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# Document controls

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**Title**                      **WestConnex M4 East  
Social Impact Assessment**

Social Impact  
Assessment

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# Glossary of abbreviations

Term	Meaning
ABS	Australian Bureau of Statistics
BTS	Bureau of Transport Statistics
CBD	Central business district
CPTED	Crime prevention through environmental design
CEMP	Construction Environmental Management Plan
DCP	Development Control Plan
EIS	Environmental Impact Statement
HCA	Heritage Conservation Area
LAC	Local Area Command
LEP	Local Environmental Plan
LGA	Local government area
NSW	New South Wales
NSRU	North Strathfield Rail Underpass Alliance
NSW 2021	<i>NSW 2021: A Plan to Make NSW Number One</i> – the NSW Government's 10-year strategic business plan.
OOSH	Out of school hours care
OTEN	Open Training Education Network
Roads and Maritime	(NSW) Roads and Maritime Services
RTA	NSW Roads and Traffic Authority (now Roads and Maritime Services)
SA1	Statistical Area Level 1
SEARs	Secretary's Environmental Assessment Requirements
SEIFA	Socio-Economic Indexes for Areas
SES	State Emergency Service
SIA	Social impact assessment
State Infrastructure Strategy	<i>State Infrastructure Strategy 2012–2032</i> – Infrastructure NSW's 20-year strategy which identifies and prioritises the delivery of critical public infrastructure.
TfNSW	Transport for NSW
Transport Master Plan	<i>NSW Long Term Transport Master Plan</i> – Transport for NSW's framework for delivering an integrated, modern and multi-modal transport system by identifying NSW's transport actions and investment priorities for the next 20 years.
Parramatta Road Strategy	<i>The New Parramatta Rd: Draft Parramatta Road Urban Renewal Strategy</i> – UrbanGrowth NSW's strategy to identify areas along the corridor where there will be a focus on encouraging growth and changes in the long term (about 20 years).
WDA	WestConnex Delivery Authority

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# Executive Summary

This report contains the social impact assessment for the proposed construction and operation of the WestConnex M4 East project. This report has been prepared to inform the environmental assessment and be included in the Environmental Impact Statement (EIS) as a technical paper.

Information inputs used in this assessment reflect the current available knowledge of the project. The WestConnex Delivery Authority (WDA), on behalf of the NSW Roads and Maritime Services (Roads and Maritime), is seeking approval to upgrade and extend the M4 Motorway from Homebush Bay Drive at Homebush to Parramatta Road and City West Link (Wattle Street) at Haberfield, in inner western Sydney. This includes twin tunnels about 5.5 kilometres long and associated surface works to connect to the existing road network.

The social impact assessment considers the likely social impacts and risks presented by the project and identifies mitigation measures to avoid or mitigate adverse impacts, and facilitate improved social outcomes. The assessment has focussed on local impacts resulting from surface works in the vicinity of five precincts; Homebush, Concord Road, Cintra Park, Wattle Street and Parramatta Road (Ashfield). Regional impacts are also assessed, as well as consideration for cumulative impacts and city wide impacts.

## Social Impacts

The key social impacts identified relate to the social risks of land acquisition affecting 161 households, and the construction stage amenity and access impacts. The main impacts identified and mitigations measures proposed are as follows:

### Construction

#### *Property and household impacts*

The project would require the full acquisition of 167 residential properties, partial acquisition of 15 and resumption of 98 properties currently owned by Roads and Maritime.

Allowing for the fact that some of these properties are vacant, it is estimated that the project would require the relocation of approximately 168 residential dwellings or households (approximately 460 people).

**Table 10.1** provides a breakdown of the residential dwellings being acquired for the project.

**Table 10.1 Summary of residential dwellings to be occupied as part of the project**

	Homebush	Concord	Wattle Street	Parramatta Road	Total
<b>Total residential dwellings to be fully acquired</b>	<b>14</b>	<b>46</b>	<b>83</b>	<b>25</b>	<b>168</b>

(Source: Compiled with data supplied by WDA)

Note: There is no property acquisition required in the Cintra Park precinct.

Land acquisition is being undertaken by Roads and Maritime in accordance with the *Land Acquisition (Just Terms Compensation) Act* NSW 1991 (the Act) and the *Roads and Maritime Land Acquisition Information Guide* (Roads and Maritime, 2012), aiming to achieve a negotiated agreement wherever possible.

WDA commenced a process of voluntary acquisition of residential properties in November 2013. Subsequently in June 2015 WDA and RMS notified individual property owners that their property was required by the preferred design, with information on the land acquisition process also provided. Valuations by RMS and property owners were subsequently sought and negotiations commenced. Some residential acquisition agreements have already been concluded.

A number of social risks are inherent in a land acquisition process:

- potential health impacts particularly for more vulnerable residents;
- inaccessibility or availability of equivalent housing at a comparable price, potentially resulting in relocation outside of existing socio-economic networks; or
- entering housing stress by taking on higher housing costs.

Vulnerable households (e.g. the sick, frail elderly, low income etc) would be most susceptible to these impacts. These risks would also be exacerbated for less vulnerable households, as land acquisition would increase property demand in the local area with some households with only nine months to identify alternate properties.

Two properties to be acquired in the Concord Road precinct are public housing properties. With already low levels of public housing in the area, this would further reduce the available affordable housing stock locally.

Property acquisition and project development in the Wattle Street Haberfield precinct is expected to exacerbate the severance currently created by Wattle Street, with the potential to negatively impact on local community cohesion.

Recommended mitigations include;

- Continue supporting home owners to obtain alternate independent property valuations, so that property owners would not be temporarily left out of pocket (i.e. property valuation fees to be paid at the time the invoice is due if this is before settlement)
- Provide relocation support services to assist land owners and vulnerable households that must relocate (both renters and owners). These services could include support in finding alternate properties and social support for households relocating within and to other areas.

#### *Social infrastructure*

The preferred design has resulted in fewer and less severe impacts to social infrastructure in the project area compared to the earlier concept design from November 2014. The preferred design has avoided the need to acquire Haberfield Aged Care, Peek-A-Boo Early Learning Centre, the heritage listed Yasmar Training Facility, and the heritage listed and socially important Ashfield Park.

Social infrastructure facilities and open spaces that would be acquired by the project include:

- Strathfield Girl Guides Hall (Strathfield Council)
- Powells Creek/Arnotts Reserve (Strathfield Council)
- Zongde Buddhist Temple
- Sydney Cheil Uniting Church (partial acquisition along its Concord Road frontage).

Negotiations are ongoing in regards to compensation and assistance in identifying alternate locations (where appropriate).

The leasing of four parcels of land would result in loss of public access to the following open spaces during construction:

- Bill Boyce Reserve at Pomeroy Street (managed by Strathfield Council)
- Parts of Reg Coady Reserve at Wattle Street (managed by Ashfield Council)
- Vacant land located west of Powells Creek (locally referred to as Arnotts Reserve) adjacent to the northern side of Parramatta Road. This land is managed by Strathfield Council who intend to develop it for open space in the future
- Cintra Park Hockey Field with this facility being reinstated on the nearby St.Lukes Park. .

Leased public reserves would be restored and returned to their owners at the end of construction.

The Cintra Park Hockey Field would be relocated nearby to St Luke's Park so that the site can be used for a construction compound. This relocation has been addressed in a separate environmental assessment which describes the Cintra Park facility not being decommissioned until the proposed hockey field at St Luke's Park is constructed and commissioned. This would ensure that a hockey field is available during the hockey season.

A number of other social facilities are in close proximity to project surface works and would likely be affected by construction traffic and amenity impacts (e.g. noise, vibration and visual amenity).

These are;

- Our Lady of the Assumption Catholic Church on Underwood Street, Homebush
- Arnotts Reserve on Allen Street, Homebush
- Concord Oval on Parramatta Road, Concord
- Jehovah's Witness Church on Wattle Street, Haberfield
- Willows Private Nursing Home on Orpington Street, Ashfield
- Haberfield Aged Car on Parramatta Road, Haberfield
- Peek-A-Boo Early Learning Centre on Parramatta Road, Haberfield
- Yasmar Training Facility on Parramatta Road, Haberfield.

Consultation in accordance with the project Community Consultation Framework would mitigate these impacts, with specific considerations including;

- Consult with Strathfield Council and Strathfield Girl Guides to assist in identifying and accessing temporary premises
- Continue to support the Zongde Temple in planning for relocation in the short and long term
- Liaise with the property owners and the congregation of users at the Sydney Cheil Uniting Church to provide alternate land for car parking
- Consult with users of Concord Oval and St Luke's Park facilities for development of the construction environmental management plan (CEMP) for the Cintra Park tunnel site
- Consult with social infrastructure (specifically aged care and child care facilities) affected by the project in regard to any respite periods (where reasonable and feasible) when the most intrusive construction activities are undertaken during the day.

#### *Access and Connectivity*

Major construction works would be primarily accessed from Parramatta Road and the M4. Access to construction ancillary facilities would be located to and from arterial roads to provide the most direct access for heavy vehicles. It is estimated construction traffic would represent only two per cent of total daily traffic on Parramatta Road. The construction workforce is expected to increase the volume of light vehicles on the surrounding road network, generating only minor impacts, except in Underwood Road and Short Street East. Localised detours, temporary traffic signals and construction traffic delays are expected to have minor impacts on motorists.

The existing cycleway along the M4 between Hill Road and Concord Road would be unavailable during construction, with a detour route proposed to the north of the M4 corridor. During construction, traffic delays due to increased waiting times at intersections may potentially impact motorists, bus passengers, cyclists and pedestrians. This may reduce the reliability of buses in making connections to other transport modes.

The short term relocation of the westbound Orpington Street bus stop in the Parramatta Road precinct would increase walking distances for visitors to the Willows Private Nursing Home. The closure of Chandos Street and relocation of the westbound bus stop could reduce accessibility and increase travel distances to public transport for residents in the area. Reduced access to public transport is particularly important, as this area recorded higher levels of relative socio-economic disadvantage and lower vehicle ownership.

Similarly, the relocation of the southbound bus stop on Concord Road, together with large footprint of the proposed interchange, would increase walking distances and potentially discourage people to walk to this bus stop or within the local area across Concord Road.

Pedestrian safety at the Bland Street exit of the Parramatta Road eastern civil site would be considered in developing construction environmental management plans.

Consultation in accordance with the project Community Consultation Framework would provide the opportunity to mitigate these impacts, with specific considerations including;

- Consult with key local social infrastructure providers in developing construction traffic management plans, including notification to local emergency services about changes to local road networks, particularly road closures
- Relocate Orpington Street bus stop in consultation with the Willows Private Nursing Home to minimise walking distance between the relocated bus stop and the nursing home
- Explore options to increase pedestrian and cyclist connectivity along the M4 alignment particularly in the vicinity of Underwood Road and Allen Street to increase opportunities for active lifestyles and contribute to offsetting the amenity impact of the project corridor
- Develop a construction car parking strategy that promotes public transport use and minimises impacts on on-street car parking
- Consider (in consultation with Haberfield Public School and Ashfield Council) pedestrian safety at the egress point for the Parramatta Road civil site at Bland Street, as part of the traffic management and safety plan.

#### *Amenity*

The project has the potential to generate considerable noise, with the greatest impacts generated during site establishment works and roadworks. These activities are generally short term at any point as the works move along the alignment. However, longer duration impacts would be experienced in the vicinity of compound and tunnel excavation/spoil removal sites.

In most cases noise generated by construction traffic would be negligible due to the use of the arterial road network. However for local roads such as Short Street East and Powell Street in Homebush, more maximum noise events may occur which would require more consideration of management during detailed design to minimise and mitigate these impacts.

Most of the project area is already exposed to high noise levels from existing traffic with many properties already experience exceedance of noise limits. With a construction period of approximately three years, management of noise and vibration impacts, especially any outside of standard working hours, would be integral to limiting negative impacts on community well-being.

Visual impacts to residences in the vicinity of the project relate primarily to the removal of existing vegetation and resultant loss of visual amenity for the properties overlooking compounds and work sites. In most cases these impacts have been assessed to be low or low to moderate. However impacts on residences adjacent to the Pomeroy Street construction compound, Underwood Road tunnel and civil site and Concord Road civil and tunnel sites, would experience high visual impacts. Residents in Wattle Street, Walker Avenue, Ramsay Street, Martin Street and Dobroyd Parade would also experience high visual impact due to their proximity to multiple project elements.

The project Human Health Risk Assessment has found the potential for stress and anxiety resulting from reduced amenity during construction. However the assessment notes that these impacts would largely be short term and intermittent and are able to be managed by standard mitigation measures.

Project property acquisition would result in the loss of 66 residential properties of heritage significance in the Concord Road, Wattle and Parramatta Road precincts, with significant impacts on the Powell's Estate and Haberfield Heritage Conservation Areas and impacts to the historical streetscape of Chandos Street.

Recommended mitigation measures, in addition to those in other specialist reports prepared for the EIS and the Community Consultation Framework, include;

- For those properties that qualify for operational noise attenuation treatments, bring forward the implementation of noise treatments to the early stages of construction where feasible and reasonable
- Supporting beautification of construction compound sites through temporary plantings, decorated hoardings and the like to assist in reducing visual impacts.

#### *Business and economic impacts*

Twenty private businesses would be fully acquired for the project prior to commencement of construction, including.

- One motel with 50 guest rooms and a restaurant;
- Four commercial offices;
- Nine automotive sales and services;
- One personal services business;
- Three homeware sales and services; and
- Two retail businesses.

The acquisition of these businesses would result in impacts to the local economy through loss of business turnover and employment. WDA's consultation with affected businesses indicates that the majority of these businesses intend to relocate their business activities to another site within the region and continue trading.

All businesses located on land to be fully acquired are located adjacent to Parramatta Road, toward the eastern end of the project in the suburbs of Ashfield and Haberfield. Many of these businesses serve a wider catchment area so their relocation will not significantly disadvantage the local community. In addition the affected businesses in this area do not generally provide complementary or supplementary goods or services, therefore the viability of adjacent or surrounding businesses should not be affected.

There is the potential for a boost in the economy due to construction expenditure in the region, with local business benefiting from this expenditure through purchases made by construction businesses and associated workers to build and support the development of the project. Employment opportunities would grow in the region through the potential increase in business customers and through the increase in demand for construction workers. The increase in demand for labour may increase wages in the region, particularly for construction workers, who would be in high demand.

### **Operation**

#### *Property and Household impacts*

The project is not expected to have any operational residential property impacts, and would not involve the consolidation, rezoning or redevelopment of residual land. However the existence of residual lands does raise the potential for future social benefits by delivering housing, open space, improved active travel connectivity, public facilities or mixed use developments.

#### *Social infrastructure*

Landscaping treatments and noise walls would mitigate amenity impacts for most social infrastructure.

The proposed operational infrastructure at Cintra Park would have only minor impacts for park users as the area to be occupied is relatively limited and the bulk of the site would be rehabilitated, landscaped and returned to Canada Bay Council for use as public open space. The upgraded car park would also be wholly available to sports facility users.

Permanent acquisition of 1,312 square metres of the Reg Coady Reserve would be required for the realignment of Wattle Street, however this is not considered to be a significant impact on the availability of local open space.

### *Access and Connectivity*

The project is expected to enhance local and regional connectivity by reducing vehicle delays along the corridor between Homebush Bay Drive in the west and the City West Link and Parramatta Road in the east. The project would support the introduction of dedicated bus lanes between Burwood and Ashfield. Peak morning travel times on strategic routes are expected to reduce by six to eight minutes, increasing to ten to eighteen minutes after the proposed M4-M5 Link is built. These improvements to connectivity would contribute to overcoming the barrier that Parramatta Road presents to regional use of social infrastructure and social benefits through freeing travel time for social and economic pursuits. However in the medium term, before the construction of the proposed future M4-M5 Link, congestion would increase in some areas, particularly on Parramatta Road east of the project.

Reduced traffic volumes and wait times at intersections would benefit cyclists and pedestrians and provide the opportunity for improved active travel infrastructure with urban renewal.

It is recommended that;

- Opportunities for providing improved pedestrian and cyclist connectivity especially in the vicinity of Wentworth Street, Underwood Road and Allen Street, Homebush are explored for project operation
- WDA liaise with Transport for NSW in regard to improving pedestrian access in the vicinity of the Concord Road interchange, and specifically the southbound Concord Road bus stop.

### *Amenity*

Road traffic noise impacts during operation would, in 78 per cent of cases, result in minor noise reductions along the M4 and Parramatta Road corridors due to traffic displacement into the new tunnels. These areas include the unmodified M4 (east of the proposed M4 East tunnel portals) and Parramatta Road between Concord Road and Wattle Street.

A minor increase in noise levels (less than 2.0 dB which is generally unnoticeable to the average person) is expected at approximately 18 percent of sensitive receivers.

There are 310 instances (4 percent of receivers) where noticeable noise increases could be experienced, primarily as a result of the acquisition of adjacent properties which had previously acted as noise barriers for these properties or where new road noise sources or traffic volumes increase. These properties are eligible for assessment for at property treatments to mitigate noise impacts. For most properties, including social infrastructure for which lower thresholds of noise are permitted, these treatments could potentially improve internal noise conditions compared to existing conditions. However in these cases, increased outdoor noise levels may result in increased levels of stress at individual properties.

Traffic displacement from the M4 and along sections of Parramatta Road is expected to deliver traffic noise amenity benefits supportive of potential urban renewal opportunities in the corridor.

Visual amenity and heritage impacts would remain, largely due to: loss of vegetation screening, new road infrastructure, closer proximity to new road infrastructure, ancillary operational facilities and the loss of heritage items and changes to streetscapes. Project design and landscaping plans aim to minimise visual intrusion of project elements and respect and respond to the existing and desired character of these areas. These impacts, and the consequent impacts to community cohesion and sense of place, are expected to diminish over time as landscaping treatments mature.

Mitigations in addition to those in other specialist reports prepared for the EIS and the Community Consultation Framework are;

- Supporting beautification of operational facilities and spaces through public art and landscaping to assist in reducing visual impacts associated with these facilities
- Providing support for local community development activities, such as community events, to assist with restoring and increasing community cohesion.

### *Business and economic impacts*

Businesses located at the eastern and western portals and west of Concord Road are likely to experience reduced amenity due to increased traffic volumes and the introduction of new infrastructure. Businesses located along Parramatta Road, east of Concord Road and not located adjacent to the eastern or western portal, would experience improved amenity due to the reduction in vehicles, particularly heavy vehicles on Parramatta Road.

Businesses on Parramatta Road that are reliant on passing trade would be affected by the project, with an estimated annual reduction of around \$7.3 million in output and around 33 full-time equivalent jobs due to loss in passing trade. There is also potential for increases in passing trade for businesses located along Parramatta Road, west of Concord Road, from an increase in traffic volumes. A total of five businesses were identified as potentially benefitting from an increase in passing trade, comprising of services stations, a car wash and cafes/restaurants.

Reduced business operational costs are also expected due to increased accessibility and transport efficiencies for business.

### *Cumulative impacts*

The key cumulative impacts are related to the overlapping constructions periods for other stages of WestConnex (current M4 widening between Church Street, Parramatta and Homebush Bay Drive and the proposed M4-M5 Link). Overlap would result in prolonged exposure of residents, motorists, cyclists, pedestrians and public transport users to construction amenity impacts and travel delays.

During operation, the cumulative impacts are expected to be positive, with the project facilitating the implementation of the Parramatta Road Urban Transport Program by reducing traffic and improving amenity in the Parramatta Road corridor, including the potential for introduction of dedicated bus lanes. Specifically, this would benefit the key urban renewal precincts of Auburn, Homebush, Burwood and Kings Bay and support housing and employment growth in these precincts. Enhanced connectivity and travel efficiencies would benefit both local and regional communities and the business and commercial sectors.

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# 1 Introduction

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## 1.1 Overview of the project

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to upgrade and extend 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. These proposed works are described as the M4 East project (the project). The location of the project is shown in **Figure 1.1**.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). The project was declared by the Minister for Planning to be State significant infrastructure and critical State significant infrastructure and an environmental impact statement (EIS) is therefore required.

The project is a component of WestConnex, which is a proposal to provide a 33 kilometre motorway linking Sydney's west and south-west with Sydney Airport and the Port Botany precinct. The location of WestConnex is shown in **Figure 1.2**. The individual components of WestConnex are:

- M4 Widening – Pitt Street at Parramatta to Homebush Bay Drive at Homebush (planning approval granted and under construction)
- M4 East (the subject of this report)
- New M5 – King Georges Road at Beverly Hills to St Peters (planning application lodged and subject to planning approval)
- King Georges Road Interchange Upgrade (planning approval granted and work has commenced)
- M4–M5 Link – Haberfield to St Peters, including the Southern Gateway and Southern Extension (undergoing concept development and subject to planning approval).

Separate planning applications will be lodged for each individual component project. Each project will be assessed separately, but the impacts of each project will also be considered in the context of the wider WestConnex.

The NSW Government has established the WestConnex Delivery Authority (WDA) to deliver WestConnex. WDA has been established as an independent public subsidiary corporation of Roads and Maritime. Its role and functions are set out in Part 4A of the *Transport Administration (General) Regulation 2013* (NSW). WDA is project managing the planning approval process for the project on behalf of Roads and Maritime. However, for the purpose of the planning application for the project, Roads and Maritime is the proponent.

## 1.2 Project location

The project is generally located in the inner west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield local government areas (LGAs). The project travels through 10 suburbs: Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield.

The project is generally located within the M4 and Parramatta Road corridor, which links Broadway at the southern end of the Sydney central business district (CBD) and Parramatta in Sydney's west, about 20 kilometres to the west of the Sydney CBD. This corridor also provides the key link between the Sydney CBD and areas further west of Parramatta (such as Penrith and western NSW).

The western end of the project is located at the interchange between Homebush Bay Drive and the M4, about 13 kilometres west of the Sydney CBD. The project at this location would tie in with the M4 Widening project in the vicinity of Homebush Bay Drive.

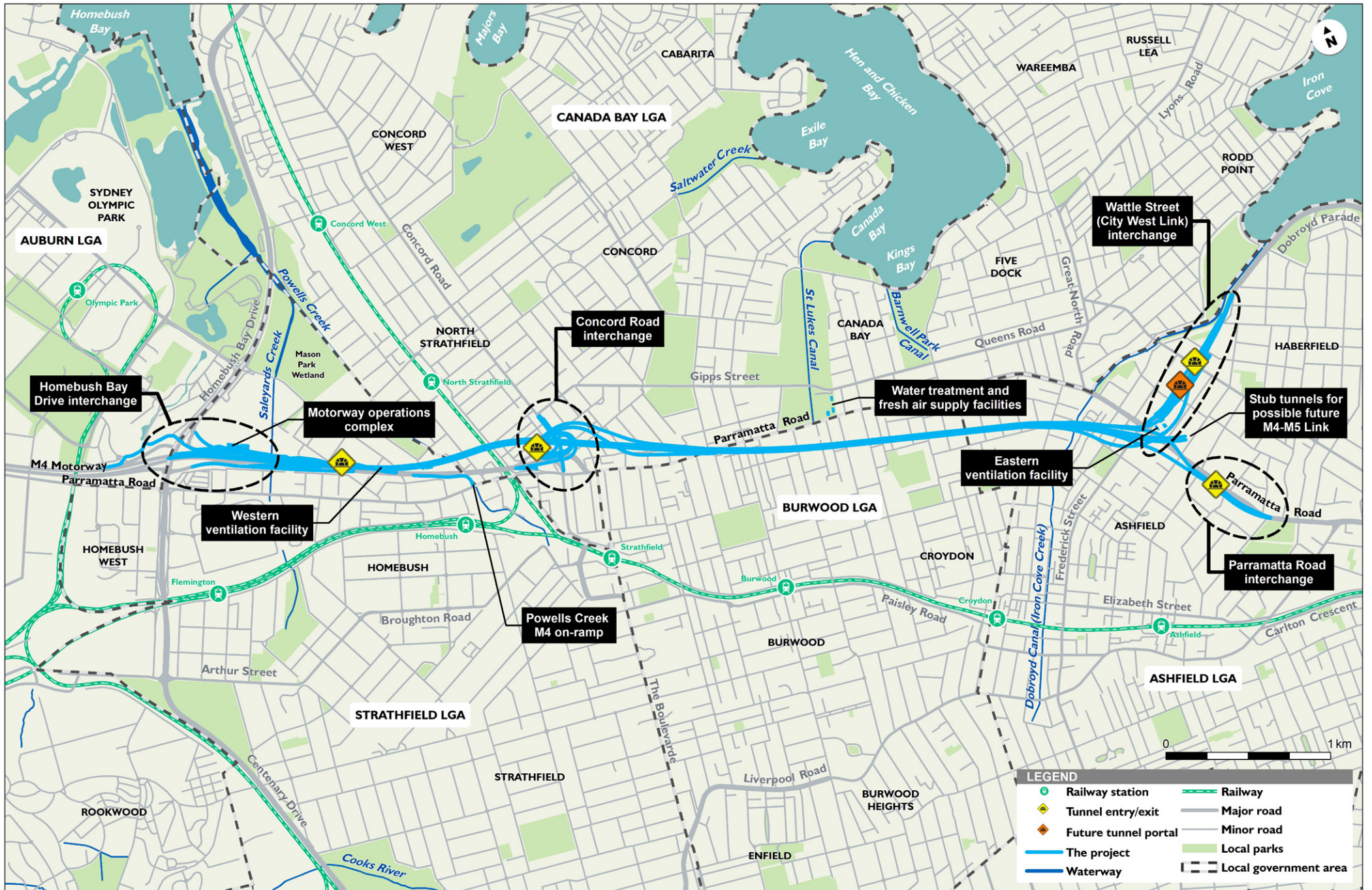


Figure 1.1 Local context of the project



**Figure 1.2 WestConnex**

The tunnel dive structures would start at the centre of the M4, west of the existing pedestrian footbridge over the M4 at Pomeroy Street, and would continue underground to the north of the existing M4 and Parramatta Road, before crossing beneath Parramatta Road at Broughton Street at Burwood. The tunnels would continue underground to the south of Parramatta Road until the intersection of Parramatta Road and Wattle Street at Haberfield. Ramps would connect the tunnels to Parramatta Road and Wattle Street (City West Link) at the eastern end of the project. The tunnels would end in a stub connection to the possible future M4–M5 Link (M4–M5 Link), near Alt Street at Haberfield.

The project would include interchanges between the tunnels and the above ground road network, along with other surface road works, at the following locations:

- M4 and Homebush Bay Drive interchange at Sydney Olympic Park and Homebush (Homebush Bay Drive interchange)
- Powells Creek, near George Street at North Strathfield (Powells Creek M4 on-ramp)
- Queen Street, near Parramatta Road at North Strathfield (Queen Street cycleway westbound on-ramp)
- M4 and Sydney Street, Concord Road and Parramatta Road interchange at North Strathfield (Concord Road interchange)
- Wattle Street (City West Link), between Parramatta Road and Waratah Street at Haberfield (Wattle Street (City West Link) interchange)
- Parramatta Road, between Bland Street and Orpington Street at Ashfield and Haberfield (Parramatta Road interchange).

### 1.3 Secretary’s environmental assessment requirements

The NSW Department of Planning and Environment has issued a list of the Secretary’s Environmental Assessment Requirements (SEARs) that inform the environmental impact assessment. **Table 1.1** displays the SEARs that are specific to the social impact assessment and also provides a cross reference to the relevant section(s) of this report which address these requirements.

The social impact assessment (SIA) will address the social requirements raised under the social and economic SEARs for the project. The *WestConnex M4 East Economic Impact Assessment* (AECOM, 2015) (Economic Impact Assessment) will address the economic and business related SEARs for the project.

In December 2013, the then NSW Department of Planning and Infrastructure sought input from government agencies ('Agency Letters') into the preparation of Director General’s Requirements (now 'SEARs') for the project. There were no agency comments received during the preparation of the SEARs relevant to the SIA.

**Table 1.1 How SEARs have been addressed in this report**

<b>SEARs</b>	
<b>Social and economic</b>	
<b>Requirement</b>	<b>Section where addressed</b>
<ul style="list-style-type: none"> <li>• Impacts on directly affected properties and land uses, including impacts related to access, land use, property acquisition (including relations and expenses for those properties acquired) and amenity related changes</li> <li>• Social and economic impacts to businesses in the vicinity of the project, including Parramatta Road and other, and to the community associated with traffic, access, property, public domain and amenity related changes</li> <li>• Social impact assessment for Concord Oval, including details of existing uses, proximity of sporting club membership and fan bases to Concord Oval, consideration of relocation options and offsets for affected clubs, and consideration of alternative sites (including the Burwood bus depot site)</li> <li>• A draft Community Consultation Framework identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback and procedures for resolving community complaints. Key issues that should be addressed in the draft framework should include:               <ul style="list-style-type: none"> <li>– Traffic management (including property access, pedestrian access)</li> <li>– Landscaping/urban design matters</li> <li>– Construction activities, including out of hours work</li> <li>– Noise and vibration mitigation and management.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Sections 6 and 7</b></li> <li>• Economic impacts are addressed in the <i>WestConnex M4 East Economic Impact Assessment</i> and their social impacts assessed in <b>sections 6.6 and 7.5</b></li> <li>• Relocation of the Cintra Park Hockey Field is being considered through a separate environmental approval process. The findings of this assessment and impacts to Concord Oval users are discussed in <b>sections 6.3.3 and 7.2.3</b></li> <li>• <b>Section 9.1</b> describes key consultation objectives for the management of social impacts which are included in the project Community Consultation Framework.</li> </ul>

## 1.4 Purpose of this report

This report presents the findings of the social impact assessment (SIA) for the project. The SIA provides:

- An analysis of the existing social profile of the local area and communities that would be impacted, as well as the regional context
- Outcomes from consultation with residents, businesses and key stakeholders
- Identification of potential social benefits and negative impacts from the project
- Mitigation strategies for each identified impact.

## 1.5 Study Area

The study area for this SIA considers both local and regional study areas.

The regional study area (the region) for this SIA covers the five LGAs (Auburn, Strathfield, Canada Bay, Burwood and Ashfield) within which the project is located. This region represents the broader communities that would experience changed access and traffic conditions in their regional area as a result of the project. Additionally, the Greater Sydney Region has been used for comparative purposes and as the wider catchment for the project. An outline of the study area is provided in **Table 1.2**.

The local study area has been defined by five precincts in the vicinity of project surface works, as illustrated in **Figure 1.3**.

These local precincts are referred to according to the area where they are located or defining features and include:

- Homebush
- Concord
- Cintra Park
- Wattle Street, Haberfield
- Parramatta Road, Ashfield.

The local precincts have been chosen to consider potential social changes to communities in close proximity to the project surface works and in particular those that would experience the most physical change<sup>1</sup>. Significant subsurface works associated with the project such as tunnelling would occur outside these precincts however, in the construction stage, these are not expected to impact at the surface. A definition of the local study area precincts is provided in **Table 1.3**.

**Table 1.2 Description of the study areas**

Study areas	Description	2011 ABS Census statistical areas
Greater Sydney Region	The Greater Sydney Region comprises the Greater Sydney Metropolitan Area. The key demographic indicators of the local study area and region have been compared to the Greater Sydney Region averages.	Greater Sydney Capital City Statistical Area (1GSYD)

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<sup>1</sup> The local study area for the social assessment includes smaller precincts as they relate to bulk of direct and indirect social impacts which will be experienced related to surface works. Alternatively, the *WestConnex M4 East Economic Impact Assessment* has considered a much larger local catchment to assess business and economic impacts, as these will be more extensively along the Parramatta Road corridor, particularly relating to changes in passing trade.

Study areas	Description	2011 ABS Census statistical areas
Region	This region covers five inner western Sydney LGAs (Ashfield, Auburn, Burwood, Canada Bay and Strathfield), in which the project is located. This region covers the whole project alignment and considers the broader communities that will experience changed access and traffic conditions within their region. This region has been compared to the Greater Sydney Region.	Ashfield (LGA10150) Auburn (LGA10200) Burwood (LGA11300) Canada Bay (LGA11520) Strathfield (LGA17100)
Local (Precincts of impact)	There are five precincts of impact located along the project alignment. These precincts consider residents living in close proximity to the project and those living adjacent to areas that will experience the most physical change. The precincts are described below:	The precincts of impact have been created from amalgamating relevant Statistical Area Level 1 (SA1) districts. These are the smallest units of ABS Census data released.

**Table 1.3 Description of the local study area precincts**

Study area	Description	2011 ABS Census statistical areas
Homebush precinct	This precinct comprises six SA1s. It is roughly bounded by Homebush Bay Drive in the west; Underwood Road/Pomeroy Street in the north; Parramatta Road in the south; and the railway line in the east near North Strathfield station. It covers the area surrounding the western end of the project, including the M4 Widening and access to the tunnel near Pomeroy Street.	List of SA1s: <ul style="list-style-type: none"> <li>• 1139603</li> <li>• 1139612</li> <li>• 1139620</li> <li>• 1139622</li> <li>• 1139624</li> <li>• 1138404</li> </ul>
Concord precinct	This precinct comprises eight SA1s. It is roughly bounded by the railway line in the west near North Strathfield station; Napier Street/Gipps Street in the north; Coles Street/Wentworth Road in the east; and Cooper Street in the south. It covers the area surrounding the Concord Road Interchange and tunnel access.	List of SA1s: <ul style="list-style-type: none"> <li>• 1138302</li> <li>• 1138325</li> <li>• 1138408</li> <li>• 1138412</li> <li>• 1139705</li> <li>• 1139713</li> <li>• 1139714</li> <li>• 1139715</li> </ul>
Cintra Park precinct	This precinct comprises two SA1s. It is roughly bounded by Loftus Street in the west; Renown Street in the north; Walker Street in the east; and Parramatta Road in the south. It covers the Cintra Park site (where a fresh air supply facility is proposed), Concord Oval and the residential area adjacent to Cintra Park in the east.	List of SA1s: <ul style="list-style-type: none"> <li>• 1138621</li> <li>• 1138303 (this area covers Concord Oval and does not contain residents)</li> </ul>
Wattle Street precinct	This precinct comprises six SA1s. It is roughly bounded by Henry Street in the west; Iron Cove Creek in the north; Mortley Avenue/Boomerang Street in the east; and Alt Street in the south. It covers the area surrounding the Wattle Street (City West Link) interchange at Haberfield.	List of SA1s: <ul style="list-style-type: none"> <li>• 1139005</li> <li>• 1139021</li> <li>• 1139527</li> <li>• 1139528</li> <li>• 1139531</li> <li>• 1139532</li> </ul>

Study area	Description	2011 ABS Census statistical areas
Parramatta Road precinct	This precinct comprises five SA1s. It is roughly bounded by Julia Street in the west; Alt Street in the north; Denham Avenue in the east; and Ormond Street/Dalhousie Street in the south. It covers the area surrounding the interchange at Parramatta Road at Ashfield.	List of SA1s: <ul style="list-style-type: none"> <li>• 1139008</li> <li>• 1139009</li> <li>• 1139018</li> <li>• 1139043</li> <li>• 1139508</li> </ul>

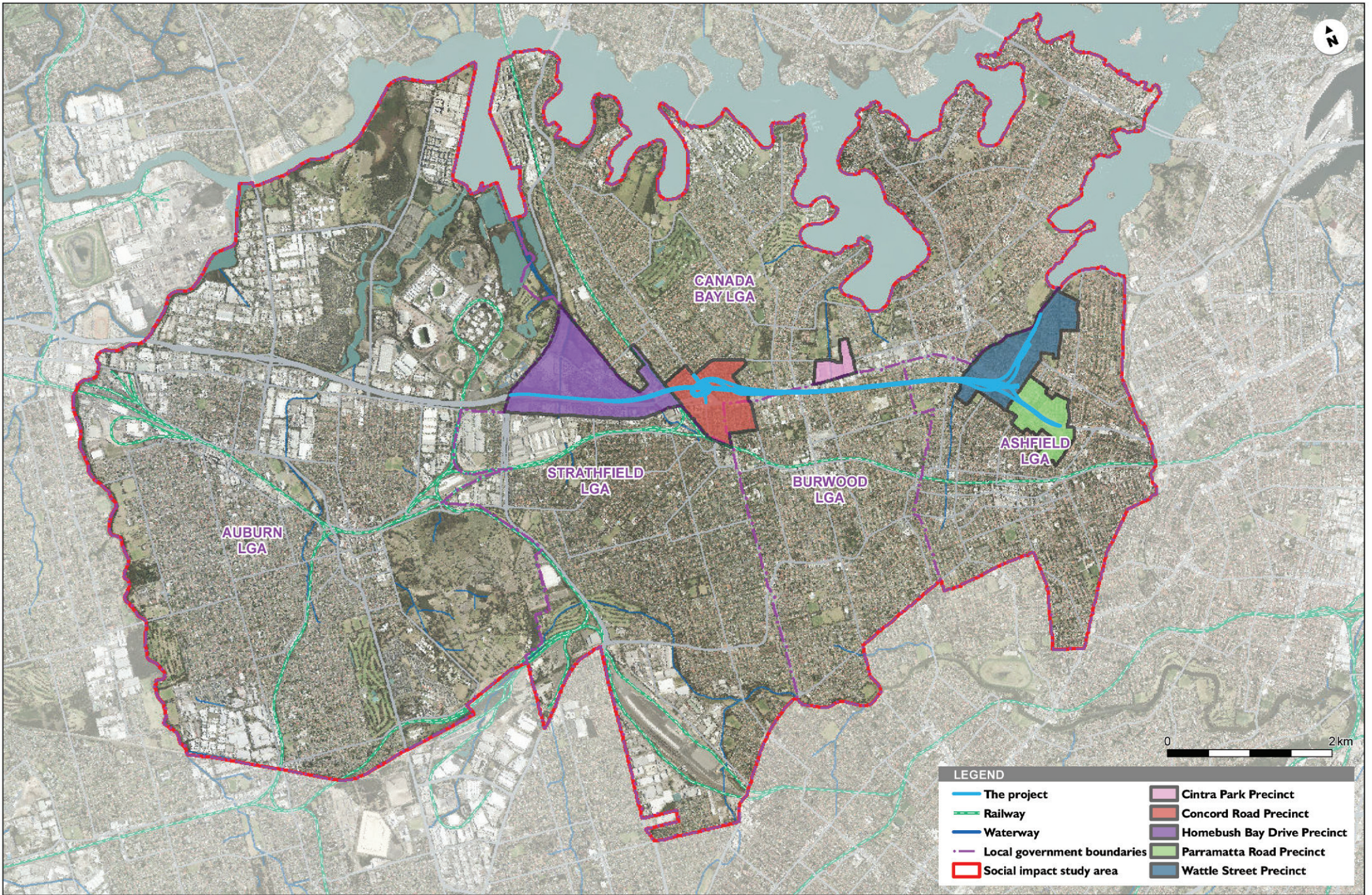


Figure 1.3 Social impact assessment study area

## 2 Proposed project

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### 2.1 Project features

The project would comprise the construction and operation of the following key features:

- Widening, realignment and resurfacing of the M4 between Homebush Bay Drive and Underwood Road at Homebush
- Upgrade of the existing Homebush Bay Drive interchange to connect the western end of the new tunnels to the existing M4 and Homebush Bay Drive, while maintaining all current surface connections
- Two new three-lane tunnels (the mainline tunnels), one eastbound and one westbound, extending from west of Pomeroy Street at Homebush to near Alt Street at Haberfield, where they would terminate until the completion of the M4–M5 Link. Each tunnel would be about 5.5 kilometres long and would have a minimum internal clearance (height) to in-tunnel services of 5.3 metres
- A new westbound on-ramp from Parramatta Road to the M4 at Powells Creek, west of George Street at North Strathfield
- An interchange at Concord Road, North Strathfield/Concord with on-ramps to the eastbound tunnel and off-ramps from the westbound tunnel. Access from the existing M4 to Concord Road would be maintained via Sydney Street. A new on-ramp would be provided from Concord Road southbound to the existing M4 westbound, and the existing on-ramp from Concord Road northbound to the existing M4 westbound would be removed
- Modification of the intersection of the existing M4 and Parramatta Road, to remove the left turn movement from Parramatta Road eastbound to the existing M4 westbound
- An interchange at Wattle Street (City West Link) at Haberfield with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. The project also includes on- and off-ramps at this interchange that would provide access to the M4–M5 Link. In addition, the westbound lanes of Wattle Street would be realigned
- An interchange at Parramatta Road at Ashfield/Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. In addition, the westbound lanes of Parramatta Road would be realigned
- Installation of tunnel ventilation systems, including ventilation facilities within the existing M4 road reserve near Underwood Road at Homebush (western ventilation facility) and at the corner of Parramatta Road and Wattle Street at Haberfield (eastern ventilation facility). The eastern ventilation facility would serve both the project and the M4–M5 Link project. Provision has also been made for a fresh air supply facility at Cintra Park at Concord
- Associated surface road work on the arterial and local road network, including reconfiguration of lanes, changes to traffic signalling and phasing, and permanent road closures at a small number of local roads
- Pedestrian and cycle facilities, including permanently re-routing a portion of the existing eastbound cycleway on the northern side of the M4 from west of Homebush Bay Drive to near Pomeroy Street, and a new westbound cycleway on-ramp connection from Queen Street at North Strathfield to the existing M4
- Tunnel support systems and services such as electricity substations, fire pump rooms and tanks, water treatment facilities, and fire and life safety systems including emergency evacuation infrastructure
- Motorway operations complex on the northern side of the existing M4, east of the Homebush Bay Drive interchange
- Provision of road infrastructure and services to support the future implementation of smart motorway operations (subject to separate planning approval)

- Installation of tolling gantries and traffic control systems along the length of the project
- Provision of new and modified noise walls
- Provision of low noise pavement for new and modified sections of the existing M4
- Temporary construction ancillary facilities and temporary works to facilitate the construction of the project.

An overview of the project at completion is shown in **Figure 2.1**.

The project does not include work required for reconfiguring Parramatta Road as part of the urban transformation program. The project does not include ongoing motorway maintenance activities during operation. These would be subject to separate assessment and approval as appropriate.

## 2.2 Construction activities

### 2.2.1 Overview

Construction activities associated with the project would generally include:

- Enabling and temporary works, including construction power, water supply, ancillary site establishment, demolition works, property adjustments and public 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 complex 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.

The project assessed in this report does not include surveys, sampling or investigation to inform the design or assessment, such as test drilling, test excavations, geotechnical investigations, or other tests. It also does not include adjustments to, or relocation of, existing utilities infrastructure undertaken prior to commencement of construction. These would be subject to separate assessment and approval as appropriate.

### 2.2.2 Construction footprint

The total area required for construction of the project, including construction ancillary facilities, is referred to as the 'construction footprint'. The construction footprint would be about 65 hectares in total, comprising about 48 hectares at the surface and about 17 hectares below ground.

In addition to below ground works, surface works would be required to support tunnelling activities and to construct surface infrastructure such as interchanges, tunnel portals, ventilation facilities, ancillary operations buildings and facilities, and new cycleway facilities near the Homebush Bay Drive interchange and Queen Street at North Strathfield.

The overall surface construction footprint generally aligns with the operational footprint, with the locations of future operational ancillary facilities being used to support construction work. Some additional areas adjacent to the operational footprint (around the portals and on- and off-ramps, and also at the tunnel mid-point) would also be required during the construction stage only to facilitate construction.

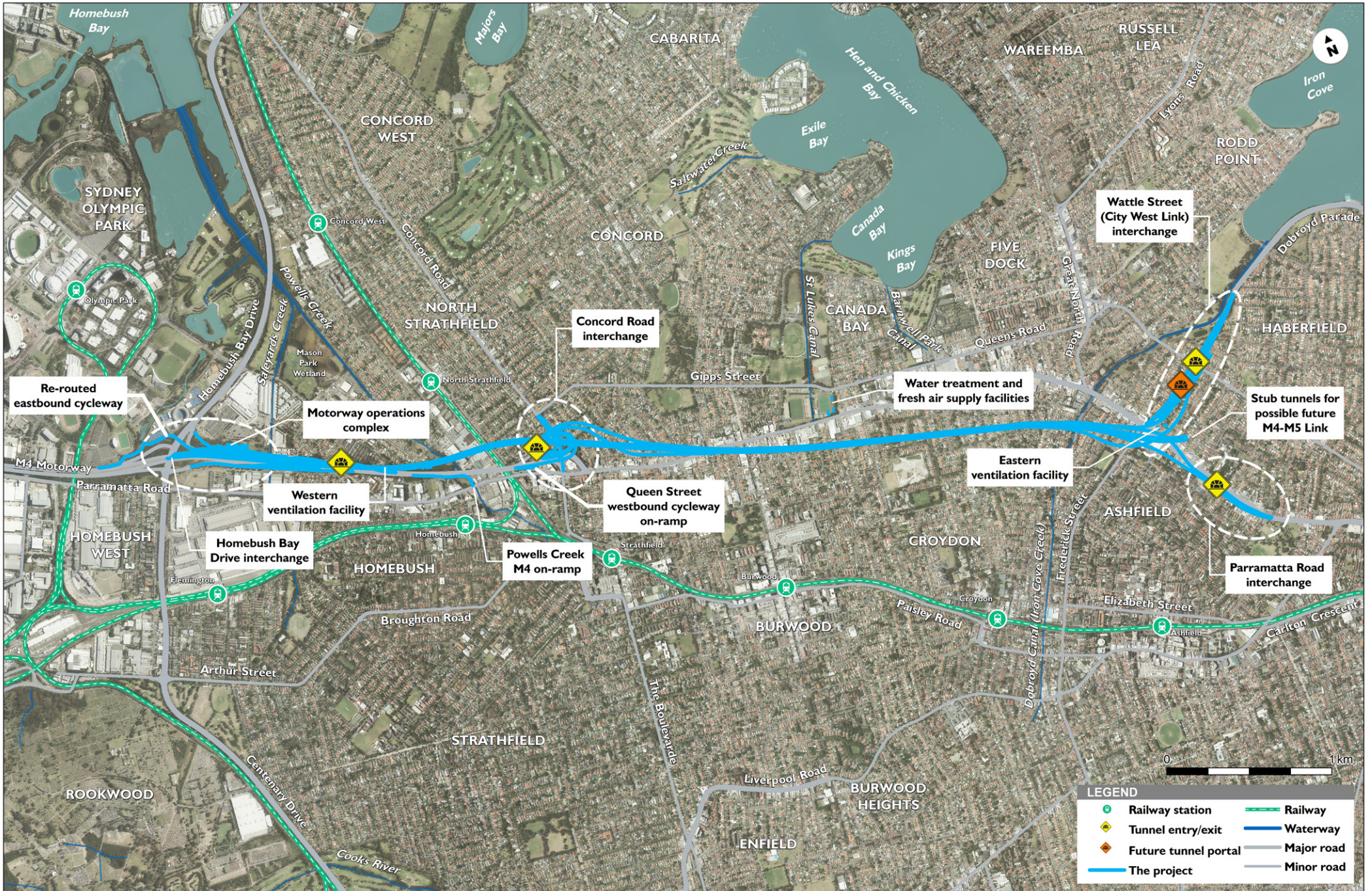


Figure 2.1 Overview of the project

Construction ancillary facilities currently proposed would be required at the following 10 locations:

- Homebush Bay Drive civil site (C1)
- Pomeroy Street civil site (C2)
- Underwood Road civil and tunnel site (C3)
- Powells Creek civil site (C4)
- Concord Road civil and tunnel site (C5)
- Cintra Park tunnel site (C6)
- Northcote Street tunnel site (C7)
- Eastern ventilation facility site (C8)
- Wattle Street and Walker Avenue civil site (C9)
- Parramatta Road civil site (C10).

An overview of the construction footprint is shown in **Figure 2.2**.

The final size and configuration of construction ancillary facilities would be further developed during detailed design.

### 2.2.3 Construction program

Subject to planning approval, construction of the project is planned to start in the second quarter of 2016, with completion planned for the first quarter of 2019. The total period of construction works is expected to be around three years, including nine months of commissioning occurring concurrently with the final stages of construction. The indicative construction program is shown in **Table 2.1**.

**Table 2.1 Indicative construction program overview**

Construction activity	Indicative construction timeframe											
	2016			2017			2018			2019		
Construction access excavation (all sites)												
Tunnelling (excavation)												
Tunnel drainage and pavement works												
Tunnel mechanical and electrical fitout works												
Tunnel completion works												
Homebush Bay Drive interchange												
M4 surface works												
Western ventilation facility												
Powells Creek on-ramp												
Concord Road interchange												
Wattle Street interchange												
Parramatta Road interchange												
Eastern ventilation facility												
Cintra Park fresh air supply facility												
Cintra Park water treatment facility												
Motorway operations complex												
Mechanical and electrical fitout works												
Site rehabilitation and landscaping												

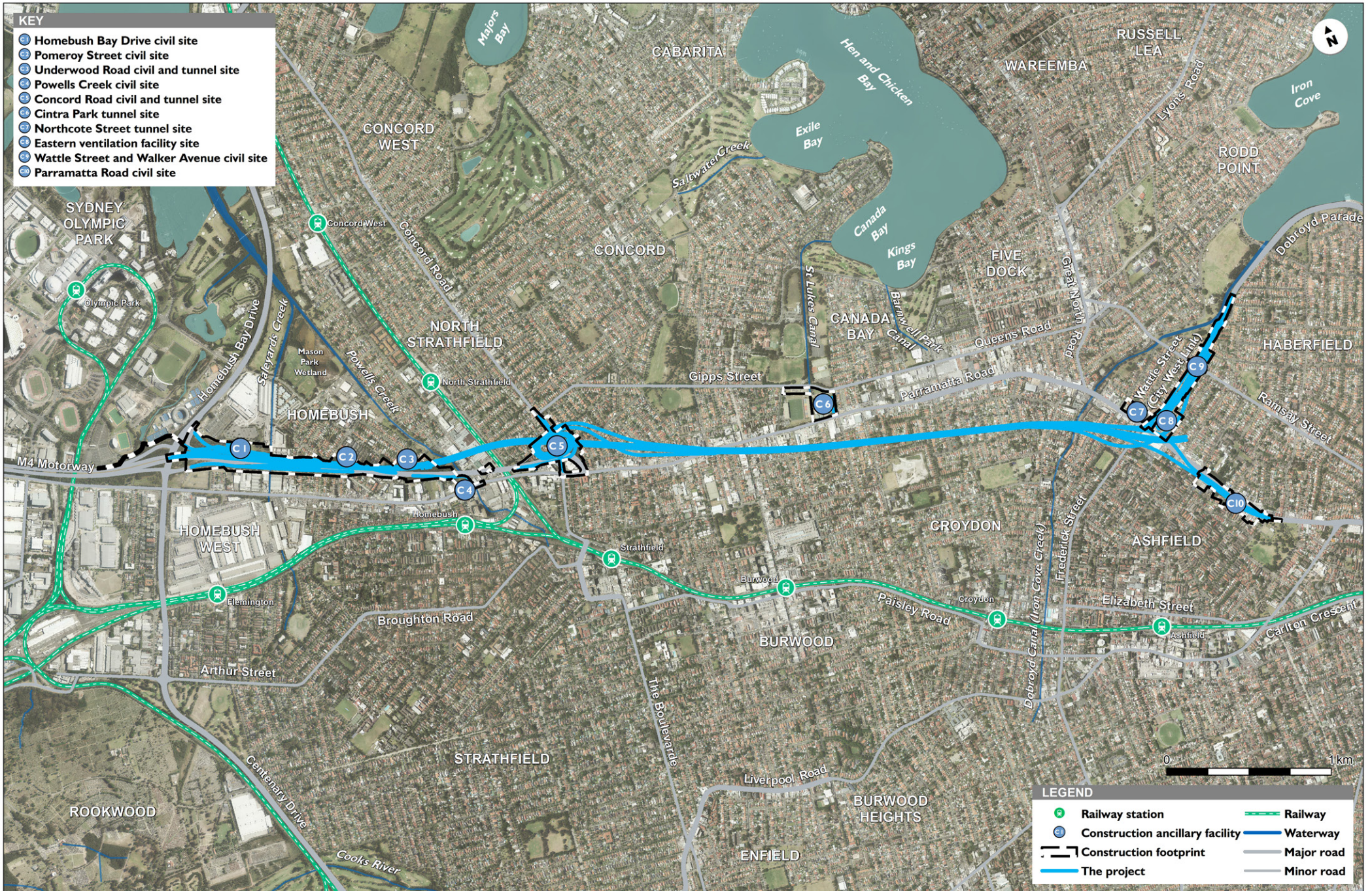


Figure 2.2 Overview of construction footprint and construction ancillary facilities

## 2.3 Specific aspects relevant to social impact assessment

### 2.3.1 Property acquisition

The project has been designed to minimise land acquisition and limit the severance of private properties.

The project would involve full acquisition of around 167 residential properties and partial acquisition of around 15 properties: a total of 182 residential properties. These comprise private property and land owned by councils, public authorities or the State of NSW. In addition, 98 properties owned by Roads and Maritime would be affected by the project. In total it is estimated that approximately 168 dwellings would be impacted by acquisition.

In addition to land to be acquired, it is anticipated that four properties would be leased during construction. One of these properties would be returned to its owner in its entirety following construction, while the other three would also be affected by permanent partial acquisition (and are included above as properties to be acquired).

Following construction, where feasible, residual land not required for operational project components would be made available for redevelopment. The project does not involve consolidation or rezoning of residual land. The future use of this residual land would be subject to separate assessment and planning approval as necessary.

**Figure 6.1** to **Figure 6.5** shows the location of property to be acquired and land already owned by Roads and Maritime.

Where partial acquisitions are required, associated property adjustment, such as realignment of private property fencing, would be undertaken. Access to all properties not affected by acquisition or temporary lease would be maintained throughout construction and operation of the project.

The total area and number of properties that would be acquired and leased for the project may change as the project is refined during detailed design, or in response to changes resulting from the exhibition of this EIS and conditions of approval that may be applied by the Minister for Planning.

Final partial and full property acquisitions would be confirmed through detailed design and undertaken in accordance with the *Land Acquisition Information Guide* (Roads and Maritime 2014) and the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW). Consultation with affected property owners has commenced and would continue throughout detailed design.

### 2.3.2 Construction vehicle access and parking

The proposed access and egress points to and from the construction ancillary facilities are summarised in **Table 2.2** below.

**Table 2.2** Indicative access routes to and from construction ancillary facilities

Site	Proposed access route
Homebush Bay Drive civil site (C1) and Pomeroy Street civil site (C2)	Heavy vehicles – via existing M4 Light vehicles – via existing M4 and Pomeroy Street
Underwood Road civil and tunnel site (C3)	Underwood Road and Short Street East
Powells Creek civil site (C4)	Heavy vehicles – Powell Street and Underwood Road Light vehicles – Powell Street and Parramatta Road
Concord Road civil and tunnel site (C5)	Heavy vehicles – Sydney Street (M4 off-ramp) and Concord Road Light vehicles – Alexandra Street and Ada Street
Cintra Park tunnel site (C6)	Heavy vehicles – Parramatta Road Light vehicles – Gipps Street
Northcote Street tunnel site (C7)	Parramatta Road and Wattle Street
Eastern ventilation facility site (C8)	Heavy vehicles – Parramatta Road and Wattle Street Light vehicles – Walker Avenue

Site	Proposed access route
Wattle Street and Walker Avenue civil site (C9)	Wattle Street
Parramatta Road civil site (C10)	Heavy vehicles – Parramatta Road Light vehicles – Orpington Street

Construction traffic movements would include heavy and light vehicles associated with spoil and waste removal, material deliveries and the arrival and departure of construction workers.

The majority of the construction sites would have parking for staff based at those sites.

An upgraded car park on the northern side of Concord Oval would provide about 250 car parking spaces. This would serve as the parking area for the main project office during the week. This site would also be available for use by the public on weekends and on weeknights, with the following spaces allocated to both groups:

- 145 public parking spaces on Saturdays (leaving 100 for the construction workforce)
- 195 public parking spaces on Sundays (leaving 50 for the construction workforce)
- 145 public parking spaces on weeknights after 6.30pm (leaving 100 for the construction workforce).

This allocation is indicative only and would be further refined following consultation with Canada Bay Council and Concord Oval user groups.

An additional car park site has also been identified at Railway Lane containing about 50 car parking spaces. The site is owned by Roads and Maritime and is currently occupied by the North Strathfield Rail Underpass (NSRU) Alliance. NSRU works will be completed by mid-2015, leaving this site available for use as an overflow car park. This car park is within walking distance of the Underwood Road civil and tunnel site (C3), Powells Creek civil site (C4) and the Concord Road civil and tunnel site (C5).

The construction workforce would be encouraged to utilise public transport. Parramatta Road is a major transport corridor that has multiple bus routes. The study area is also well serviced by the rail network with seven stations within walking distance of the construction sites.

In addition, a construction car parking strategy would be developed as part of the Traffic Management and Safety Plan to limit impacts on the surrounding communities, in consultation with local councils and stakeholders associated with the sporting facilities adjacent to the project site.

### 2.3.3 Changes to local roads

The project would require some temporary road closures and diversions to facilitate construction. These measures are detailed in **Table 2.3**.

At all locations where road closures are required, access would be maintained to properties throughout the construction period. Appropriate signage for road closures or detours would be installed.

**Table 2.3 Indicative temporary road closures and diversions during construction**

<b>Location</b>	<b>Estimated duration</b>	<b>Staging of any closure or modification</b>	<b>Road access reinstatement</b>
Pomeroy Street/ Wentworth Road South intersection	6 months	Closure of both lanes for about two months, then reduction to one lane to facilitate road works and associated modification of retaining wall. Temporary traffic signals would be provided either side of the corner to manage traffic during single lane operation. Existing street parking within the area would be maintained except within the work zone.	Once works are completed, road would be reopened.
Underwood Road	2 years	Temporary diversions at various stages. One lane in each direction would be maintained at all times. A new signalised intersection would be provided to facilitate safe site and pedestrian access. No parking would be allowed in front of the worksite along Underwood Road.	Once works are completed, road would be reopened.
Sydney Street (M4 off-ramp) and Queen Lane	2 years	Temporary diversions at various stages. There would be no reduction in the number of traffic lanes or impact on movements.	Road would be rebuilt on existing alignment at completion of works.
Existing M4 east of Sydney Street off-ramp	2 years	Temporary diversions at various stages. There would be no reduction in the number of traffic lanes (except during night works) or impact on movements.	Road would be rebuilt on new alignment at completion of works.
Northcote Street at Parramatta Road	Duration of construction works	Closure at Parramatta Road to facilitate demolition of buildings and site compound access.	Once works are completed, road would be reopened.
Ramsay Street (east of Wattle Street)	18 months	Temporary diversions at various stages.	Road would rebuilt on existing alignment at completion of works.
Martin Street (east of Wattle Street) at Wattle Street	2 years	Closure to facilitate road construction.	Once works are completed, road would be reopened in line with permanent design.
Walker Avenue at Parramatta Road	Duration of construction works	Closure of northbound lane and left-in from Parramatta Road permitted only for construction traffic. The southbound lane would remain open and would permit left turn onto Parramatta Road.	Once works are completed, road would be reopened.

Location	Estimated duration	Staging of any closure or modification	Road access reinstatement
Chandos Street (south of Parramatta Road) at Parramatta Road	18 months	Closure to facilitate demolition of buildings and dive construction.	Once works are completed, road would be reopened.
Parramatta Road between Orpington Street and Bland Street	Duration of construction works	Closure of one of the three westbound lanes, resulting in only two westbound lanes from Dalhousie Street to west of Chandos Street. Provision of a new signalised intersection on Parramatta Road, near Rogers Avenue, to provide a dedicated right turn bay for eastbound construction vehicles entering the Parramatta Road civil site.	Once works are completed, temporary traffic signals would be removed and the road would be reopened in line with permanent design.
Orpington Street	Duration of construction works	Reconfiguration of the Parramatta Road / Orpington Street intersection to facilitate new site entry intersection including traffic signals.	Once works are completed, traffic signals would be removed.

As a result of work at the surface, a number of streets would be closed or traffic movements permanently altered as a result of project operation. These changes include the following:

- Rod Laver Drive – currently a special events bus connection from Sydney Olympic Park to Homebush Bay Drive and the M4 eastbound. The connection to the M4 is currently prioritised. This priority would be changed so that buses would be required to join the on-ramp traffic closer to Homebush Bay Drive, and give way to through traffic. The connection to Homebush Bay Drive would remain unaltered
- Parramatta Road, near George Street – with the provision of the new Powells Creek on-ramp, a new signalised intersection would be provided on Parramatta Road. A right turn lane would be provided for westbound traffic on Parramatta Road, and traffic signals would control eastbound traffic on Parramatta Road (including the left turn onto the new ramp) to permit westbound traffic to turn right. Westbound through traffic on Parramatta Road would not be restricted by the traffic signals
- Taylor Lane and Young Street – both are located in the triangle bounded by the existing M4, Sydney Street and Concord Road. Properties in this area would be acquired as part of the project, so these roads would be closed as they would no longer be required for access
- Concord Lane, south of Carrington Lane – this section would be closed to facilitate cut-and-cover tunnel construction and would not be reopened. Access to Carrington Lane would be retained
- Carrington Street – currently has a left-out connection to Concord Road, which would be converted to a cul-de-sac
- Sydney Street, east of Concord Road – currently a left-in only connection from Concord Road, which would be converted to a cul-de-sac immediately west of the intersection with Thornleigh Street
- Edward Street – currently ends as a cul-de-sac, which would be relocated approximately 60 metres east, clear of the proposed on- and off-ramps at the Concord Road interchange
- Alexandra Street – currently connects to Edward Street via a six metre-wide lane. This connection would be cut off by the proposed M4 westbound on-ramp, and a cul-de-sac is proposed at the end of Alexandra Street

- Martin Street north of Wattle Street – currently connects to Wattle Street, providing left and right turn movements in and out. This connection would require modification to permit left-in and left-out movements only, due to the physical separation of the eastbound and westbound carriageways on Wattle Street
- Allum Street – currently connects to Wattle Street, providing left and right turn movements into Wattle Street and left turn movements from Wattle Street into Allum Street. Part of Allum Street would be affected by the realignment of Wattle Street, and the remaining section of Allum Street north of Walker Avenue would be converted into a cul-de-sac.

### 2.3.4 Public transport services

Construction of the project would generally not impact bus stops and bus services. Initial assessment has identified that four bus stops would be relocated during construction to protect community safety. As the detailed design develops, additional bus stops requiring relocation may be identified.

Local residents, business owners and bus passengers would be notified of traffic management procedures, and ongoing consultation would be undertaken to provide information on planned construction activities and changes to any bus stops or access arrangements.

**Table 2.4** outlines the indicative changes to bus stop locations during construction.

**Table 2.4** Indicative bus stop relocations

Location	Estimated duration	Details of relocation
Underwood Road civil and tunnel site (C3)	20 months	Bus stops located on Underwood Road beneath the M4 bridge would be relocated north to in the vicinity of Short Street. The bus stops would remain relocated for the duration of works at this construction site.
Concord Road civil and tunnel site (C5)	3 years	The bus stop located on Concord Road (northbound) near the Concord Road bridge over the existing M4 would be permanently relocated north to the vicinity of Carrington Street. The bus stop on Concord Road (southbound) near the Concord Road bridge would be closed during the duration of works at this construction site. The nearest existing bus stop is located to the north near the Patterson Street intersection.
Cintra Park tunnel site (C6)	3 years	Bus stop currently near Cintra Park would be relocated east in the vicinity of Taylor Street. The bus stops would remain relocated for the duration of works at this construction site.
Parramatta Road civil site (C10)	2 years	Westbound bus stop at Chandos Street would be closed for the duration of works at this construction site. This bus stop would reopened following completion of works. Westbound bus stop after Orpington Street would be relocated closer to Orpington Street for the duration of works at this construction site. Eastbound bus stops near Chandos Street and Rogers Avenue would be affected by short-term temporary relocations as required due to traffic staging and adjustments to footpaths.

### 2.3.5 Walking and cycling

A number of pedestrian diversions would be put in place during construction to protect community safety. These would involve eliminating where possible interactions between pedestrians and heavy vehicles at site access points, and providing alternative pedestrian access around the construction sites. In most cases, this would involve maintaining pedestrian access on one side of the road, with suitable crossing points and signage provided.

Initial assessment has identified that there would be temporary closure of footpaths along Wattle Street, Martin Street, Parramatta Road and Chandos Street. As the detailed design develops, additional footpaths requiring temporary closure may be identified. Indicative details of major pedestrian and cycleway diversions during construction are listed in **Table 2.5**.

Local residents and business owners would be notified of pedestrian changes, and ongoing consultation would be undertaken to provide landowners with information on planned construction activities and changes to any access arrangements.

There is a lack of segregated cycling facilities along the Parramatta Road corridor. Cycling is generally restricted to the surrounding local roads. Dedicated cycleways or cycle lanes that are provided are geared towards leisure trips rather than commuter trips with off road cycle paths predominantly restricted to recreational foreshore or park areas. The existing cycleway on the outside shoulders of the existing M4 has been closed for construction of the M4 Widening and would remain closed during construction of the project.

An alternate cycle route has been implemented as part of the construction of the M4 Widening. This alternate route is shown in **Figure 2.3**. It is anticipated that this alternate cycle route would form the basis of the cycleway diversion for the duration of construction of the project. Some minor amendments, in the vicinity of Concord Road, may be required to accommodate works at the Concord Road civil and tunnel site. The indicative cycleway diversion shown in the figure would be confirmed following appropriate consultation with Roads and Maritime, local councils and cycling groups.

**Table 2.5 Indicative pedestrian and cyclist diversions during construction**

Location of diversion	Estimated duration	Details of diversion	Measures to maintain pedestrian/cycle route
<b>Homebush Bay Drive civil site (C1) and Underwood Road civil and tunnel site (C3)</b>			
M4	Duration of construction works	Cyclists detoured off the M4 in both directions for duration of works	<ul style="list-style-type: none"> <li>Existing M4 Widening construction alternate cycle route via Hill Road, Pondage Link, Edwin Flack Avenue, Sarah Durack Avenue, Bennelong Parkway, existing Bicentennial park shared path, existing shared path along Powells Creek through Bressington Park and Mason Park, Pomeroy Street, Queen Street, Princess Avenue Concord Road</li> </ul>
<b>Wattle Street and Walker Avenue civil site (C9)</b>			
Wattle Street between Parramatta Road and Martin Street	Duration of construction works	Closure of pedestrian footpath on eastern side of road, between Parramatta Road and northern side of Martin Street	<ul style="list-style-type: none"> <li>Pedestrian route on northern side would be available along Wattle Street and Dobroyd Parade at all times with crossings located at Parramatta Road, Ramsay Street and Waratah Street.</li> </ul>
Martin Street south of Wattle Street	25 months	Closure of access to Wattle Street from Martin Street (east of Wattle Street)	<ul style="list-style-type: none"> <li>Alternate route to Wattle Street via Alt Street and Ramsay Street or Waratah Street.</li> </ul>
Dobroyd Parade between Martin Street and north of Waratah Street (end of works)		Closure of pedestrian footpath on the western side of road, north of Martin Street to the end of the works	<ul style="list-style-type: none"> <li>Alternate pedestrian route via Reg Coady Reserve and Timbrell Park, or footpath on western side of Dobroyd Parade, with pedestrian crossings located at Ramsay Street, Waratah Street, and Timbrell Drive/Mortley Avenue.</li> </ul>

Location of diversion	Estimated duration	Details of diversion	Measures to maintain pedestrian/cycle route
<b>Parramatta Road civil site (C10)</b>			
Parramatta Road, between Orpington Street and Bland Street	Duration of construction works	Closure of pedestrian footpath on southern side of road, between Orpington Street and Bland Street	<ul style="list-style-type: none"> <li>• Pedestrian route on north side of road would remain open at all times with crossing located at Bland Street and Dalhousie Street (south of Orpington Street)</li> </ul>
Chandos Street	17 months	Closure of access to Parramatta Road from Chandos Street due to construction site at intersection.	Alternate routes via: <ul style="list-style-type: none"> <li>• Chandos Street, Loftus Street and Orphington Street</li> <li>• Chandos Street, Julie Street and Bland Street</li> </ul>



Figure 2.3 Alternate cycle routes during construction

## 3 Assessment methodology

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### 3.1 Methodology

This SIA has been developed in accordance with the *Roads and Maritime Environmental Impact Assessment Practice Note: Socio-economic assessment*. These guidelines identify a range of impact categories and types, and provide a framework for this assessment. This SIA constitutes a “moderate” investigation, as defined in the practice note. A moderate level assessment applies to projects with several impacts, medium duration impacts or impacts on groups of people.

It should be noted that potential economic impacts have been assessed in the Economic Impact Assessment. The outcomes of the Economic Impact Assessment have been reviewed and presented in this SIA.

The SIA has included the following:

- Site visits to review existing land uses and local conditions in the study area (see **section 1.5**)
- Development and analysis of a community profile from desktop sources including the Australian Bureau of Statistics (ABS) 2011 Census. Census data has been sourced for Auburn, Strathfield, Burwood, Canada Bay and Ashfield local government areas, with comparison made to the Greater Sydney Region. More detailed analysis has been undertaken for each of the areas that would experience the most physical change (e.g. property acquisition) with 2011 Census data sourced for relevant Statistical Area Level 1 (SA1) and aggregated to reflect the local precincts of impact (see **section 5** for more detail)<sup>2</sup>
- Social research to identify and consider local issues and community values
- Review of the project’s other technical reports prepared for the EIS relating to transport, noise and vibration, non-Indigenous heritage, visual impact and urban design and economic assessment
- Analysis of the outcomes of community consultation undertaken by WDA during the period December 2013 to February 2014 and June to July 2015, including with users of Cintra Park and Concord Oval
- Consultation with local social service providers to further understand the local socio-economic environment and the potential impacts of the project on local communities
- Social impact assessment, identifying potential social impacts and benefits that would result from the proposal.

The SIA has drawn significantly on consultation with project affected stakeholders undertaken by WDA during land acquisition and community engagement activities. WDA has consulted with representatives of local councils within the project area during 2014 and 2015 and augmented consultation with key affected social infrastructure providers.

### 3.2 Impact assessment framework and rating

A range of categories and associated concepts relevant to assessing the social impacts of transport infrastructure have been developed from experience gained from several transport focused SIAs, as well as from a review of other major Australian road infrastructure projects.

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<sup>2</sup> The SIA has assessed smaller local impact areas than the EIA. The SIA has confined the local study area to those areas in the vicinity of surface works, addressing broader social impacts within the regional area (which is broadly consistent with the wider catchment used in the Economic Impact Assessment), whereas the Economic Impact Assessment study area has been chosen to capture business impacts along the Parramatta Road corridor (e.g. loss of passing trade).

The findings and lessons from these are outlined in **Appendix A**. The relevant impact issues drawn from these previous assessments include:

- Property acquisition – including temporary and permanent changes to the use of residential and commercial properties as well as public land and facilities. One of the potential impacts of residential property acquisition is social dislocation:
  - Dislocation effects which occur primarily at the household and individual level. They include property disruption or acquisition, or people leaving an area due to significant changes to the valued features of their local environment
- Community networks – including temporary and permanent changes to the distribution of and access to community resources, as well as changes in access to other desired locations such as employment, study, friends and family and safety of movement. Impacts to community networks may include:
  - Severance – when people’s ability to move around their local and regional area is reduced. Severance effects occur when local roads are cut off, connector roads are changed or suffer increased traffic movements, or when public transport routes are changed. This may result in short or long-term behaviour patterns (e.g. where people shop and which community resources and attractors they use most frequently)
  - Access benefits – when travelling times are reduced there may be easier access to community services and facilities
  - Individual mobility changes – relates to the transport choices that people have available to them and the decisions that affect the mode of travel they use for different trips
- Amenity – changes in neighbourhood character, air quality, noise, visual amenity and environmental values that attract residents to move to and remain in the area or visit certain community resources and attractors. Amenity impacts are specific impacts on the attractiveness of a given area and the enjoyment of it. They may include changes to property, the general landscape, the noise environment, and also changes to the amenity of important community facilities.

**Table 3.1** sets out the impact assessment rating criteria developed for the SIA. The first criteria assesses the duration of social impacts and the second the spatial or receptor scope that project-related change processes have on receptors.

**Table 3.1** Impact assessment rating criteria

<b>Duration</b>	<b>Spatial scope</b>	<b>Level of impact</b>
<b>Temporary</b> Less than one year	<b>Locality</b> 2–3 SA1s (neighbourhood) or specific location (e.g. a single street)	<b>Negligible</b> Marginal change from the baseline conditions such that no discernible effect is expected and a functional recovery occurs within several months.
<b>Short term</b> One year or more but less than three years	<b>Suburb</b> A suburb as defined by ABS	<b>Minor</b> A small but measurable change from baseline social conditions. Changes are expected to be temporary and/or only affect a small number of people. Can be mitigated and would not cause substantial impact.

<b>Duration</b>	<b>Spatial scope</b>	<b>Level of impact</b>
<b>Medium term</b> Three years or more but less than 10 years	<b>Municipality</b> LGA	<b>Moderate</b> Noticeable and substantial change from the social baseline. The impacts may be temporary or long term, affecting large numbers of people, but respond to mitigation measures.
<b>Long term</b> 10 years or more	<b>Region</b> Inner-western region of Sydney	<b>Major</b> A significant change from baseline conditions, fundamentally altering the social conditions in the community and affecting a large or moderate number of people in the long term (more than 10 years). This category also includes more localised impacts such as land acquisition and other impacts that require compensation.

### 3.3 Key assumptions

Social assessment local study precincts used in this report have been defined to align with impacts experienced at the surface. Significant subsurface works and subsurface acquisitions associated with the mainline tunnels and ramps would occur outside these precincts, however in the construction stage these are not expected to impact the surface.

## 4 Social policy context

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### 4.1 Introduction

This section presents an overview of the relevant strategic documents which inform and guide the SIA. This includes policies and plans from various state and local government agencies.

### 4.2 A Plan for Growing Sydney

*A Plan for Growing Sydney* (NSW Government 2014) is a broad framework prepared by the NSW Government to guide Sydney's development over the next twenty years. It predicts that Sydney will grow by approximately 1.6 million people in the next twenty years. This will generate the need for approximately 664,000 new homes and 689,000 new jobs across the Sydney Metropolitan area. The strategy identifies four key goals that will support growth:

- 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.

The plan identifies Western Sydney as a key hub for Sydney's freight industry. It anticipates that WestConnex will better connect Western and South-western Sydney with the Sydney CBD.

A range of objectives are identified under each of these goals. Those with most relevance to the project and this SIA are outlined below.

#### *Direction 1.5: Enhance capacity at Sydney's gateways and freight networks*

WestConnex will improve connections between agriculture industries in regional NSW and Sydney's ports, making goods export more cost efficient.

#### *Action 2.2.2: Undertake urban renewal in transport corridors which are being transformed by investment, and around strategic centres*

WestConnex is identified as a catalyst for major urban renewal along the Parramatta Road corridor. It is expected to improve local amenity along Parramatta Road by reducing through-traffic on surface roads, and allowing for enhanced north-south local connectivity.

### 4.3 NSW 2021: A Plan to Make NSW Number One

*NSW 2021: A Plan to Make NSW Number One* (NSW Department of Premier and Cabinet 2011) (NSW 2021) is the NSW Government's 10-year strategic business plan. It sets priorities for action and guides resource allocation to deliver economic growth and critical infrastructure throughout NSW. The *NSW 2021 Performance Report 2014–2015* (NSW Department of Premier and Cabinet 2014) provides information on how the NSW Government intends to measure and deliver on the goals, targets and measures outlined in NSW 2021.

NSW 2021 emphasises investment in and delivery of an efficient and effective transport system including road infrastructure that will relieve congestion, reduce travel times, improve road safety and enhance and expand capacity on key road corridors. These outcomes will contribute to both the national and state economies as well as reducing the costs of doing business for many large and small businesses and services.

Within the context of the goals identified in NSW 2021, the project (as part of WestConnex) would help to achieve several priority actions by expanding the capacity of the M4 and extending it further east along the Parramatta Road corridor. The key goals of the plan of relevance to the SIA are:

- Goal 4 – Increase the competitiveness of doing business in NSW

- Goal 7 – Reduce travel times
- Goal 8 – Grow public transport patronage
- Goal 10 – Improve road safety
- Goal 19 – Invest in critical infrastructure
- Goal 20 – Build liveable centres.

## 4.4 State Infrastructure Strategy

The *State Infrastructure Strategy 2012–2032* (Infrastructure NSW 2012) (State Infrastructure Strategy) is a 20-year strategy which identifies and prioritises the delivery of critical public infrastructure to drive productivity and economic growth. Infrastructure NSW's assessment of the State's existing infrastructure has highlighted critical deficiencies in urban road capacity. The State Infrastructure Strategy identifies strategic infrastructure options to meet the challenges of population growth and substantial increases in freight volumes.

The State Infrastructure Strategy recognises the economic impacts and other constraints created by reduced functionality along the M4 corridor.

In November 2014, Infrastructure NSW released a revised State Infrastructure Strategy – the *State Infrastructure Strategy Update 2014* (State Infrastructure Strategy Update) to guide the allocation of funds from the sale of the State's 'poles and wires' electricity network businesses, as part of the NSW Government's Rebuilding NSW initiative.

The State Infrastructure Strategy Update identified the possible expansion of WestConnex to include connections to Victoria Road and the Anzac Bridge to the north (the Northern Extension), and a connection to President Avenue at Rockdale to the south (the Southern Extension). The State Infrastructure Strategy also highlights investigations into a third road crossing of Sydney Harbour (the Western Harbour Tunnel), which would connect to the possible WestConnex Northern Extension and provide access to North Sydney between the Gore Hill and Warringah freeways. This possible new tunnel, together with the M4–M5 Link, would avoid the need to travel through the CBD.

## 4.5 NSW Long Term Transport Master Plan

The *NSW Long Term Transport Master Plan* (Transport for NSW 2012) (Transport Master Plan) provides a framework for delivering an integrated, modern and multi-modal transport system by identifying NSW's transport actions and investment priorities for the next 20 years. Under the Transport Master Plan, WestConnex is identified as a critical link in Sydney's motorway network and an immediate priority for the NSW Government.

The Transport Master Plan recognises that WestConnex would encourage Sydney's long-term economic growth by supporting the growing freight task between Sydney's international gateways and Greater Western Sydney, facilitating the transfer of goods and services between Sydney's eastern and western economic centres by improving capacity and reducing travel times, and supporting the continued development of Sydney's global economic corridor

## 4.6 Draft Parramatta Road Urban Transformation Program

The *New Parramatta Rd: Draft Parramatta Road Urban Renewal Strategy* (UrbanGrowth NSW 2015) (Parramatta Road Urban Renewal Strategy) identifies areas along the corridor where there will be a focus on encouraging growth and changes in the long term (about 20 years). The aim of the strategy is to create an environment with good design, land use mix, housing choice and infrastructure, as well as improved access to community facilities and services and access to public and active transport. It is envisaged that up to 40,000 new dwellings and 50,000 new jobs would be generated in the urban renewal precincts.

A Parramatta Road Urban Transformation Program is being undertaken in parallel with the project to implement the strategy. A concept plan is currently being developed with stakeholders to guide the long-term renewal of the corridor. The concept plan integrates land use and transport planning, optimising locations and scale of growth close to transport and open space networks.

A key element of this program is improved public transport services along Parramatta Road. The project would enable traffic reductions on Parramatta Road from Burwood to the CBD, which would in turn free up road space and create greater public transport options for existing and new residents along the Parramatta Road corridor. This road program is also planning for the construction and delivery of walking and cycling infrastructure in key locations along the corridor.

Over recent years the following issues have contributed to the deterioration of the streetscape along Parramatta Road:

- More than 90,000 vehicles, including up to 6000 trucks, travel each weekday on some sections of the road
- Noise, visual clutter from cables, poles and signage and a lack of street trees to relieve the urban landscape
- Poor north–south connection across the corridor for pedestrians, cyclists and motorists
- Planning of the corridor has not been uniform or coordinated across the 10 councils located along the corridor.

To improve the corridor, the Parramatta Road Strategy has identified eight urban renewal precincts at Granville, Auburn, Homebush, Burwood, Kings Bay (Five Dock), Taverners Hill, Leichhardt and Camperdown. These precincts were selected because of their:

- Proximity to places of employment
- Accessibility, especially to public transport
- Capacity to support new housing types
- Proximity to existing infrastructure
- Opportunity for future development
- Unique character and diversity
- Potential for new or refreshed linkages.

WestConnex is identified within the Parramatta Road Strategy as a catalyst for the restoration of the Parramatta Road corridor, because it would reduce through traffic from the Parramatta Road corridor. 'Through traffic' in this context refers to traffic that travels more than five kilometres along Parramatta Road to destinations away from Parramatta Road. The reduction in traffic, particularly trucks, would assist in improving public transport and urban amenity, both of which would support future growth along the corridor, in particular residential development.

The regional project area contains three of these urban renewal precincts: Homebush, Burwood and Kings Bay (Five Dock). The Homebush urban renewal precinct is expected to accommodate approximately one third of all population growth in the Parramatta Road corridor under the renewal program. The project would result in a reduction in the number of vehicles along Parramatta Road in these locations, which would help support future growth. While the project alone would not facilitate the growth of areas along Parramatta Road, in combination with other WestConnex projects it would assist in improving amenity along the corridor, making the corridor more attractive for future growth.

## 4.7 Council community strategic plans

Under the *Local Government Amendment (Planning and Reporting) Act 2009* (NSW), all councils in NSW are required to develop long-term community strategic plans in consultation with their communities. These plans set an overarching vision and a coordinated approach to planning and delivery for each local government area (LGA). Reviewing community strategic plans therefore provides insight into the aspirations and priorities of communities.

The community strategic plans for Auburn, Strathfield, Canada Bay, Burwood and Ashfield have been reviewed to gain an understanding of the values and relevant issues for the communities that would be most impacted by the proposal.

### 4.7.1 Auburn City Community Strategic Plan 2013-2023

*Auburn City Community Strategic Plan 2013-2023* is a 10 year vision that was developed following consultations with 7000 community members in 2010, with further consultations in 2012 and 2013.

#### *Themes*

Auburn City Council has identified four themes for the Community Strategic Plan. The themes and priority areas relevant to the WestConnex project and this SIA are outlined below.

1. Our community – diverse and inclusive
  - Increased community education and safety programs
  - Building community harmony and social cohesion
  - Building a positive image of our local area
  - Improved health and wellbeing of community members
  - Better distribution of services and facilities across Auburn City.
2. Our places – attractive and liveable
  - Improved cleanliness and attractiveness of town centres
  - Improved planning for residential developments and growth areas
  - Better access to and provision of public transport
  - Continued level of maintenance of roads and footpaths
  - Increased provision of parking
  - Improved traffic management.
3. Our environment – healthy and green
  - Continued maintenance and improvement of local parks and playgrounds
  - Protection of low rise residential areas
  - Improved tree maintenance
  - Improved provision of open space through better town planning.
4. Our leadership – visionary and responsible
  - Improved responsiveness to complaints and enquiries
  - Development of effective partnerships to increase resources into the area.

### 4.7.2 Strathfield 2025

Strathfield Council developed *Strathfield 2025* following consultation with the community in 2011 and 2012. The vision outlined in the plan is:

*Strathfield is a well-connected urban centre in Sydney's Inner West with rich cultural diversity and a strong sense of community cohesion. The community is engaged with Council in guiding a sustainable future and opportunities for education, recreation, employment and overall wellbeing in Strathfield.*

#### *Community priorities*

Ten priorities were identified during the community engagement process in 2011 and 2012. These priorities were: transport; community safety; quality of life and civic pride; well-maintained local area; local environment; Council leadership; community participation and cohesion; community facilities and programs; and business.

Of most relevance to the project is the transport priority, within which five sub-themes were identified:

- Address traffic congestion
- Improve mobility, ease and safety of public and private transport
- Improve access and availability of public transport
- Improve parking availability and controls
- Maintain roads and footpaths.

### *Guiding principles*

Strathfield Council has identified 'sustainability' and 'social justice' as guiding principles for its Community Strategic Plan. Sustainability is explained as meeting the needs of the present community without compromising the ability of future communities (that is, future generations) to meet their own needs. This is a holistic approach that is intended to extend across social, economic, environmental and civic leadership needs.

Strathfield Council also conveys a commitment to social justice, by which it means:

- Equitable distribution of resources
- Rights are recognised and promoted
- Access is provided to resources and services required to meet basic needs and improve quality of life on a fair basis
- Participation and consultation opportunities are available for those affected by decisions.

### *Themes*

In the context of the above, five key themes have been identified. A summary of the relevant themes in the context of this SIA have been outlined below.

#### 1. Connectivity

- Movement to and from Strathfield is easy and safe
- Infrastructure and development is integrated, planned and sustainable

#### 2. Community wellbeing

- Strathfield is a safe and healthy place
- Strathfield community is healthy, active and inclusive
- Strathfield is a harmonious community with a strong sense of community cohesion

#### 3. Prosperity and opportunities

- Development of industrial and commercial areas is sustainable and well planned

#### 4. Liveable neighbourhoods

- Strathfield has high quality sustainable urban design that mixes well designed and innovative development with existing local character
- Strathfield's neighbourhoods are clean, attractive and well maintained
- Strathfield's natural environment is protected and enhanced

#### 5. Responsible leadership

- The Strathfield community trusts Council and is informed, valued and heard.

### 4.7.3 City of Canada Bay – FuturesPlan20

The City of Canada Bay first developed a community strategic plan, *FuturesPlan20*, in 2008. It has since been reviewed in 2010 and 2012, with community consultation undertaken during the initial development and subsequent reviews.

#### *Themes*

The City of Canada Bay has identified four themes for its Community Strategic Plan. The themes and goals relevant to WestConnex and this SIA are outlined below.

#### 1. Active and vibrant

- Residents feel a sense of health and wellbeing
- There are places for residents to participate in sport and other outdoor recreation
- There are services that meet residents individual needs
- Residents have awareness and respect for local Aboriginal heritage and culture.

#### 2. Sustainable spaces and places

- Residents are proud of and value their city's natural environmental assets
- Residents live in a clean, healthy local environment
- Residents feel safe and comfortable using community spaces
- The city has attractive streets, village centres and public spaces
- The city has attractive landscapes with sustainable development and where heritage is conserved.

#### 3. Innovative and engaged

- Residents have opportunities to participate in and contribute their opinions to local decision making through consultation and other forms of engagement with Council
- The city is well managed and residents' needs are met through high quality services and well maintained facilities and infrastructure.

#### 4. Thriving and connected

- The city has a range of housing options
- Residents can walk or cycle on designated paths to a range of commercial, recreational and community spaces around the city
- Residents can get where they need to go safely without too much delay
- Residents have good day to day public transport options which take them to the places they need to go.

### 4.7.4 Burwood 2030

*Burwood 2030* was developed following broad community consultation in 2009, 2010 and 2013. The community vision for Burwood outlined in the plan is: 'A well connected, sustainable and safe community that embraces and celebrates its diversity'.

#### *Themes*

Council has articulated five themes, and identified a number of strategic goals for each theme. The themes and goals relevant to this SIA are outlined below.

#### 1. A sense of community

- A safe community for residents, workers and visitors
- High quality activities, facilities and services

- A well informed, supported and engaged community
  - A community that celebrates diversity.
2. Leadership through innovation
    - Strong partnerships to benefit the community
  3. A Sustainable natural environment
    - Maintain and enhance open green spaces and streetscapes.
  4. Accessible services and facilities
    - Effective traffic management and adequate parking provision
    - Accessible services and facilities that are well utilised
    - Encourage active and healthy lives
    - Vibrant and clean streetscape.
  5. A vibrant economic community
    - Support and manage Burwood's major centre status
    - Support small business
    - Increase employment and training opportunities
    - Economic centre growth and preserved residential areas.

#### 4.7.5 Ashfield 2023

*Ashfield 2023* is a ten year plan that was developed from a broad community engagement process. The community vision for Ashfield by 2023 is: 'A caring community of linked villages inspired by its rich cultural history, heritage and diversity'.

##### *Themes*

Seven key themes have been identified based on the community's aspirations and priorities. Those priorities which are most relevant to this SIA are highlighted below.

1. Creative and inclusive community
  - Improving individual and collective wellbeing with services and programs that support individuals at all stages of life and levels of ability
  - Community programs and activities that are accessible to everyone
  - Creating places that connect people and facilities, and public spaces that build community spirit through everyday use.
2. Unique and distinctive neighbourhoods
  - Encourage more local employment through diverse and mixed services and facilities. Encourage the revitalisation of local corner stores and business development which supports local jobs
  - Creating plans and policies to ensure the distinct urban village atmosphere and local heritage are valued and protected
  - Delivering clean, attractive streets, well-maintained footpaths and street furniture that helps to promote pride in our neighbourhoods and create safe, pleasant places.
3. Safe, connected and accessible places
  - Promoting sustainable living and improving pedestrian routes, cycleways and an active transport network that will connect people with the places there they live, work and relax
  - Reducing the reliance on private cars

- Providing a wide variety of facilities and places for recreation and community activities that promote a healthy lifestyle.
4. Living sustainably
- Promoting sustainable transport use through planning processes
  - Promoting active lifestyles and facilitating active transport e.g. improved infrastructure.
5. Thriving local economy
- Creating main street economies that are vibrant and desirable locations for businesses, visitors and residents
  - Promoting Liverpool Road and the Parramatta Road enterprise corridor to business and investment sectors
  - Connectivity and accessibility for visitors to the area.
6. Attractive and lively town centre
- Create an urban framework that balances access, using various forms of transport, with the need to develop an attractive, enjoyable and safe place
  - Beautify the streetscape and public domain.
7. Engaging and innovative local democracy
- Ashfield Council will be recognised for excellence in our community engagement and for listening to and responding to the needs and concerns of all residents.

## 5 Description of the existing community

If completed, WestConnex would link the western and south-western suburbs of Sydney with the Sydney CBD, Sydney Airport and Port Botany via a 33 kilometre continuous motorway. It is anticipated that the benefits of WestConnex, including improved road travel times, would be experienced by the Sydney region overall, including residents, visitors and others travelling by road through these areas.

This section describes the existing profile of the local communities that would be most impacted by the project. These are expected to be residents living in close proximity to the project, particularly those whose properties would be acquired, those living adjacent to areas that would experience the most physical change, and the broader communities that would experience changed access and traffic conditions.

The profile describes the demographics of the resident population, provides an overview of local social infrastructure (including facilities and services), and summarises community values and issues raised through community and stakeholder consultation to date.

### 5.1 Regional study area community profile

#### 5.1.1 Overall population summary

The total population of the regional study area (the region) was approximately 258,326 people in 2011. Within the region, both Canada Bay and Auburn LGAs had the largest populations (both 29 per cent) and the greatest population growth. **Table 5.1** below shows the population of the region by LGA.

**Table 5.1 Population of the region**

LGA	Number of persons (2011)	Percentage change from 2006 to 2011 census	Percentage of the region (2011 Census)	Forecast population as at 2031*	Percentage change from 2011 to 2031
Auburn	73,738	14%	29%	130,600	77%
Strathfield	35,188	10%	14%	50,900	45%
Canada Bay	75,763	15%	29%	111,350	47%
Burwood	32,423	5%	13%	47,500	47%
Ashfield	41,214	4%	16%	53,400	30%
<b>Region</b>	<b>258,326</b>	<b>11%</b>	<b>100%</b>	<b>393,750</b>	<b>52%</b>

Source: ABS Census Data 2006 and 2011. \* Department of Planning and Environment, 2014

Population growth in the region is forecast to be strongest in Auburn, with least growth in the inner LGA of Ashfield. This growth also reflects the Parramatta Road Urban Transformation Program objectives which will see four of the eight urban renewal projects within the project regional area. These development precincts are Auburn, Homebush, Burwood and Kings Bay which together are expected to account for sixty per cent of the 51,600 new residents the program expects to accommodate by 2031.

Compared to Greater Sydney, the overall population of the region was characterised by:

- A median age of 34 years (two years younger than Greater Sydney) although this varied across the LGAs from 31 years in Auburn to 37 years in both Ashfield and Canada Bay
- A fairly consistent age profile to Greater Sydney although there were more 25–34 year olds and fewer children aged under 18 years. The age profile varied across the LGAs with:
  - More 25–49 year olds and people aged over 70 years in Ashfield
  - More young children (zero–four years) and young adults (18–34 years) in Auburn
  - More young adults (18–24 years) and people aged over 70 years in Burwood
  - More young children (0–4 years), 35–49 year olds and people aged over 70 years in Canada Bay

- More young people (12–34 years) in Strathfield.
- A culturally diverse population in particular in Auburn, Strathfield and Burwood LGAs
- A small proportion of Indigenous residents (0.5 per cent), with a similar proportion in each LGA (from 0.3 to 0.6 per cent)
- A slightly higher unemployment rate (6.3 per cent). Of the five LGAs, Auburn had the highest unemployment rate (8.6 per cent) and Canada Bay had the lowest rate (4.3 per cent)
- A higher rate of residents with a tertiary qualification (61 per cent). All the LGAs, except Auburn (53 per cent), had a similar proportion (61 to 66 per cent)
- Most people lived in separate houses (44 per cent), followed by flats, units and apartments (39 per cent). This was reflected in all LGAs, except Ashfield, where most people lived in flats, units and apartments
- Mostly family households (73 per cent), which was reflected across all the LGAs. Most households in the region were couples with children (49 per cent), also reflected across the LGAs
- Slightly fewer lone person households (21 per cent). Ashfield and Canada Bay however had significant proportions of lone person households
- Slightly fewer one parent families (14 per cent), which was reflected across all the LGAs
- Similar weekly median household income (\$1424), with the lowest household income in Auburn (\$1160) and highest in Canada Bay (\$1817)
- Slightly lower rate of home ownership (with or without a mortgage) (62 per cent), with lowest rate in Ashfield and Auburn (both 59 per cent) and highest rate in Canada Bay (66 per cent)
- Slightly higher rate of renting (38 per cent), with the highest rates in Ashfield (42 per cent) and Auburn (41 per cent) and lowest in Canada Bay (34 per cent)
- Fewer public housing tenants (three per cent) although this varied across the LGAs, with the highest proportions of public housing tenants in Strathfield (4.2 per cent), Auburn (3.9 per cent) and Burwood (three per cent)
- Close to half of the region's residents (48 per cent) have lived in the area for over five years, while over three-quarters (77 per cent) have lived there for over one year. This demonstrates that there are established communities and social networks in the region. Burwood, Ashfield and Canada Bay had the highest proportions of residents who had lived in their current home for over five years
- While an index of relative socio-economic disadvantage is not available for the region, compared with LGAs in the region the index of relative socio-economic disadvantage indicated Auburn had a higher level of disadvantage.

## 5.2 Local study area – precinct profiles

### 5.2.1 Homebush precinct

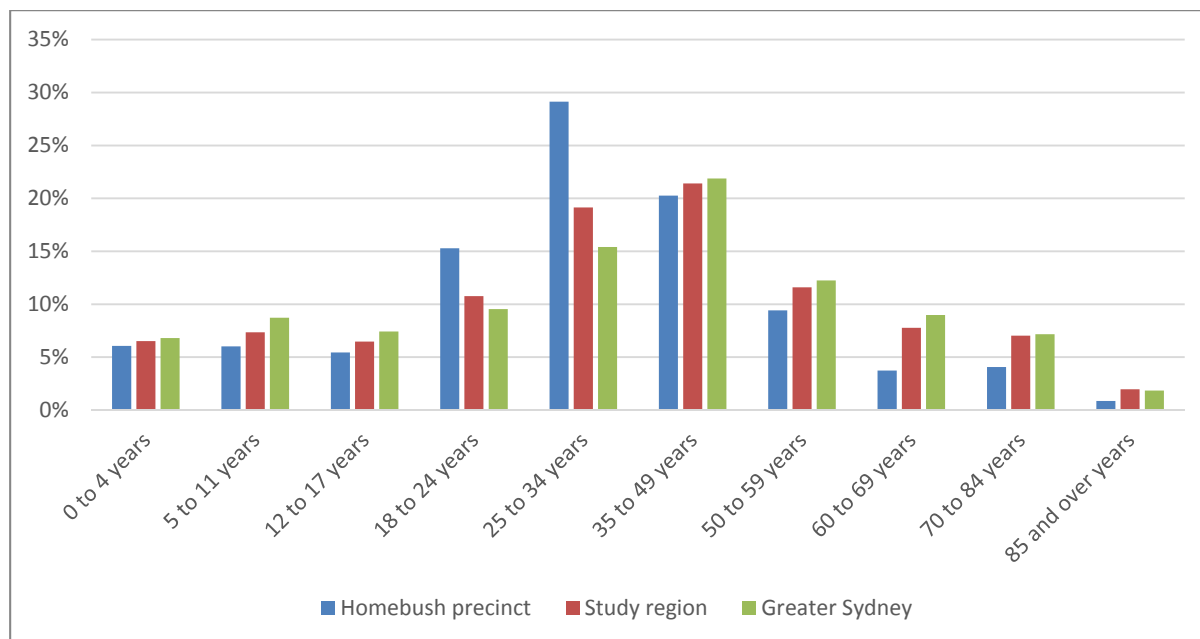
#### **Overall population summary**

The total population of the Homebush precinct was approximately 2093 people in 2011. Compared to the region and Greater Sydney, the population was characterised by:

- A younger age profile, with significantly more people aged 18–34 years
- A culturally diverse community
- Higher median weekly household incomes
- Higher level of renting as well as transience within the community, with mostly aged between 18–49 years moving in and out of the precinct
- More people paying a mortgage
- High rate of vehicle ownership and car dependency for travel to work

- Higher train usage for travel to work.

The following sections provide a detailed analysis of the Homebush precinct.



**Figure 5.1 Age profile for Homebush precinct, 2011**

### Age profile

**Figure 5.1** shows the age profile for Homebush precinct. Compared to the region and Greater Sydney, the precinct's age profile was younger characterised by:

- A median age of 31 years (three years younger than the region and five years younger than Greater Sydney)
- Significantly more young people (18–34 years)
- Slightly fewer children under 18 years
- Significantly fewer people aged over 50 years.

People who required assistance with daily activities was lower at 2.3 per cent than the region (4.6 per cent) and Greater Sydney (4.4 per cent). This reflects the precinct's overall younger population.

### Cultural diversity

The precinct's community was culturally diverse, with 45 per cent of residents born in a non-main English-speaking country and over half speaking a language at home other than English (52 per cent). These were similar to the region (43 and 54 per cent) and higher than Greater Sydney (26 and 33 per cent).

A small percentage of residents however identified as Indigenous (0.5 per cent), consistent with the region and slightly lower than Greater Sydney (1.2 per cent).

### Employment and education

Labour force participation in the Homebush precinct (69 per cent) was higher than the region and Greater Sydney average (60 and 62 per cent). In addition, more people completed Year 12 (67 per cent), which was higher than the region (61 per cent) and Greater Sydney average (55 per cent). More people also had a tertiary qualification (65 per cent), compared to the region (61 per cent) and Greater Sydney (60 per cent).

The unemployment rate (5.5 per cent) was slightly lower than the region and Greater Sydney average (6.3 and 5.7 per cent respectively).

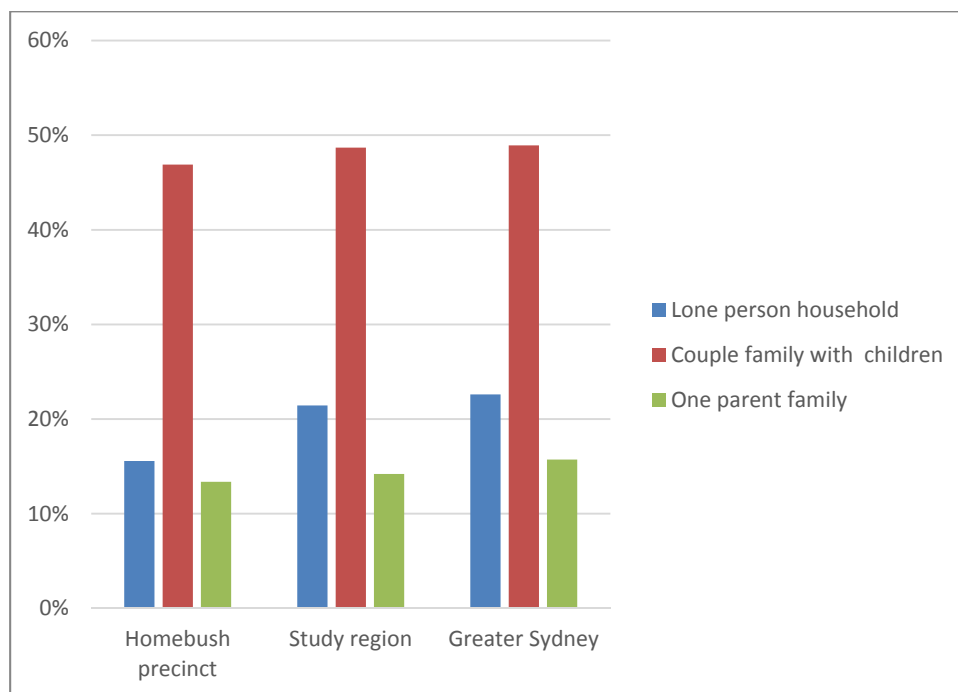
Most residents were employed as professionals (24 per cent), technicians and traders (15 per cent) and clerical and administrative workers (15 per cent).

### Dwellings and household composition

The Homebush precinct contained mostly flats, units and apartments (38 per cent) and separate houses (36 per cent). There were slightly fewer flats, units and apartments than the region (39 per cent) but more than Greater Sydney (24 per cent). While there were fewer separate houses than both the region and Greater Sydney (44 and 57 per cent respectively).

The precinct had a higher proportion of family households (79 per cent), compared to the region and Greater Sydney average (both 73 per cent). This was reflected in the average household size of 2.8 persons, which was consistent with the region and similar to Greater Sydney (2.7 persons).

Most families were couples with children (47 per cent) consistent with the region and Greater Sydney average (both 49 per cent). One parent families made up 13 per cent of households, slightly lower than the region (14 per cent) and Greater Sydney average (16 per cent). There were fewer lone person households (16 per cent), compared to the region (21 per cent) and Greater Sydney average (23 per cent).



**Figure 5.2 Household composition for Homebush precinct, 2011.**

### Household income

Weekly median household incomes in the precinct (\$1626) were higher than the region (\$1424) and Greater Sydney (\$1447).

### Tenure

In the Homebush precinct, 41 per cent of people rented their homes, which was higher than the region (38 per cent) and Greater Sydney average (33 per cent). The number of people renting from public housing (2.6 per cent) was lower than the region (3 per cent) and Greater Sydney average (4.7 per cent).

In the precinct 18 per cent of people fully owned their homes, lower than the region and Greater Sydney average (both 31 per cent) while 41 per cent of people were paying a mortgage, higher than the region (31 per cent) and Greater Sydney average (36 per cent).

## Length of residence

In 2011, 35 per cent of people in the Homebush precinct had lived at the same address for over five years, considerably lower than the region (48 per cent) and Greater Sydney average (53 per cent). Similarly, the proportion of residents who lived at the same address for over one year (69 per cent) was lower than the region (77 per cent) and Greater Sydney (80 per cent). This indicates a higher level of transience among residents.

Based on the precinct's younger age profile (refer to the age profile above), this indicates that the majority of people that moved to or purchased a home in the precinct were likely aged between 18–49 years.

## SEIFA Index of Relative Disadvantage

The 2011 Index of Relative Disadvantage scores for the precinct's smaller areas indicate that the population was generally less disadvantaged, similar to Strathfield LGA (1022).

**Table 5.2 Index of Relative Disadvantage scores by smaller area within Homebush precinct, 2011**

Smaller area within Homebush precinct	1139603	1139612	1139620	1139622	1139624	1138404	Strathfield LGA
2011 Index of Relative Disadvantage score	1023	1029	1037	N/A*	1039	1074	1022

\*Due to the small population for this area, this data was not available.

## Vehicle ownership

There was a high level of vehicle ownership in the precinct, with 92 per cent of households owning at least one vehicle. This was higher than the region (85 per cent) and Greater Sydney (88 per cent).

## Travel to work (by one method only)

Most residents (56 per cent) in the Homebush precinct travelled to work as either a driver or passenger of a car. This was similar to the region (58 per cent) but lower than the Greater Sydney average (66 per cent).

In the precinct 34 per cent of residents travelled to work by train, which was significantly higher than the region (26 per cent) and Greater Sydney average (15 per cent). Bus usage (0.6 per cent) however was lower than the region (five per cent) and Greater Sydney average (six per cent). The proportion of people that walked only to work (four per cent) was consistent with the region (four per cent) and Greater Sydney (five per cent).

## 5.2.2 Concord precinct

### Overall population summary

The total population of Concord precinct was approximately 3693 people in 2011. Compared to the region and Greater Sydney, the population was characterised by:

- A younger age profile, with significantly more people aged 18–34 years
- A culturally diverse community
- Lower median weekly household incomes
- Higher level of renting as well as transience within the community, with mostly people likely aged between 18–49 years moving in and out of the precinct
- More people paying a mortgage
- Lower rate of vehicle ownership and car dependency for travel to work
- Higher train usage for travel to work.

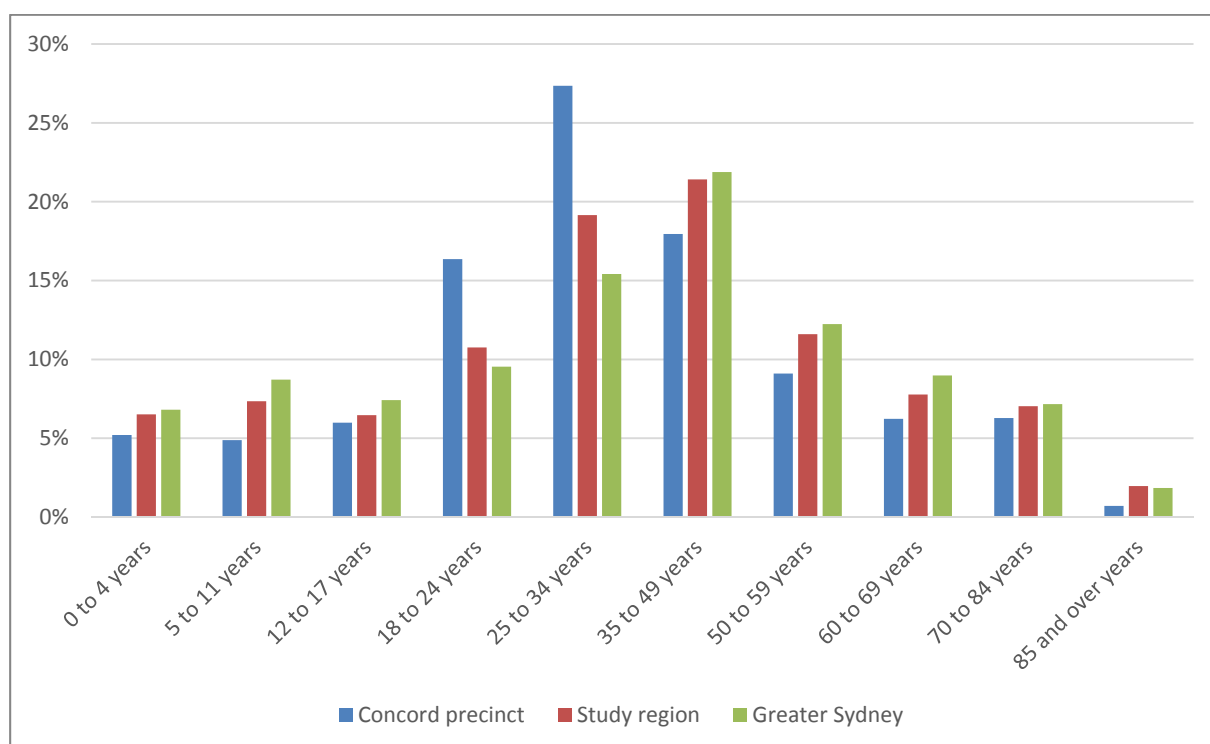
The following sections provide a detailed analysis of the Concord precinct.

## Age profile

**Figure 5.3** below shows the age profile for the Concord precinct. Compared to the region and Greater Sydney, the precinct's age profile was younger characterised by:

- A median age of 32 years (two years younger than the region and four years younger than Greater Sydney)
- Significantly more young people (18–34 years)
- Slightly fewer children under 18 years
- Fewer people aged over 60 years.

People who required assistance with daily activities was lower at 2.8 per cent than the region (4.6 per cent) and Greater Sydney (4.4 per cent). This reflects the precinct's overall younger population.



**Figure 5.3** Age profile for the Concord precinct, 2011.

## Cultural diversity

The precinct's community was culturally diverse, with 54 per cent of residents born in a non-main English-speaking country and around two-thirds speaking a language at home other than English (61 per cent). These were both higher than the region (43 and 54 per cent) and Greater Sydney (26 and 33 per cent).

A small percentage of residents however identified as Indigenous (0.1 per cent), lower than the region (0.5 per cent) and Greater Sydney (1.2 per cent).

## Employment and education

Labour force participation in the Concord precinct (61 per cent) was similar to the region and Greater Sydney average (60 and 62 per cent). Despite this, the unemployment rate (7.6 per cent) was higher than the region and Greater Sydney average (6.3 and 5.7 per cent respectively). Most residents were employed as professionals (29 per cent), clerical and administrative workers (14 per cent) and technicians and traders (13 per cent).

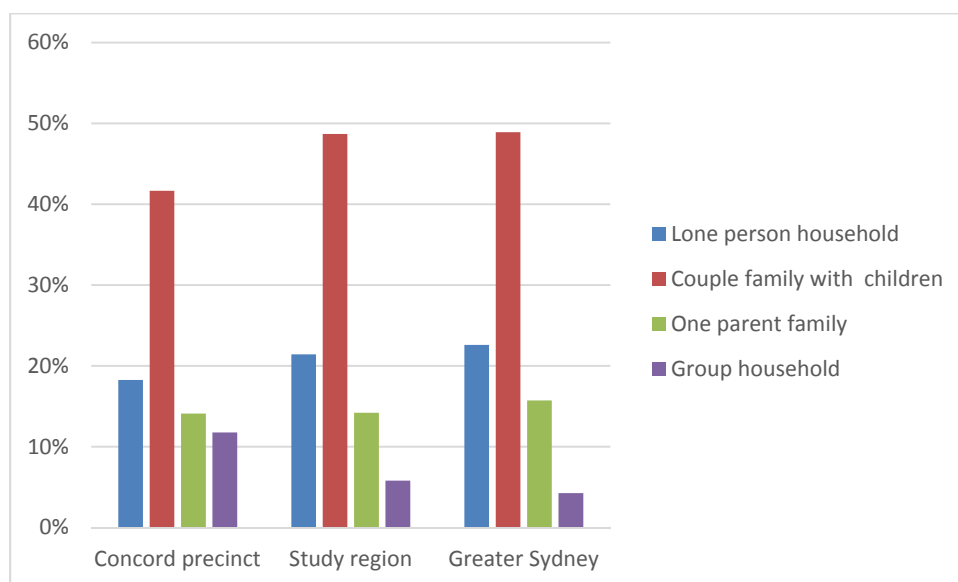
More people completed Year 12 (68 per cent), which was higher than the region (61 per cent) and Greater Sydney average (55 per cent). Similarly, more people had a post-school qualification (65 per cent), compared to the region (61 per cent) and Greater Sydney (60 per cent).

### Dwellings and household composition

The Concord precinct contained mostly separate houses (52 per cent), which was higher than the region (44 per cent) and lower than the Greater Sydney average (57 per cent). Flats, units and apartments made up 35 per cent of dwelling types, higher than the Greater Sydney average (24 per cent) and lower than the region (39 per cent).

The average household size in the Concord precinct was 2.8 persons, which was consistent with the region and similar to Greater Sydney (2.7 persons). Concord precinct had a similar proportion of family households (70 per cent) with the region and Greater Sydney (both 73 per cent). Most families were couples with children (42 per cent), lower than the region and Greater Sydney average (both 49 per cent). This was followed closely by couples without children (40 per cent), which was higher than the region (34 per cent) and Greater Sydney (33 per cent).

There were fewer lone person households (18 per cent), compared to the region (21 per cent) and Greater Sydney average (23 per cent). Group households (a household consisting of two or more unrelated people where all persons are aged 15 years and over) made up 12 per cent of all households, higher than the region (six per cent) and Greater Sydney (four per cent).



**Figure 5.4 Household composition for the Concord precinct, 2011.**

### Household income

Weekly median household incomes in the precinct (\$1346) were lower than the region (\$1424) and Greater Sydney (\$1447).

### Tenure

In Concord precinct, 42 per cent of people rented their homes, which was higher than the region (38 per cent) and Greater Sydney average (33 per cent). A small proportion of people rented from public housing (0.7 per cent) compared to the region (3 per cent) and Greater Sydney (4.7 per cent).

In the precinct 26 per cent of people fully owned their homes, lower than the region and Greater Sydney average (both 31 per cent) while 32 per cent of people were paying a mortgage, slightly higher than the region (31 per cent) and lower than the Greater Sydney average (36 per cent).

## Length of residence

In 2011, 39 per cent of people in Concord precinct had lived at the same address for over five years, considerably lower than the LGAs (48 per cent) and Greater Sydney average (53 per cent). Similarly, the proportion of residents who lived at the same address for over one year (67 per cent) was lower than the region (77 per cent) and Greater Sydney (80 per cent). This indicates a higher level of transience among residents.

Based on the precinct's younger age profile (refer to the age profile above), this indicates that the majority of people that moved to or purchased a home in the precinct were likely aged between 18 to 49 years.

## SEIFA Index of Relative Disadvantage

The 2011 Index of Relative Disadvantage scores for the precinct's smaller areas indicate that parts of the population were more disadvantaged, compared to Canada Bay LGA (1067).

The SA1 areas (nos. 1139713 and 1139714) had a slightly higher level of disadvantage. These areas are located south of the project footprint and Parramatta Road.

**Table 5.3 Index of Relative Disadvantage scores by smaller area within Concord precinct, 2011**

Smaller area within Concord precinct	113830 2	113832 5	113840 8	113841 2	113970 5	113971 3	113971 4	113971 5	Canada Bay LGA
2011 Index of Relative Disadvantage score	1054	997	1047	N/A*	1018	983	985	1031	1067

\*Due to the small population for this area, this data was not available.

## Vehicle ownership

Vehicle ownership (owning at least one vehicle) among households in the Concord precinct was slightly lower (81 per cent), compared to the region (85 per cent) and Greater Sydney (87 per cent).

## Travel to work

Train usage was high in the Concord precinct (42 per cent), significantly higher than the region (26 per cent) and Greater Sydney average (15 per cent). Bus usage (three per cent) however was lower than the region (five per cent) and Greater Sydney average (six per cent). The proportion of people that walked only to work (four per cent) is consistent with the region (four per cent) and Greater Sydney average (five per cent).

46 per cent of people in the Concord precinct travelled to work as either a driver or passenger of a car. This was lower than the region (58 per cent) and Greater Sydney average (66 per cent).

### 5.2.3 Cintra Park precinct

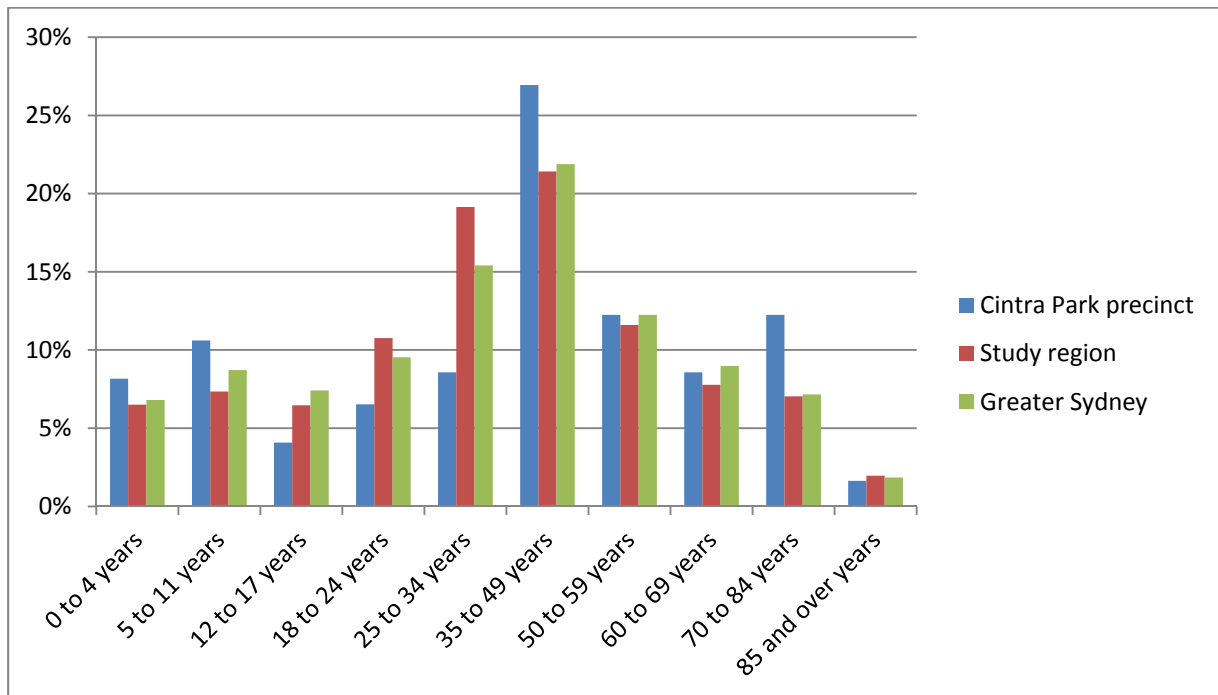
#### Age profile

**Figure 5.5** shows the age profile for the Concord precinct. Compared to the region and Greater Sydney, the precinct's age profile was older characterised by:

- A median age of 44 years (ten years older than the region and eight years older than Greater Sydney)
- More young children aged under 12 years as well as 35–49 year olds, indicating a significant proportion of young families living here
- Fewer high school aged children and young people (12–34 years)

- More 70–84 year olds.

Despite the precinct's overall older population, people who required assistance with daily activities was lower at 2.9 per cent than the region (4.6 per cent) and Greater Sydney (4.4 per cent). This however represented a small number of people (seven people).



**Figure 5.5 Age profile for Cintra Park precinct, 2011.**

### Cultural diversity

The precinct's community was culturally diverse, with over a quarter of residents born in a non-main English-speaking country (26 per cent) and almost half speaking a language at home other than English (46 per cent). This was compared to the region (43 and 54 per cent) and Greater Sydney (26 and 33 per cent). However, no residents identified as Indigenous.

### Employment and education

Labour force participation in Cintra Park precinct (63 per cent) was slightly higher than the region and Greater Sydney average (60 and 62 per cent). The unemployment rate (6.7 per cent) was slightly higher than the region and Greater Sydney average (6.3 and 5.7 per cent respectively) however this represented a small number of people (eight people).

Fewer people completed Year 12 (52 per cent), which was lower than the region (61 per cent) and Greater Sydney average (55 per cent). Similarly, fewer people had a post-school qualification (54 per cent), compared to the region (61 per cent) and Greater Sydney (60 per cent).

Most residents were employed as professionals (27 per cent), clerical and administrative workers (18 per cent) and technicians and traders (18 per cent).

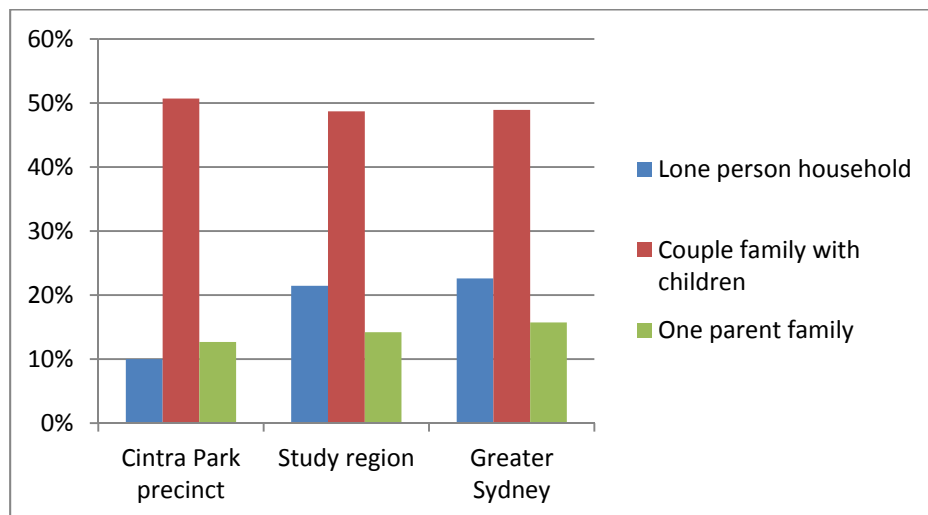
### Dwellings and household composition

Cintra Park precinct contained mostly separate houses (87 per cent), which was significantly higher than the region (44 per cent) and Greater Sydney (57 per cent). Semi-detached dwellings made up seven per cent of dwelling types, lower than the region (11 per cent) and Greater Sydney average (12 per cent).

The average household size in this precinct was 2.9 persons, slightly higher than the region (2.8 persons) and Greater Sydney (2.7 persons). Mostly family households (86 per cent) lived in Cintra Park precinct, higher than the region and Greater Sydney (both 73 per cent).

Around half of families were couples with children (51 per cent), slightly higher than the region and Greater Sydney average (both 49 per cent). 13 per cent were one parent families, slightly lower than the region (14 per cent) and Greater Sydney (16 per cent).

There were fewer lone person households (10 per cent), compared to the region (21 per cent) and Greater Sydney average (23 per cent).



**Figure 5.6 Household composition for the Cintra Park precinct, 2011.**

### Household income

Weekly median household incomes in the precinct (\$2028) were higher than the region (\$1424) and Greater Sydney (\$1447).

### Tenure

Full home ownership was higher in Cintra Park precinct (40 per cent), compared to the region and Greater Sydney average (both 31 per cent). 35 per cent of residents were paying a mortgage, higher than the region (31 per cent) and lower than the Greater Sydney average (36 per cent).

A quarter of residents rented their homes, which was lower than the region (38 per cent) and Greater Sydney average (33 per cent). 3.9 per cent of residents rented from public housing, which was higher than the region (three per cent) and lower than Greater Sydney (4.7 per cent). However, this only represented three households.

### Length of residence

Most residents had lived in the precinct for a long time. In 2011, 62 per cent of people had lived at the same address for over five years, higher than the LGAs (48 per cent) and Greater Sydney average (53 per cent). The proportion of residents who lived at the same address for over one year (92 per cent) was also significantly higher than the region (77 per cent) and Greater Sydney (80 per cent).

### SEIFA Index of Relative Disadvantage

The 2011 Index of Relative Disadvantage score for the Cintra Park precinct indicates that the population is generally less disadvantaged, with a score slightly lower than Canada Bay LGA (1067).

**Table 5.4 Index of Relative Disadvantage scores by smaller area within the Cintra Park precinct, 2011**

Smaller area within Cintra Park precinct	1138621	1138303	Canada Bay LGA
2011 Index of Relative Disadvantage score	1043	N/A*	1067

\*There were no residents living in this smaller area.

### **Vehicle ownership**

Most households owned at least one vehicle (92 per cent), compared to the region (85 per cent) and Greater Sydney (87 per cent).

### **Travel to work**

Most residents travelled to work by car as either a driver or passengers (76 per cent), compared to the region (58 per cent) and Greater Sydney average (66 per cent).

Overall public transport usage was lower (21 per cent or 23 people) than the region (32 per cent) and Greater Sydney (21 per cent). Public transport usage only consisted of train (10 per cent) and bus (11 per cent). No residents walked or cycled to work.

## **5.2.4 Wattle Street precinct**

### **Overall population summary**

The population of Wattle Street precinct was approximately 2703 people in 2011. Compared to the region and Greater Sydney, the population was characterised by:

- An older age profile, with fewer people aged 18–34 years
- A culturally diverse community
- Higher median weekly household incomes
- Higher level of home ownership and long-time residents
- Higher rate of vehicle ownership and car dependency for travel to work
- Higher bus usage for travel to work.

**Appendix B** provides a detailed analysis of the Wattle Street precinct.

### **Age Profile**

**Figure 5.7** below shows the age profile for the Wattle Street precinct. Compared to the region and Greater Sydney, the Wattle Street precinct's age profile was older, as characterised by:

- A median age of 40 years (six years older than both the region and four years older than Greater Sydney)
- Fewer young people aged 18–34 years
- Slightly more people aged 35–59 years
- Slightly more people aged 70–84 years.

People who required assistance with daily activities was high at 4.5 per cent, which was consistent with the region (4.6 per cent) and Greater Sydney (4.4 per cent). This could be due to the precinct's overall older population.

### **Cultural diversity**

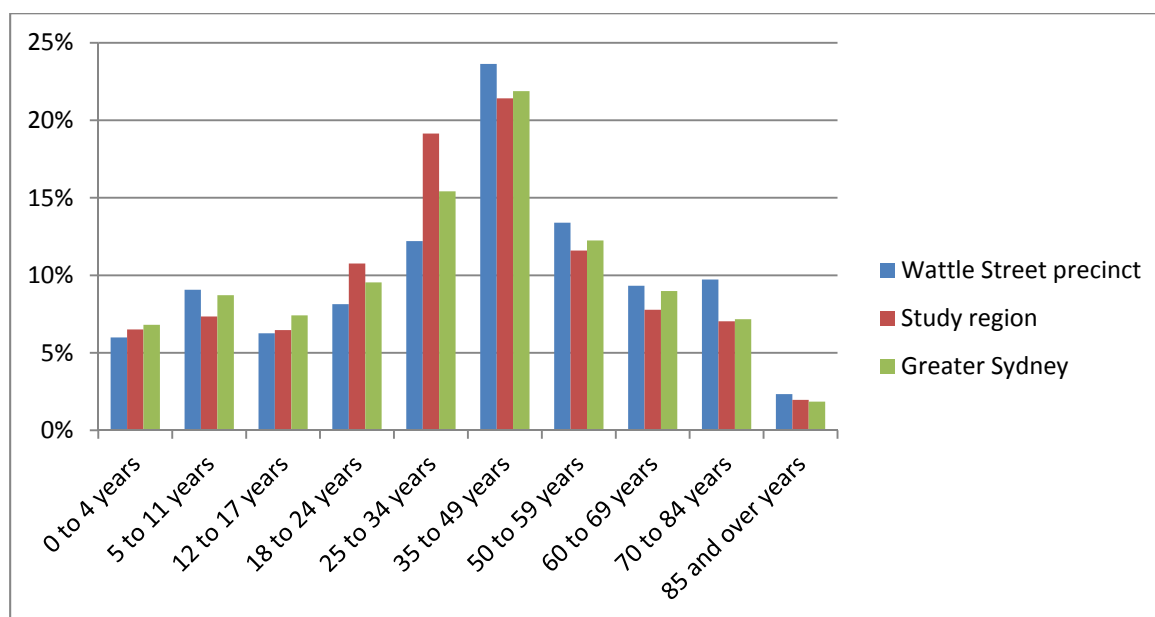
The precinct's community was culturally diverse, with 30 per cent of residents born in a non-main English-speaking country and 36 per cent speaking a language at home other than English. These were higher than Greater Sydney (26 and 33 per cent) but lower than the region (43 and 54 per cent).

A small percentage of residents identified as Indigenous (0.5 per cent), compared to the region (0.5 per cent) and Greater Sydney (1.2 per cent).

## Employment and education

Labour force participation in Wattle Street precinct (63 per cent) was slightly higher than the region and Greater Sydney average (60 and 62 per cent). The unemployment rate (4.3 per cent) was lower than the region and Greater Sydney average (6.3 and 5.7 per cent respectively). Most residents were employed as professionals (31 per cent), clerical and administrative workers (17 per cent) and managers (17 per cent).

In the precinct 63 per cent of people completed Year 12, slightly higher than the region (61 per cent) and Greater Sydney (55 per cent). 61 per cent of people had a post-school qualification, consistent with the region and similar to Greater Sydney (60 per cent).



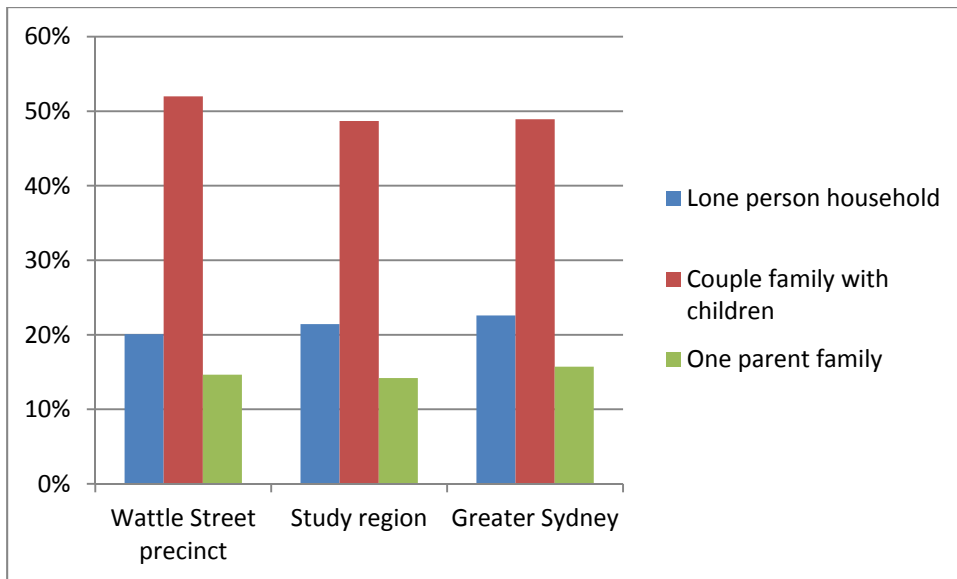
**Figure 5.7** Age profile for Wattle Street precinct, 2011.

## Dwellings and household composition

The Wattle Street precinct contained mostly separate houses (55 per cent), which was higher than the region (44 per cent) and lower than the Greater Sydney average (57 per cent), reflecting its history as a 'garden suburb'. There were more semi-detached dwellings (18 per cent) than the region (11 per cent) and Greater Sydney (12 per cent). Flats, units and apartments made up 20 per cent of dwelling types, lower than the region (39 per cent) and Greater Sydney (24 per cent).

The average household size in the Wattle Street precinct was 2.7 persons, similar to the region (2.8 persons) and Greater Sydney (2.7 persons). Wattle Street precinct had a slightly higher proportion of family households (75 per cent) than the region and Greater Sydney (both 73 per cent). A proportion of households were lone person households (20 per cent), although slightly lower than the region (21 per cent) and Greater Sydney average (23 per cent).

Most families were couples with children (52 per cent), slightly higher than the region and Greater Sydney average (both 49 per cent). A proportion were one parent families (15 per cent), similar to the region (14 per cent) and Greater Sydney (16 per cent).



**Figure 5.8 Household composition for the Wattle Street precinct, 2011.**

### Household income

Weekly median household incomes in the precinct (\$1670) were higher than the region (\$1424) and Greater Sydney (\$1447).

### Tenure

Full home ownership was higher in Wattle Street precinct (40 per cent), compared to the region and Greater Sydney average (both 31 per cent). 32 per cent of residents were paying a mortgage, higher than the region (31 per cent) and lower than the Greater Sydney average (36 per cent).

In the precinct 28 per cent of residents rented their homes, which was lower than the region (38 per cent) and Greater Sydney average (33 per cent). 11 per cent rented from public housing, compared to the region (eight per cent) and Greater Sydney (14 per cent).

### Length of residence

Most residents had lived in the precinct for a long time. In 2011, 61 per cent of people had lived at the same address for over five years, higher than the LGAs (48 per cent) and Greater Sydney average (53 per cent). Similarly, the proportion of residents who lived at the same address for over one year (84 per cent) was higher than the region (77 per cent) and Greater Sydney (80 per cent).

### SEIFA Index of Relative Disadvantage

The 2011 Index of Relative Disadvantage scores for the precinct's smaller areas indicate that the population was generally less disadvantaged, compared to Ashfield LGA (1015).

**Table 5.5 Index of Relative Disadvantage scores by smaller area within Wattle Street precinct, 2011**

Smaller area within Wattle Street precinct	113900 5	113902 1	113952 7	113952 8	113953 1	113953 2	Ashfield LGA
2011 Index of Relative Disadvantage score	1067	1052	1025	1034	993	1084	1015

## Vehicle ownership

Most households owned at least one vehicle (90 per cent), compared to the region (85 per cent) and Greater Sydney (87 per cent).

## Travel to work (by one method only)

Most residents travelled to work by car as either a driver or passengers (64 per cent), compared to the region (58 per cent) and Greater Sydney average (66 per cent).

In the precinct 13 per cent of residents travelled to work by bus, which was higher than the region (five per cent) and Greater Sydney average (six per cent). Train usage (12 per cent) however was lower than the region (26 per cent) and Greater Sydney average (15 per cent). The proportion of people that walked only to work (four per cent) was consistent with the region (four per cent) and Greater Sydney (five per cent).

## 5.2.5 Parramatta Road precinct

### Age profile

Figure 5.9 below shows the age profile for Parramatta Road precinct. Compared to the region and Greater Sydney, Parramatta Road precinct's age profile was characterised by:

- A median age of 36 years, consistent with Greater Sydney and two years older than the region
- Fewer school aged children (5–17 years)
- More 25–34 year olds
- Slightly more people aged over 85 years.

People who required assistance with daily activities (seven per cent) was higher than the region (4.6 per cent) and Greater Sydney (4.4 per cent). This could be due to the higher proportion of older residents aged over 85 years.

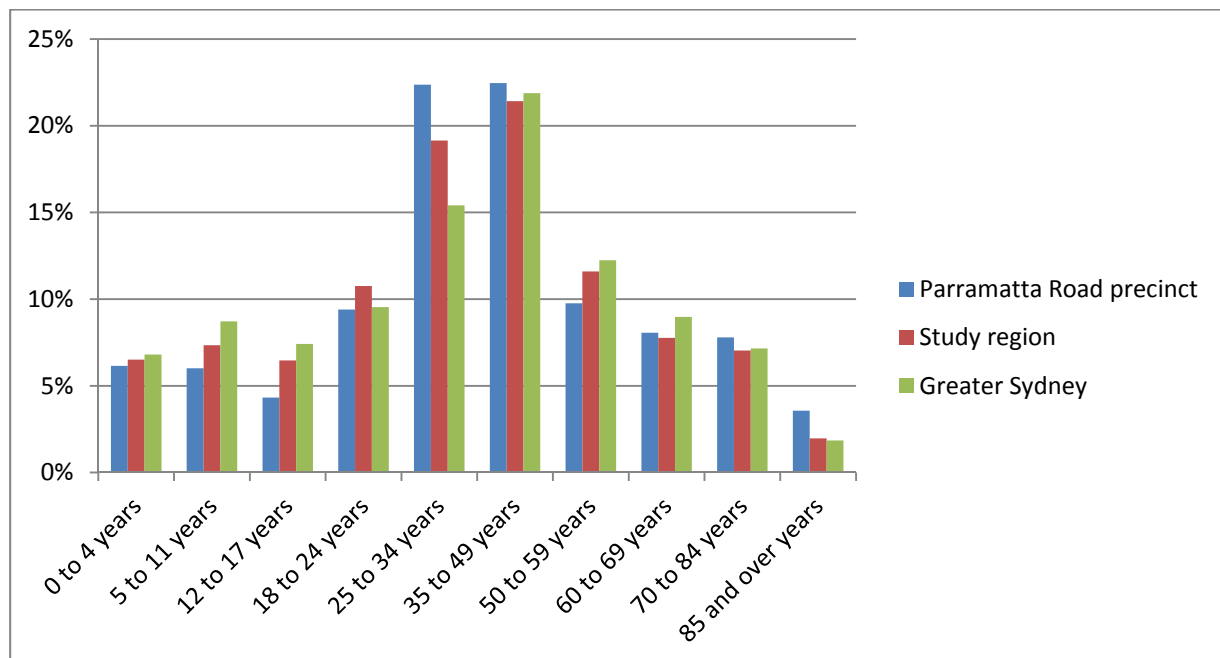


Figure 5.9 Age profile for Parramatta Road precinct, 2011.

## Cultural diversity

The precinct's community was culturally diverse, with 43 per cent of residents born in a non-main English-speaking country and 51 per cent speaking a language at home other than English. These were higher than Greater Sydney (26 and 33 per cent) but lower than the region (43 and 54 per cent).

A small percentage of residents however identified as Indigenous (0.7 per cent), compared to the region (0.5 per cent) and Greater Sydney (1.2 per cent).

## Employment and education

Labour force participation in Parramatta Road precinct (62 per cent) was similar to the region and Greater Sydney average (60 and 62 per cent). Despite this, the unemployment rate (6.9 per cent) was slightly higher than the region and Greater Sydney average (6.3 and 5.7 per cent respectively). Most residents were employed as professionals (32 per cent), clerical and administrative workers (13 per cent) and managers (13 per cent).

In the precinct 66 per cent of people completed Year 12, higher than the region (61 per cent) and Greater Sydney (55 per cent). Similarly, 69 per cent of people had a post-school qualification, higher than the region (61 per cent) and Greater Sydney (60 per cent).

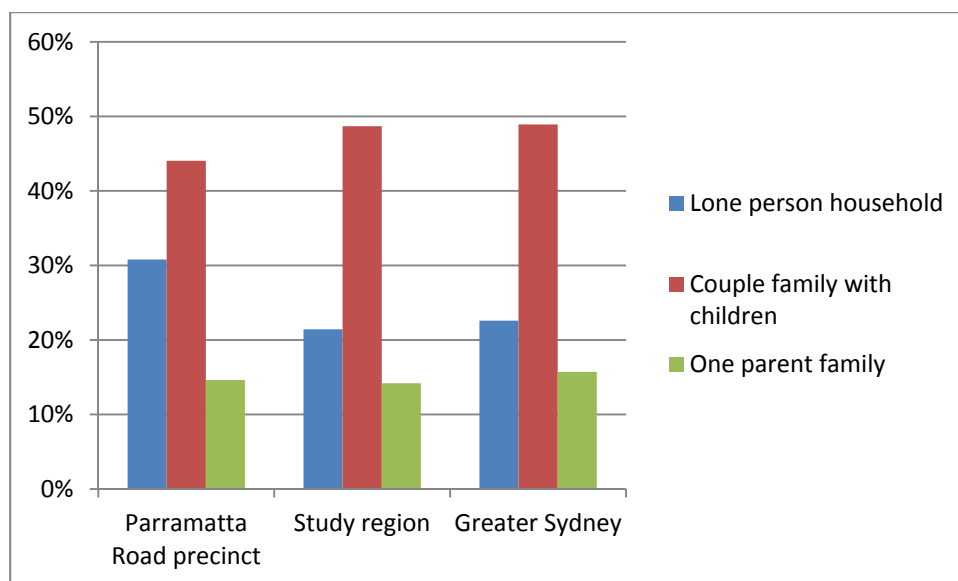
## Dwellings and household composition

The Parramatta Road precinct contained mostly flats, units and apartments (62 per cent), which was higher than the region (39 per cent) and Greater Sydney (24 per cent). This was followed by separate houses (16 per cent), which was significantly lower than the region (44 per cent) and lower than the Greater Sydney average (57 per cent). Semi-detached dwellings made up 12 per cent of dwelling types, similar to the region (11 per cent) and Greater Sydney (12 per cent).

The average household size in Parramatta Road precinct was 2.4 persons, slightly smaller than the region (2.8 persons) and Greater Sydney (2.7 persons). The precinct had a smaller proportion of family households (64 per cent) than the region and Greater Sydney (both 73 per cent). Almost a third of households were lone person households (31 per cent), significantly higher than the region (21 per cent) and Greater Sydney average (23 per cent).

Most families were couples with children (44 per cent), slightly lower than the region and Greater Sydney average (both 49 per cent). This was followed by couples without children (37 per cent), which was slightly higher than the region (34 per cent) and Greater Sydney average (33 per cent).

A proportion were one parent families (15 per cent), similar to the region (14 per cent) and Greater Sydney (16 per cent).



**Figure 5.10** Household composition for Parramatta Road precinct, 2011.

## Household income

Weekly median household incomes in the precinct (\$1292) were lower than the region (\$1424) and Greater Sydney (\$1447).

## Tenure

In Parramatta Road precinct, 46 per cent of people rented their homes, which was higher than the region (38 per cent) and Greater Sydney average (33 per cent). A small proportion of people rented from public housing (0.7 per cent) compared to the region (three per cent) and Greater Sydney (4.7 per cent).

Additionally, 25 per cent of people fully owned their homes, lower than the region and Greater Sydney average (both 31 per cent), while 30 per cent of people were paying a mortgage, consistent with the region (31 per cent) and lower than the Greater Sydney average (36 per cent).

## Length of residence

In the precinct, 44 per cent of people in Parramatta Road precinct had lived at the same address for over five years, considerably lower than the region (48 per cent) and Greater Sydney average (53 per cent). Similarly, the proportion of residents who lived at the same address for over one year (74 per cent) was lower than the region (77 per cent) and Greater Sydney (80 per cent). This indicates a higher level of transience among residents.

## SEIFA Index of Relative Disadvantage

The 2011 Index of Relative Disadvantage scores for the precinct's smaller areas indicate that the population was generally less disadvantaged, compared to Ashfield LGA (1015).

The SA1 areas (nos. 1139009 and 1139043) however had a slightly higher level of disadvantage. The SA1 no. 1139009 area is roughly bounded by Loftus Street in the west; Chandos Street to the north; Parramatta Road to the east; and Orpington Street to the south. Number 1139043 area is roughly bounded by Alt Street in the north; Parramatta Road in the east; and Bland Street in the south.

**Table 5.6** Index of Relative Disadvantage scores by smaller area within Parramatta Road precinct, 2011

Smaller area within Parramatta Road precinct	1139008	1139009	1139018	1139043	1139508	Ashfield LGA
2011 Index of Relative Disadvantage score	1018	979	1032	983	1025	1015

## Vehicle ownership

Vehicle ownership (owning at least one vehicle) among households in Parramatta Road precinct was lower (80 per cent), compared to the region (85 per cent) and Greater Sydney (87 per cent).

## Travel to work

Public transport usage was high in Parramatta Road precinct (42 per cent), compared to the region (32 per cent) and Greater Sydney average (22 per cent).

31 per cent of residents travelled to work by train, compared to the region (26 per cent) and Greater Sydney (15 per cent). Eight per cent travelled by bus, slightly higher than the region (five per cent) and Greater Sydney (six per cent).

Fewer residents travelled to work by car as either a driver or passenger (49 per cent), compared to the region (58 per cent) and Greater Sydney average (66 per cent).

## 5.3 Social infrastructure

This SIA identifies key social infrastructure in the regional which could be impacted by the construction or operation of the project. These impacts could include changes to how they are used by the community, or how they are accessed.

Social infrastructure includes both the physical infrastructure (such as community facilities) and the non-physical infrastructure (such as services, programs and networks) which help individuals and communities to meet their social needs and enhance community wellbeing. Social infrastructure can be considered according to three broad categories:

- Universal facilities and services – including libraries, education/training, health, open spaces, parks, sport and recreation, community centres, cultural facilities, and safety and emergency services
- Life-stage targeted facilities and services – for children, young people and older people
- Targeted facilities and services – for groups with distinct needs, such as families, people with a disability, Indigenous people, and people from culturally and linguistically diverse backgrounds.<sup>3</sup>

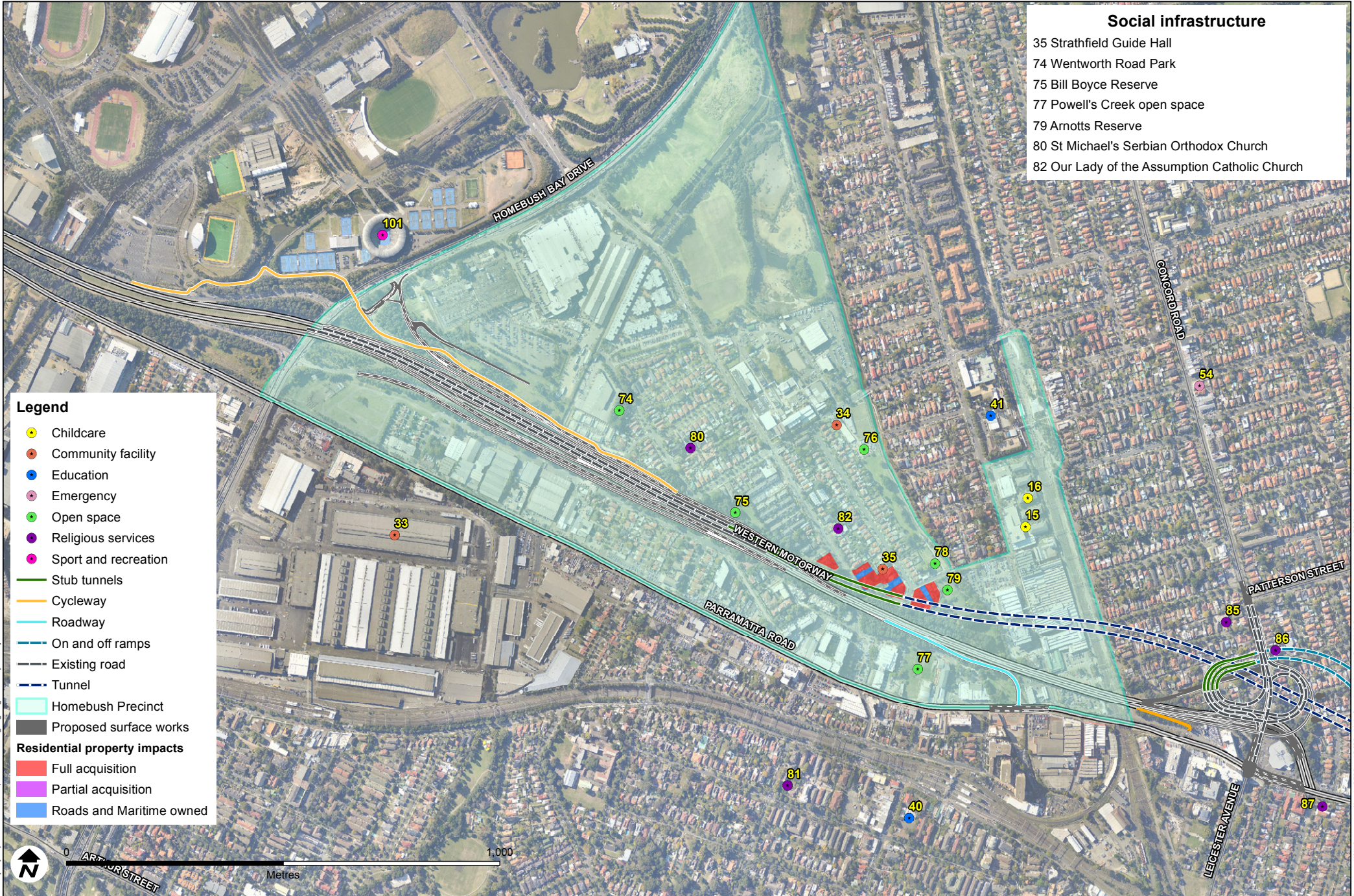
This section identifies social infrastructure roughly within 500 metres of the project alignment (including tunnels). **Figure 5.11** shows this social infrastructure. A summary of these is provided below, with further descriptions provided in **Appendix C**.

It is important to note, that not all social infrastructure may be captured in this report. Information has been gathered through desktop research, site visits, information from Councils and information provided as part of community consultation. There may be some social infrastructure which is not identified at this stage but it is anticipated that **Appendix C** will be continually updated as part of the ongoing environmental planning and assessment process.

How people access social infrastructure is also key to how it is used. Each of the local Councils in the region indicated the importance of Parramatta Road and other arterial roads and associated congestion in effectively discouraging or limiting resident and visitor access across the region. This has implications for social infrastructure, for how people work, recreate and socialise. The nature of these access issues is discussed in **sections 6.4 and 7.3**.

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<sup>3</sup> Adapted from QLD Department of Infrastructure *Implementation Guideline No. 5 – Social Infrastructure Planning* (2009)



5.11 Map of social infrastructure within the study area in proximity to the project alignment - Homebus Drive

Data source: NSW Department of Lands, DTDB and DCOB - 2012. Geospatial Australia Data 2012. Design data and aerial imagery: AECOM. Department of Primary Industry 2010. Created by: gchugh



**Social infrastructure**  
 85 Concord Baptist Church  
 86 Concord Uniting Church (Cheil Church)  
 87 St Andrew's Anglican Church

- Legend**
- Aged care
  - Childcare
  - Community facility
  - Education
  - Emergency
  - Health
  - Open space
  - Religious services
  - Stub tunnels
  - Roadway
  - On and off ramps
  - Existing road
  - Tunnel
  - ▭ Concord Precinct
  - ▭ Proposed surface works
- Residential property impacts**
- ▭ Full acquisition
  - ▭ Partial acquisition
  - ▭ Roads and Maritime owned
  - ▭ Full acquisition of multiple dwellings (mixed Roads and Maritime and private ownership)

Figure 5.12 Map of social infrastructure within the study area in proximity to the project alignment - Concord Road

Data source: NSW Department of Lands, DTDB and DCD8 - 2012, Geoscience Australia Data 2012, Design data and aerial imagery AECOM, Department of Primary Industry 2010 Created by: gchun

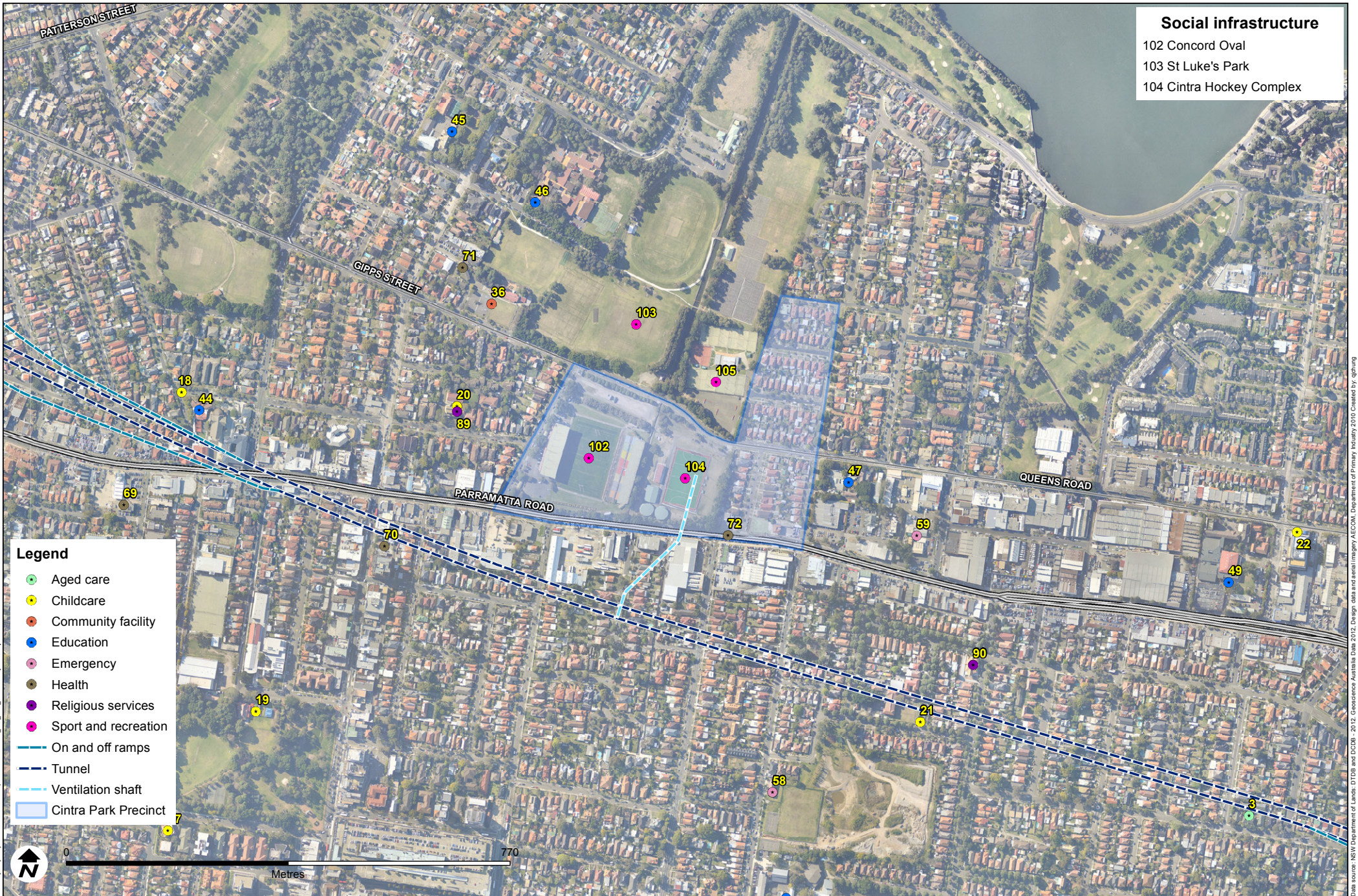


Figure 5.13 Map of social infrastructure within the study area in proximity to the project alignment - Cintra Park



Figure 5.14 Map of social infrastructure within the study area in proximity to the project alignment - Wattle Street

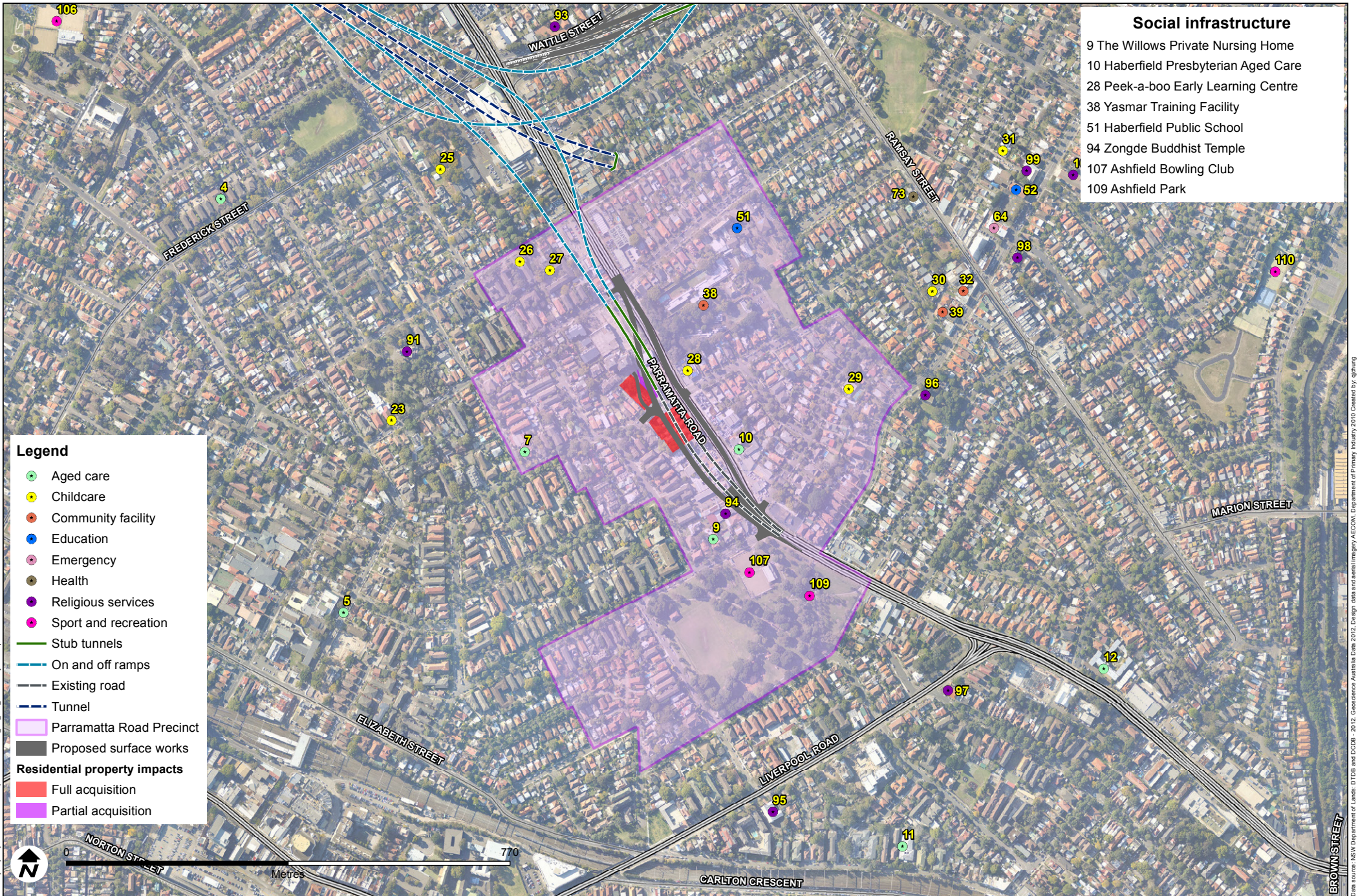


Figure 5.15 Map of social infrastructure within the study area in proximity to the project alignment - Parramatta Road

### 5.3.1 Community facilities

A community facility is a building or place used for the physical, social, cultural or intellectual development or welfare of the community. It may be owned or controlled by a public authority or non-profit community organisation.

Various community facilities are located in proximity to the project alignment, providing spaces for community use, education, and social cohesion. These are listed below, with those directly affected by or immediately adjacent to the project listed first. These include:

- Strathfield Girl Guides Hall
- Yasmar Training Facility – a NSW Juvenile Justice facility that provides counselling and programs for young offenders
- Strathfield Men's Shed – a meeting place for men to share skills and activities
- Concord Community Centre, which provides space/rooms for hire
- Ella House which is operated by the St David's Uniting Church and provides aged care and respite, along with training, social and respite activities for young people with intellectual and physical disabilities
- Haberfield Library – an Ashfield library branch library
- A former student hostel located on Concord Road.

### 5.3.2 Aged care

Several residential aged care facilities provide high, low, dementia and respite care. These include:

- Haberfield Presbyterian Aged Care
- The Willows Private Nursing Home
- Chandos Nursing Home
- Ashfield Presbyterian Aged Care
- Ainsley Nursing Home
- Linburn Nursing Home
- Woodfield Retirements Village and Nursing Home
- Wyoming Nursing Home.

### 5.3.3 Education and childcare

Five primary schools are located in proximity to the project alignment:

- Dobroyd Point Public School (also provides out of school hours and vacation care)
- Haberfield Public School
- Concord Public School
- St Mary's Primary School
- St Joan of Arc Primary School (also provides out of school hours care).

High schools in proximity of the project alignment are:

- Concord High School
- Rosebank College
- Burwood Girls High School.

There are three combined (Kindergarten–Year 12) schools:

- Methodist Ladies College

- McDonald College
- Lucas Gardens School (which provides educational programs for students with intellectual and physical disabilities).

Additional information on schools is provided in **Appendix C**.

The closest tertiary education provider to the local study area is TAFE NSW Western Sydney Institute – Open Training and Education Network (OTEN) Strathfield, which provides distance education.

There are five childcare centres in proximity to the project alignment which offer long day care, outside of school hours care), preschool, and playgroups (see **Figure 5.11**). One of these centres, the Infants Home, provides five services within its grounds, as well as offering care for vulnerable children and children with special needs. Additional information on childcare centres is provided in **Appendix C**.

### 5.3.4 Sport and recreation

Sport and recreation facilities provide important opportunities for both exercise and social interaction. There are a number of sport and recreation facilities, including:

- Bill Boyce Reserve (passive recreational space)
- Arnotts Reserve (passive recreational space)
- Ismay Reserve (passive recreational space)
- Powells Creek open space (passive recreational space)
- Concord Oval (rugby union, rugby league and soccer)
- Cintra Park hockey facility
- St Lukes Park (rugby, cricket, athletics)
- Reg Coady Reserve (three netball courts, playground and passive recreational space)
- Ashfield Park (football field, passive recreational space, and Ashfield Bowling Club)
- Cintra Park tennis courts (12 tennis courts)
- Sydney Olympic Park.

### 5.3.5 Health and emergency services

No health or emergency services would be directly impacted by the proposal.

The study area is part of the Central and Eastern Sydney Primary Health Network. Several hospitals are located in the region, including the Concord Repatriation General Hospital (NSW Health), and three private hospitals (Strathfield, Concord and St John of God Burwood). Residents in the eastern most parts of the study area also likely use the Royal Prince Alfred Hospital at Camperdown.

Police, fire and ambulance emergency services are also located in the region. The closest police stations are Five Dock (Burwood LAC), Ashfield (Ashfield LAC) and Strathfield (Flemington LAC). Fire stations are located in Ashfield, Burwood and Concord. The closest NSW Ambulance station is in Summer Hill and St John Ambulance Australia (NSW) also operates an ambulance service in Burwood.

Three State Emergency Service (SES) units are also located in the regional study area, including Canada Bay, Burwood and Ashfield/Leichhardt SES Units.

### 5.3.6 Religious services

In addition to their faith based activities, places of worship can play other important roles in communities, providing places for community interaction, services to local communities, as well as facilities for community use.

The Zongde Buddhist Temple is located on Parramatta Road at Ashfield will be acquired for project construction. There are several Christian churches in the local study area (Baptist, Catholic, Anglican and Uniting). Two churches are also affiliated with particular ethnic groups (Korean, Lebanese), including the predominantly Sydney Cheil Uniting Church at Concord which will require partial property acquisition for the project. Additional information on religious services is in **Appendix C**.

### 5.3.7 Shopping Areas

Several shopping areas are located within the regional study area which attract local and regional shoppers, including:

- Burwood Town Centre, which includes the main retail strip along Burwood Road, a major shopping centre (Westfield Burwood) and smaller shopping centre (Burwood Plaza)
- Bakehouse Quarter along George Street, North Strathfield – a commercial, retail and entertainment precinct with supermarkets, restaurants, bars and cafes
- Rhodes Peninsula, which includes a major shopping centre (Rhodes Waterside)
- Ashfield Town Centre along Liverpool Road, which includes a major shopping centre (Ashfield Mall) and restaurants
- Strathfield Town Centre, which includes a major shopping precinct and Strathfield Plaza shopping centre along The Boulevard
- Majors Bay Road Shopping Village – a retail and commercial strip with cafes and restaurants.

Neighbourhood shopping areas close to the local study area include:

- Ramsay Street, Haberfield
- Concord Road, North Strathfield.

## 5.4 Access and Connectivity

Whilst the arterial roads that facilitate through traffic are central to access and connectivity in the study area, their high traffic volumes and congestion can act as barriers to local access and connectivity. Parramatta Road, the M4, Wattle Street, Concord Road and Homebush Bay Drive/Centenary Drive provide the key east-west and north-south routes within the project local study area. Slow travel times and intersection delays can deter local and regional travel that crosses these routes. This road infrastructure also offers low amenity for pedestrian, cyclists and motorists. Local roads on the other hand offer streetscapes with trees and heritage housing, lower speed and quieter environments and the opportunity for pedestrian and cyclist movements.

The local study area is well located for public transport, as discussed below. With proximity to employment and regional recreation centres, the area is also proposed to host three urban renewal precincts at Homebush, Burwood and Kings Bay as part of the Draft Parramatta Road Urban Renewal Strategy.

### 5.4.1 Public transport

There are seven train stations proximal to the local study area. Strathfield is a major interchange on the Sydney Trains network. Strathfield and Burwood stations (to the south) also accommodate the highest volume of passengers due to the large number of AM and PM peak services. **Table 5.7** below details the train lines available at each station.

**Table 5.7 Train station details**

Station	Train services
North Strathfield	T1 Northern Line
Flemington	T2 Inner West and South Line
Homebush	T2 Inner West and South Line
<b>Strathfield</b>	T1 North Shore and Northern Line T1 Northern Line T1 Western Line T2 Inner West and South Line T6 Carlingford Line Blue Mountains Line Central Coast and Newcastle Line
Burwood	T1 North Shore and Northern Line T1 Northern Line T1 Western Line T2 Inner West and South Line T6 Carlingford Line
Croydon	T2 Inner West and South Line
Ashfield	T2 Inner West and South Line

As displayed in **Figure 5.16**, multiple buses travel throughout the area, linking the suburbs in the west with the inner west and the Sydney CBD. Those bus routes which travel along sections of Parramatta Road between Homebush Bay Drive and Wattle Street relevant to this study are summarised in **Table 5.8** below. Six of these routes cross Parramatta Road during peak periods between Homebush Bay Drive and Wattle Street.

**Table 5.8 Bus route details**

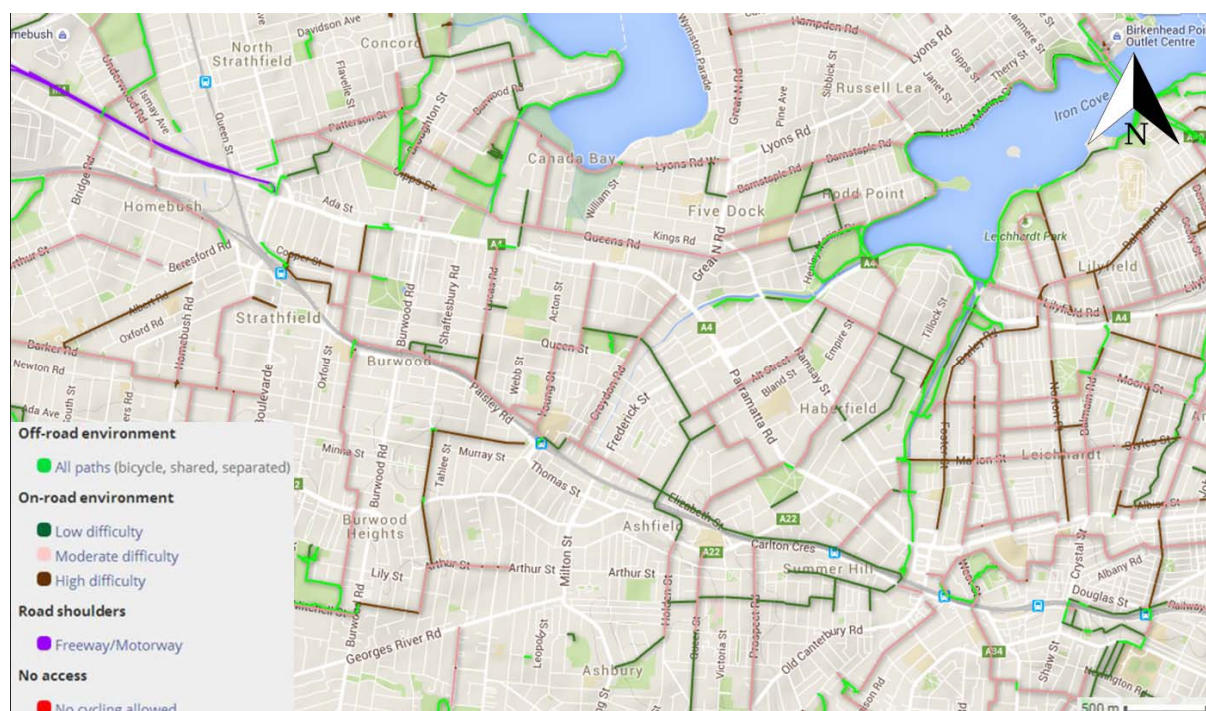
Relevant road	Bus number	Route
Underwood Road / Parramatta Road	525	Parramatta – Newington – Burwood
	526	Sydney Olympic Park Wharf – Newington – Strathfield
Parramatta Road	415	Campsie – Strathfield – Burwood – Chiswick
	461	Burwood – Parramatta Road – City – Domain
	490	Drummoyne – Burwood – Kingsgrove – Hurstville
	491	Five Dock – Canterbury – Bardwell Park – Hurstville
	492	Drummoyne – Burwood – Kingsgrove – Rockdale



## 5.4.2 Pedestrians and cyclists

The nature of the pedestrian network in the region varies. Residential areas generally provide good local walking connections and footpaths, particularly in areas away from major roads. Sydney Markets, Sydney Olympic Park, Rhodes and Burwood are located in the region and within walking distance to rail station and bus connections. There are a limited number of signalised pedestrian crossings on Parramatta Road, with the distance between signalised pedestrian crossings is up to 800 metres in some sections. Generally, arterial roads and rail lines in the region inhibit or deter pedestrians and cyclists, but also motorists. The key transport barrier for local communities, as noted by all councils was Parramatta Road, due long intersection and journey times and limited pedestrian and cyclist amenity and crossing points

**Figure 5.17** shows the existing cycling network that surrounds or intersects through the project area. There are limited segregated cycling facilities along the Parramatta Road corridor. Dedicated cycleways or cycle lanes are generally aimed towards leisure rather than commuter trips. There are major gaps in north-south connections, due to the lack of permeability of Parramatta Road and the M4. Cyclists currently use the shoulders of the existing M4. In the eastbound direction, cyclists are required to leave the motorway at Sydney Street due to the inadequate shoulder east of Sydney Street. In the westbound direction, cyclists access the M4 from the westbound on-ramp at Concord Road, due to the inadequate shoulder east of this location. Of relevance to the project, Bill Boyce Reserve in Homebush (which will be occupied for construction) is located on a pedestrian and cycle route which links to the south side of the M4 via an adjacent pedestrian bridge.



**Figure 5.17** Existing cycling network within the project area. (Source: NSW Government, bicycle information for NSW Cycleway Finder V2, 2015)

## 5.5 Community values and issues

Project consultation has comprehensively explored community concerns with regard to the project. Of relevance to the social impacts assessment these concerns largely relate to changes in access, impacts to social infrastructure including open space, loss of community connections resulting from changes to local roads/character, road safety and traffic congestion, construction amenity impact and operational air quality. These concerns are also reflected in the targeted consultation held with local Councils and social infrastructure providers in the project local study area.

### 5.5.1 Issues raised by councils and social infrastructure providers

Consulting with councils which would be directly affected by the project (i.e. the project passes through the LGA) was undertaken between May 2014 and August 2015. These were Ashfield, Burwood, Canada Bay, Strathfield and Auburn Councils. WDA also consulted with social infrastructure providers, including some of those directly affected (i.e. by property acquisition) and those indirectly affected by impacts such as changes to access and amenity. Some providers declined the opportunity to comment.

The consultations informed the social impact assessment providing contextual insight into the area and potential impact and mitigation identification. **Table 5.9** summarises potential impacts and suggested mitigation measures identified by the Councils which are specific to their local areas. **Table 5.10** summarises those recommended by social infrastructure providers.

**Table 5.9 Summary of additional concerns raised in local council consultations**

<b>Council</b>	<b>Potential impacts identified by council</b>	<b>Mitigations suggested by council</b>
Ashfield	<p>Construction</p> <ul style="list-style-type: none"> <li>• Traffic congestion in particular around the Infants Home</li> <li>• Impact on traffic, pedestrian and cycling access in particular to Parramatta Road and Ashfield Station</li> <li>• Impact on north-south connectivity for communities living on either side of Parramatta Road</li> <li>• Reduced access to schools, childcare and aged care facilities</li> <li>• Impact on the mobility, safety, connectivity and isolation of older residents</li> <li>• Increased travel time impacting on health and wellbeing</li> </ul>	<ul style="list-style-type: none"> <li>• Provide more pedestrian crossings over Parramatta Road</li> <li>• Increase community access to Yasmar, improve facilities and provide public open space onsite</li> <li>• Improve connections between Ashfield and Haberfield</li> <li>• Increase open space and provide new/upgraded community facilities.</li> </ul>
Burwood	<p>Operation</p> <ul style="list-style-type: none"> <li>• Increased traffic on local road network.</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure adequate consultation with, and compensation and support for those residents whose properties will be acquired</li> <li>• Implementing a communication strategy throughout construction (e.g. road signage, community meetings, information sessions with interpreters, written information translated into community languages).</li> <li>• Need to link WestConnex and the Parramatta Road Revitalisation clearly for residents to associate the benefits from WestConnex</li> <li>• Improve pedestrian crossings over Parramatta Road</li> <li>• Encourage more buses along Parramatta Road</li> </ul>

Council	Potential impacts identified by council	Mitigations suggested by council
Canada Bay	<p>Construction</p> <ul style="list-style-type: none"> <li>• Impact on street trees</li> </ul> <p>Operation</p> <ul style="list-style-type: none"> <li>• Benefits associated with reducing traffic on Parramatta Road, increased public transport, enabling the renewal of Parramatta Road for improved urban design and access</li> <li>• Impact of property acquisition on community cohesion.</li> </ul>	<ul style="list-style-type: none"> <li>• Work with Burwood LAC to identify opportunities to address crime issues through CPTED initiatives and urban design</li> <li>• Public art could help soften hard infrastructure associated with the project. An integrated public art project could be established with the other councils along the corridor</li> <li>• Wayfinding and signage for pedestrians and cyclists. Signage could integrate art or design and project updates</li> <li>• Pop-up cafes and shops could activate streets during construction, and provide economic opportunities for local businesses (e.g. construction workers buying local food options)</li> <li>• Plant street trees to enhance the streetscape as part of urban design.</li> </ul>
Strathfield	<p>Construction</p> <ul style="list-style-type: none"> <li>• Journey disruptions and increased traffic in areas such as: <ul style="list-style-type: none"> <li>– The former Ford Factory development on Birnie Ave would occur at the same time</li> <li>– Underwood Road</li> </ul> </li> <li>• Impact on pedestrian access including reduced access crossing Centenary Drive to access Flemington Station and Flemington Markets</li> <li>• Concern about proximity of ventilation stacks to residential areas.</li> </ul> <p>Operation</p> <ul style="list-style-type: none"> <li>• Financial impact of tolls on community members</li> <li>• Impact on local heritage and biodiversity</li> <li>• Reduced access to adjacent residential and commercial areas.</li> </ul>	<ul style="list-style-type: none"> <li>• Extensive landscaping to improve visual amenity</li> <li>• New cycle paths to ensure good connectivity to other areas</li> <li>• Consult residents directly (including Chinese, Indian and Korean communities).</li> </ul>
Auburn	Ongoing issues with impacts to cycleways	<ul style="list-style-type: none"> <li>• Consider other options for cycle path alignments and plans</li> <li>• Greater engagement with bicycle user groups.</li> </ul>

**Table 5.10 Summary of social infrastructure consultations**

<b>Social infrastructure provider</b>	<b>Potential impacts identified by providers</b>	<b>Mitigations suggested by social infrastructure providers</b>
<b>Directly affected</b>		
Sydney Cheil Uniting Church (Concord Road/Sydney Street)	<p>Construction:</p> <ul style="list-style-type: none"> <li>Loss of green space and car parking from partial property acquisition.</li> </ul> <p>Operation:</p> <ul style="list-style-type: none"> <li>Change to traffic flow</li> <li>Amenity impacts (e.g. noise and visual)</li> <li>Impact on parking.</li> </ul>	<ul style="list-style-type: none"> <li>Acquisition of nearby residual land to replace the loss of car parking</li> <li>Noise walls.</li> </ul>
<b>Adjacent to the project</b>		
West's Tigers (Concord Oval, Cintra Park and St Lukes Park)	<p>Construction:</p> <ul style="list-style-type: none"> <li>Disruption to training due to Cintra Park Hockey Field relocation to St Lukes oval</li> <li>Concern that the club may need to find alternate training fields</li> <li>Noise, dust and air quality impacts</li> <li>Impacts to local roads and parking (including Concord Oval car park) from construction workers.</li> </ul>	<ul style="list-style-type: none"> <li>Communication about works at St Lukes ovals</li> <li>Noise walls.</li> </ul>
Inter Lions Soccer Club (Concord Oval)	Did not raise any concerns about the project construction or operation.	
Jehovah's Witnesses Kingdom Hall	Did not raise any concerns about the project construction or operation.	
The Willows Private Nursing Home	<p>Construction:</p> <ul style="list-style-type: none"> <li>Impact on access for staff, deliveries, patient transport and emergency services</li> <li>Noise impacts and duration of construction works</li> <li>Changed access due to relocation of bus stop (route 406)</li> <li>Reduced privacy for residents.</li> </ul>	<ul style="list-style-type: none"> <li>Provide route information to home to notify suppliers and service providers</li> <li>Identify the home as a sensitive receiver and monitor noise regularly</li> <li>Provide information on timing and impact of works to residents and staff.</li> </ul>
Yasmar Training Facility	<p>Construction:</p> <ul style="list-style-type: none"> <li>Loss of Philip Lodge (hotel on Parramatta Road to be acquired) accommodation for trainees</li> <li>Changed access due to relocation of bus stop (route 406)</li> <li>Changed pedestrian access.</li> </ul>	<ul style="list-style-type: none"> <li>Communication about Philip Lodge closure</li> <li>Ensure wayfinding to Yasmar is clear.</li> </ul>
Haberfield Presbyterian Aged Care (Parramatta Road)	<p>Construction:</p> <ul style="list-style-type: none"> <li>Noise and dust impacts.</li> </ul>	

Social infrastructure provider	Potential impacts identified by providers	Mitigations suggested by social infrastructure providers
<b>In the local study area</b>		
The Infants Home (Bland Street)	Construction: <ul style="list-style-type: none"> <li>Impacts on access and parking.</li> </ul> Operation: <ul style="list-style-type: none"> <li>Air quality and visual impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Air quality monitoring</li> </ul>
Haberfield Public School	Construction: <ul style="list-style-type: none"> <li>Impact on children's safety</li> <li>Construction noise impacts.</li> </ul> Operation: <ul style="list-style-type: none"> <li>Impact on children's safety</li> <li>Air quality impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Participation in the consultative committee on air quality</li> <li>Air quality monitor at the school before construction.</li> </ul>
St. Andrew's Anglican Church, Strathfield	Construction: <ul style="list-style-type: none"> <li>Impact to local roads and parking from construction workers</li> <li>Traffic noise impacts on church activities.</li> </ul> Operation: <ul style="list-style-type: none"> <li>Traffic congestion, noise and parking impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Temporary sound barriers during construction.</li> </ul>
Concord Baptist Church	Operation: <ul style="list-style-type: none"> <li>Changed access due to closure of Carrington Street</li> <li>Air quality impacts from ventilation outlets.</li> </ul>	
Ashfield Bowling Club	Construction: <ul style="list-style-type: none"> <li>Changed access due to relocation of bus stop (route 406)</li> <li>Impact to local roads and parking on patrons and deliveries from construction workers</li> <li>Amenity and safety impacts from haulage trucks.</li> </ul> Operation: <ul style="list-style-type: none"> <li>Amenity impact from increased traffic on Orpington Street</li> <li>Impact on street parking.</li> </ul>	<ul style="list-style-type: none"> <li>Signage to notify proposed relocation of bus stop</li> <li>Introduce resident parking stickers and timed parking</li> <li>Investigate shuttle service for construction workers</li> <li>Ensure Orpington Street is not used as a haulage route.</li> </ul>

## 5.5.2 Community values

Community values are those that residents and workers consider important for their wellbeing and the liveability of the communities and workplaces. These provide a broad context for understanding how social impacts will be experienced by communities.

The Council strategic plans discussed in **section 4.7**, the community demographic profile and consultations have informed this understanding of social values in the local and regional areas, as follows;

- Amenity and character – including public open and active places, attractive, clean and safe streetscapes, urban villages, built heritage, innovation, places that are activated and bring people together
- Accessibility – equality and affordability of access to facilities and services, safe, healthy, active and efficient transport and public transport access to places people need and want to go

- Diversity – in language and culture, facilities and economy
- Connectedness – inclusive with a sense of community cohesion

## 6 Assessment of construction impacts

### 6.1 Overview of social assessment of construction impacts

Social impacts of project construction are expected to vary between temporary (less than one year) to short-term (between one and three years) during the three year construction period. This section discusses the short-term impacts for issues related to:

- Specific impacts to social infrastructure
- Access and connectivity
- Changes in amenity

This section also considers permanent impacts of residential and social infrastructure property acquisition required as part of the project.

While some types of impacts would be common across the project at the regional level, other issues will be more localised and affect smaller and more discrete populations. This assessment considers both the overarching issues and also specific considerations for the impact in each local precinct (where appropriate).

### 6.2 Property and household impacts

#### 6.2.1 Overview

Full acquisition will be required of 167 residential dwellings, partial acquisition of 15 residential properties. In addition, the project will involve the use of a further 98 properties owned by Roads and Maritime. All properties will need to be vacated by the end of the first quarter of 2016, to enable construction to commence in mid 2016. . A detailed list of required properties is contained in **Appendix F**.

Conservatively, assuming that the Roads and Maritime properties are already vacant, it is likely that property requirements for the project would result in the relocation of 168 dwellings or households.

**Table 6.1 Summary of residential dwellings to be acquired as part of the project**

	Homebush	Concord	Wattle Street	Parramatta Road	Total
<b>Total residential dwellings to be fully acquired</b>	<b>14</b>	<b>46</b>	<b>83</b>	<b>25</b>	<b>168</b>

(Source: Compiled with data supplied by WDA)

Note: There is no residential property acquisition required in the Cintra Park precinct. This assessment focusses on affected dwellings, however this may be different from the number of properties as one property may support multiple dwellings.

Roads and Maritime has the authority to acquire property under the *NSW Roads Act (1993)* either by agreement or through a compulsory acquisition process. Land acquisition is being undertaken by Roads and Maritime in accordance with the *Land Acquisition (Just Terms Compensation) Act NSW 1991* (the Act) and the *Roads and Maritime Land Acquisition Information Guide* (Roads and Maritime, 2014), aiming to achieve a negotiated agreement wherever possible. The Act and Guide outline an owner's entitlement to compensation for their land being acquired. This includes;

- The market value of the property
- Any special value, meaning the financial value of any advantage, in addition to market value
- Severance or the amount of any reduction in the market value of any other land of the person entitled to compensation
- Disturbance, including legal costs, valuation fees, relocation costs, stamp duty costs, mortgage discharge and execution fees or other financial costs reasonably incurred

- Solatium, meaning financial compensation to a person for non-financial disadvantage resulting from the necessity of the person to relocate his/her principal place of residence as a result of acquisition
- Any increase or decrease in the value of adjoining or severed land (by reason of the carrying out of, or the proposal to carry out, the public purpose for which the land was acquired).

WDA commenced a process of voluntary acquisition of residential properties in November 2013. Subsequently in June 2015 WDA and RMS notified individual property owners that their property was required by the preferred design, with information on the land acquisition process also provided. Valuations by RMS and property owners were subsequently sought and negotiations commenced. Some residential acquisition agreements have already been concluded.

Additionally, WDA is providing access for affected households to a counselling service, WestConnex Assist to support affected households in negotiating the land acquisition process. This service provides short-term, results-focused support to help people adapt to changes brought by the property acquisition process, and can also on-refer clients to other service providers as required.

WDA is also providing an independent service to vulnerable households (e.g. elderly, those suffering an illness) to help assist with their relocation. This service aims to provide assistance with tasks such as finding a new property (either to rent or purchase), arranging removalists, disconnection of services (electricity, gas etc.), attending appointments with solicitors and other tasks associated with relocating. With nine present of people in the region over the age of 70 years and 4.6 per cent needing assistance for their daily needs, this support will be imperative to mitigating relocation disruption.

WDA is also working with Roads and Maritime to provide community relations support in the project area to respond to community issues, concerns and requests and offers a translation service for those households for whom English is a second language.

Choosing a new home, and moving house, especially for property owners and long term tenants can be amongst the most significant events in people's lives. A house provides the focus for the operation of its householders, and the location can significantly influence how they travel to work or study, visit family and friends, and access services both locally and regionally. As such, minimising dislocation of affected households from their existing socio-economic networks is a key consideration in avoiding social risks to those affected by property acquisition.

The social risks related to land acquisition include:

- Inaccessibility of equivalent housing at a comparable cost – if compensation does not allow property owners to access similar housing in the local area which may result in:
  - Relocation to other areas where affordable properties can be purchased
  - Increased indebtedness to remain in the area
- Relocation health risks – relocation can be an emotionally and physically taxing process, especially when externally instigated. 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 relocating
- Altered access to social infrastructure – if land acquisition results in households needing to move to other areas, this may affect continuing access to:
  - Social services (e.g. proximity to health services, changes in school catchments, availability of child care services)
  - Family and local social networks (including sporting, social and recreation groups).

In general, renting households tend to have less emotional investment in their properties, have shorter residence periods and are therefore likely more adaptable to such changes. However it should be noted that renters can occupy properties for long periods, or rent properties within the same local area for extended periods of time, leading to strong connections to their homes and/or communities.

Of the 168 households to be relocated, it is estimated that 40 per cent would be renting and 60 per cent would own or hold a mortgage on their property. While for some households acquisition may present an opportunity to downsize, upsize, or otherwise move on (e.g. to other areas, or to alternative accommodation such as aged care facilities for elderly residents), it is expected that the majority of owner occupiers would aim to relocate within the local area. Many landlords may also be less emotionally invested in their property and the local area.

The social risks inherent to the land acquisition process (mentioned above) are compounded by the scope and context of the project, specifically: the rapid pace of project development resulting in periods of just nine months for some households to find replacement housing; property market volatility and recent appreciation; and any increase in local market competition from acquired property owners. Additionally, project land acquisition will reduce available housing stock in the local area. In many cases the affected properties are already in less desirable locations (e.g. on major roads) and may be of lower value than other functionally similar properties in the area.

The Act supports people having their land acquired to be reimbursed for seeking independent legal advice and valuations. RMS' practice is to support this through a reimbursement process at settlement if a property is acquired by agreement. This provision puts the onus on the landowner to incur costs and/or seek payment for advice, which can complicate the process and potentially act as a disincentive to exercising this right. There is some flexibility within this process and WDA/RMS is exercising this on a case by case basis, for example allowing these costs to be met at the time they are incurred ensuring affected households are not left out of pocket before settlement.

Overall, it is anticipated that the social impacts of relocating for many of the directly affected households would be a major short term impact. For some households who may wish to relocate locally but are unable to, the impact may involve dislocation of social networks and disruption and change to daily routines (work, study, recreation etc.). There may also be a risk of households taking on increased indebtedness or entering rental stress in order to remain in the area..

The preliminary concept design from November 2013 involved impact on public open space (Ashfield Park), heritage items (e.g. Yasmar) and sensitive social infrastructure (e.g. relocation of Haberfield Aged Care and Peek-A-Boo Early Learning Centre). The preferred design the subject of the EIS by comparison represents a reduced impact to these key social infrastructure assets which are highly valued by the local community.

The preferred design also seeks to minimise future land acquisition and disturbance relating to the possible future development of the M4–M5 Link. Developing the tunnel stubs, on and off ramps and ventilation facility for the M4–M5 Link concurrently with the construction of the project would help to minimise land acquisition and construction disturbance in the local study area in the future.

Unfamiliarity and uncertainty about potential property acquisition process has the potential to cause stress and anxiety for some residents, business owners and employees located near the project, potentially impacting on health, well-being and quality of life. Consultation with affected residents and media coverage indicate that this effect is currently being experienced by some people, with concerns about potential property impacts and uncertainty relating to decisions about buying or selling properties.

This uncertainty has been exacerbated by changes to the project footprint whereby properties identified as required for acquisition in November 2013 are no longer required, whilst others who did not expect to be impacted were advised in June 2015 that their properties now needed to be acquired.

## 6.2.2 Homebush precinct

Land acquisition as a result of the project in this precinct would result in the relocation of 14 households located on Ismay Avenue, Allen and Short Streets and Underwood Road. Property acquisition is illustrated in **Figure 6.1**. One property would also be partially acquired. With an average household size in the precinct of 2.8 persons, it is likely that acquisition would require the relocation of approximately 39 people.

ABS census data for the precinct indicates that owner occupiers represent almost 60 per cent of the residential population and that on average they are more likely younger family households. The census data indicates low levels of vulnerability for the precinct, including higher levels of English language skills, low levels of need for assistance with daily activities and relatively higher incomes, and thus a community less vulnerable to change.

Many of the households being relocated would likely seek to relocate locally. Several of the properties are directly adjacent to the existing M4 (separated by noise walls), with three properties owned by Roads and Maritime. The loss of a relatively small number of properties in several pockets within the Homebush precinct is not considered significant to cohesion of the community at the local level.

The Bill Boyce Reserve and the Strathfield Council owned Girl Guide Hall on Ismay Avenue would be acquired for the project in addition to a small amount of land from the Powells Creek/Arnotts Reserve. These impacts are discussed under social infrastructure in **section 6.3.1**.

### 6.2.3 Concord precinct

Land acquisition as a result of the project in this precinct would result in the relocation of 46 households located along Concord Road, Sydney and Young streets to the west, and Edward Street to the east of Concord Road. Property acquisition is illustrated in **Figure 6.2**. Two properties in this precinct would also be partially acquired. Roads and Maritime also own 8 residential properties which will be required. With an average household size in the precinct of 2.8 persons, it is likely that acquisition would require the relocation of approximately 129 people.

With the exception of Edward Street, these properties are on or surrounded by heavily trafficked roads and experience the consequent noise and amenity impacts. As a consequence, these properties are likely of relatively lower value than those in other areas of Concord.

Two rental properties to be acquired on Concord Road are public housing. There is little public housing in the area (less than one per cent in the precinct compared with three per cent in the region and 4.7 per cent in Greater Sydney), so loss of public housing in the area is of detriment to housing diversity in the area. The social housing tenants will be provided replacement accommodation and assisted to relocate. If public housing is not available locally, tenants may have to relocate outside of their existing socio-economic networks, potentially leading to further disadvantage in the short term.

Maintaining and increasing the availability of affordable housing and particularly social housing is an important social issue throughout Sydney as there are already low levels of social housing in Concord. Providing affordable housing as a component of potential redevelopment of residual land and urban renewal could deliver significant benefits to the community in the long term.

In this area, consultation with some affected residents has indicated the proximity to Concord Hospital and the Strathfield transport interchange are key locational advantages to the area, and these considerations may influence how they choose the location of future housing.

For this precinct, property acquisition would not result in severance of communities or isolation of properties, and is not considered likely to impact on the cohesion of the community at the local level.

The project would require the acquisition of a strip of land from the Sydney Cheil Uniting Church on the corner of Concord Road and Sydney Street. These impacts are discussed under social infrastructure in **section 6.3.2**.



Figure 6.1 Property acquisition and residual land - Map 1



Figure 6.2 Property acquisition and residual land - Map 2

## 6.2.4 Cintra Park precinct

There is no residential property acquisition required in the Cintra Park precinct. The project would utilise the area occupied by the Cintra Park Hockey Field and the adjacent unsealed overflow car park on the northern side of Concord Oval. The precinct is illustrated in **Figure 6.3**.

The car park would be upgraded for construction vehicle parking during the week. On weekend game days during agreed times, parking for project personnel would be limited to allow for public use. At the conclusion of the construction period the residual land not required for operational purposes is to be returned for use as open space, and the parking area is intended to be returned for use as public parking.

## 6.2.5 Wattle Street precinct

Land acquisition as a result of the project would impact on 83 households in this precinct. The affected dwellings are primarily located along Wattle Street, Parramatta Road, and include some adjoining properties in Wolseley, Northcote, Ramsay and Martin Streets and Walker Avenue. Roads and Maritime also own 24 properties which will be utilised for the project. In addition, there are four residential properties which would be partially acquired. Property acquisition is illustrated in **Figure 6.4**.

With an average household size in the precinct of 2.7 persons, it is likely that acquisition would require the relocation of approximately 224 people. Generally, residents in this precinct are older, with higher rates of home ownership and longer stability in tenure. They also have median household incomes above that of the region and Sydney, indicating both a potential capacity for change but also a strong connection to place.

For this precinct, proposed land acquisition and construction works along Wattle Street would result in further division of the local community to either side of Wattle Street. The demolition of a relatively large number of homes of heritage value in a community with a strong connection to place is expected to have a moderate impact on the cohesion of the community at a local level.

## 6.2.6 Parramatta Road precinct

Land acquisition as a result of the project would impact 25 dwellings and likely 25 households in this precinct. These properties primarily front the southern side of Parramatta Road and adjoining areas of Chandos Street. Property acquisition is illustrated in **Figure 6.5**. With an average household size in the precinct of 2.4 persons, it is likely that acquisition would require the relocation of approximately 60 people. In addition, there is one residential property which would be partially acquired.

The social profile in **section 5.2.5** indicates that residents in the precinct are more likely to move house more often, have a greater likelihood of needing assistance, live in single person households, and experience greater relative socio-economic disadvantage. This indicates that some affected households in this precinct may have a lower capacity to adjust to the changes brought about by acquisition.

For this precinct, proposed land acquisition and construction works along Parramatta Road would reinforce the existing severance created by this road between the adjacent residential suburbs of Ashfield and Haberfield. In addition, a number of the properties to be acquired along Parramatta Road are relatively isolated and surrounded by commercial and vacant properties. As a result this is not considered likely to significantly impact on the cohesion of the community at the local level.

The Zongde Temple on Parramatta Road would also be acquired for the project. These impacts are discussed under social infrastructure in **section 6.3.5**.



Figure 6.3 Property acquisition and residual land - Map 3



Figure 6.4 Property acquisition and residual land - Map 4

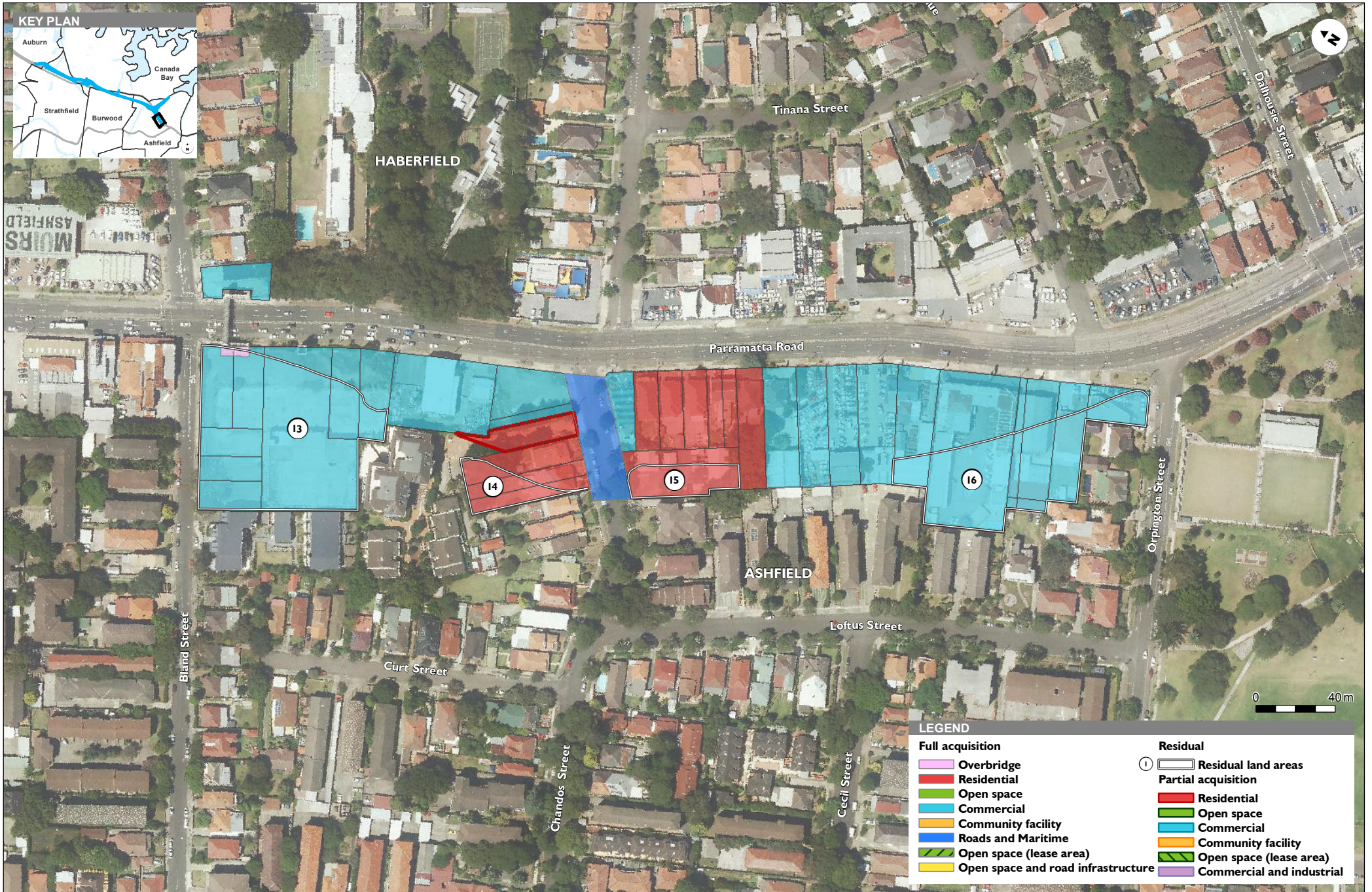


Figure 6.5 Property acquisition and residual land - Map 5

## 6.3 Social infrastructure

As mentioned in **section 6.2.1**, the preferred design, the subject of the EIS, has resulted in fewer and less severe impacts to social infrastructure in the project area compared to the preliminary concept design. The preferred design has avoided the need to acquire Haberfield Aged Care and Peek-A-Boo Early Learning Centre. It has also avoided land acquisition for the heritage listed Yasmar property and the heritage listed and socially important Ashfield Park.

Social infrastructure facilities and open spaces that would be acquired by the project include:

- Strathfield Girl Guides Hall (Strathfield Council)
- Powells Creek/Arnotts Reserve (Strathfield Council)
- Zongde Buddhist Temple
- Sydney Cheil Uniting Church (partial acquisition along its Concord Road frontage).

The leasing of four parcels of land would result in loss of public access to the following open spaces during construction:

- Bill Boyce Reserve at Pomeroy Street (managed by Strathfield Council) – 100 percent loss during construction
- Parts of Reg Coady Reserve at Wattle Street (managed by Ashfield Council) – approximately 6 percent of it's area up to Dobroyd Canal used during construction
- Vacant land located west of Powells Creek (locally referred to as Arnotts Reserve) adjacent to the northern side of Parramatta Road which is managed by Strathfield Council and is proposed to be developed for open space - approximately 19 percent used during construction
- Cintra Park hockey field -100 percent loss during construction although the facility is to be relocated nearby to St.Lukes Park.

Other social infrastructure, due to their proximity to the construction ancillary facilities, would be affected by noise, traffic, vibration and visual impacts during construction. The location of social infrastructure within each precinct is shown in **Figure 5.11**.

The impacts associated with acquisition and changes to amenity and access for social infrastructure are discussed for each precinct below.

### 6.3.1 Homebush precinct

#### **Directly affected**

##### *Strathfield Girl Guides Hall*

Acquisition of the council-owned Strathfield Girl Guides Hall on Ismay Avenue would require the relocation of the organisation. WDA are in discussions with Strathfield Council regarding interim accommodation for the Girl Guides.

Strathfield Council would undertake consultation with the operators of the Girl Guides to ensure the needs of the organisation and other users are met during temporary relocation. It is anticipated that relocation of the organisation would be within Homebush or adjoining suburbs and that this would result in a short term, minor impact on access for members.

##### *Bill Boyce Reserve*

The use of Bill Boyce Reserve during construction would result in the entire reserve being unavailable for use by the public. This would result in a small reduction in open space within the community during the construction phase. It is located on a pedestrian and cycle route which links to the south side of the M4 via an adjacent pedestrian bridge.

This reserve is a passive recreation park separating the existing M4 from adjacent properties. The location of similar nearby passive open space on Wentworth Street is expected to adequately meet the needs of the local community during construction. The park would be restored and returned to public use at the conclusion of construction works.

### *Powells Creek/Arnotts Reserve*

The project would involve leasing a parcel of land within Arnotts Reserve adjacent to Powells Creek for the purpose of a construction ancillary facility, and acquiring small areas for the siting of pylons for the new westbound on-ramp to the M4. This land is currently not available for use by the public and therefore its use during construction would not result in any impacts on the community.

This land is however identified for future redevelopment as parkland as part of the *Powells Creek Masterplan* prepared by Strathfield Council. The loss of this land during construction may lead to a minor, short term impact on visual amenity for the local community.

### **Indirectly affected**

As discussed in **section 6.3**, amenity impacts, primarily related to noise and traffic would also affect other local facilities including:

- Our Lady of the Assumption Catholic Church
- St Michael's Serbian Orthodox Church
- Arnotts Reserve
- Wentworth Road Park.

#### *Our Lady of Assumption Catholic Church*

Our Lady of Assumption Catholic Church is located on Underwood Road, diagonally adjacent to the Underwood Road construction compound. The current view from the church presents a relatively quiet, leafy outlook which during construction would alter to one of construction hoarding and increased traffic.

The church may also experience considerable noise and traffic impacts due to its close proximity to the Underwood Road construction compounds. Our Lady of the Assumption has regular mass five mornings and three evenings per week as well as other events and services at various times. The loss of local parking for construction work zones would also reduce available parking for congregation members to attend these services. The church likely already experiences considerable traffic noise from the M4. The impact to the amenity of church services is expected to have a short term moderate impact for church members.

#### *St Michael's Serbian Orthodox Church*

St Michael's is a small church located on Wentworth Street providing services to the Serbian Orthodox community, with regular services held on Saturday evenings and Sunday mornings. The church is already subject to considerable traffic noise impacts from the M4. The impact to the amenity of church services is expected to have a short term minor impact for church members.

Both churches would be assessed for the appropriateness for architectural treatments to ameliorate operational traffic noise impacts. If these are required, it is recommended that these be implemented in advance of construction so that they can mitigate noise impacts during both construction and operation.

#### *Arnotts Reserve and Wentworth Road Park*

Arnotts Reserve, located on Allen Street (to the north of the M4 as separate to the undeveloped Powells Creek site to the south of the M4 which is also referred to as Arnotts Reserve) has recently been upgraded. Wentworth Road Park is a local playground and park. Arnotts Reserve is adjacent to the Underwood Road tunnel and civil site and Wentworth Road Park is in close proximity to the construction corridor. Both are expected to experience reduced amenity as a result of construction noise and visual impacts.

### 6.3.2 Concord Road precinct

#### **Directly affected**

##### *Sydney Cheil Uniting Church*

A strip of land along the Concord Road frontage of the Sydney Cheil Uniting Church would be acquired for the project. This area currently comprises green space and four car parking spaces. The green space includes a children's playground and sandpit, and is the only green space in the church grounds. Parking is already an issue in the area and for the Church.

Replacement of green space and parking are the two key concerns of the Church as their loss would affect the amenity for patrons, and the ability to accommodate members, with the congregation drawn from a large catchment (10–15 kilometres). The acquisition would also result in the removal of the mature screen tree plants and of sandstone gateposts and a sandstone cobble driveway which have historical and aesthetic significance. Changes to the cul-de-sac of Sydney Street and driveway access to the church are minor impacts.

WDA is working with the church to explore opportunities for increasing access to green space and parking at the conclusion of construction, as the green space and children's play area are significant features of the property for regular outdoor social uses for the 300–350 strong congregation. The church grounds, entrance gates and boundary fence would be re-established along the new Concord Road boundary on completion of construction works

#### **Indirectly affected**

##### *Concord Baptist Church*

The Concord Baptist Church is located just north of the Concord Road civil and tunnel site (C5). The Church may experience local amenity impacts from noise and traffic, but has not expressed concerns in this regard. They consider the permanent closure of nearby Carrington Street to be a minor impact with regard to access and convenience, but have also expressed concern about air quality impacts.

##### *St Andrew's Anglican Church*

St Andrew's Anglican Church is located on Swan Street, just to the south of current M4 and Parramatta Road intersection, with activities primarily focused on Sunday and Tuesday evenings, which are provided in both English and Korean. The church raised concerns with regard to potential for local parking competition with contractors, and construction noise impacts, however these are expected to be negligible for parking and minor for noise.

### 6.3.3 Cintra Park precinct

The project would require the acquisition of the Cintra Park site which is currently occupied by a hockey field. The existing hockey field is being relocated to the north side of Gipps Street in St Lukes Park, under a separate environmental assessment process. The *St Lukes Sporting Facility Works Review of Environmental Factors* (WDA, 2015) included consultation with users of St Lukes Park, Canada Bay Council and Briars Hockey Club who are the key users of the Cintra Park facility. The proposal included proposed staging of the construction of the new hockey field and associated amenities building so that as far as practicable the existing hockey field at Cintra Park would not be decommissioned until the new hockey field at St Lukes Park is constructed and commissioned. This would ensure that there would be no loss of hockey field availability during the hockey season.

Careful staging of the proposed works in coordination with the organisations that use the sporting fields at St Lukes would mitigate temporary impacts on these users. The new site has been agreed by Canada Bay Council and can be constructed without any permanent reduction in the number of playing fields. The relocation of the hockey facility within the immediate vicinity of the existing site means that there would be limited impacts on accessibility for users and sports spectators.

The Cintra Park location for the construction ancillary facility was considered to be more appropriate than other alternatives including Burwood bus depot on the south side of Parramatta Road. The Burwood bus depot is an important operational site which is located centrally to serve the bus network. To relocate the bus depot would likely involve significant land acquisition and given the nature of the depot operations would potentially create amenity conflicts with surrounding land uses.

Concord Oval is adjacent and to the west of Cintra Park and is currently head office and training venue for the West Tigers NRL, the home ground of the West Harbour Rugby Football Club. It is also used by Inter Lions Soccer Club. West Tigers and West Harbour Rugby also use the adjacent St Lukes Park and have been involved in consultation in relation to the relocation of Cintra Park to St Lukes Park.

West Tigers have 100 to 120 players and undertake training sessions 6 days a week at Concord Oval where they also have their head office and gym facilities. The venue is also used for community events but not matches. Consultation with West Tigers (see **Chapter 7** (consultation)) indicates that their concerns are largely related to potential noise (coaches and players being able to be heard outdoors), air quality and car parking impacts. As there are limited events which draw large crowds of supporters, social impacts to their supporters (in regard to amenity and accessibility) are considered minor. As West Tigers also use the St Lukes fields for training sessions for their lower grade teams, an upgrade of St Lukes grounds and facilities would be of benefit to the club.

West Harbour Rugby use Concord Oval for matches on Saturdays between March and September, with club games attracting crowds of around 2,000 spectators and finals matched around 20,000 people. The site also includes an office, warehouse and gym which provides affordable access for its members, around half of whom are Pacific Islanders. The club also uses St Lukes Park for training.

The Inter Lions Soccer Club is a local soccer club of about 500 members which holds games at Concord Oval all day Sundays. Consultation with the club did not indicate any concerns about construction or operation of the project.

Social impacts to users of Concord Oval during construction will be primarily related to amenity impacts from noise and dust. The existing spectator grandstand on the eastern side of the oval will provide a barrier moderating these impacts to some extent. Accessibility changes due to alterations to parking and the relocation of the Parramatta Road bus stop are considered to be minor.

For the clubs continued utilisation of Concord Oval throughout construction, effective management of dust, noise and parking are key to minimising impacts to players. A construction car parking strategy would be developed as part of the Traffic Management and Safety Plan to limit impacts on the surrounding communities, in consultation with local councils and stakeholders associated with the sporting facilities adjacent to the project site.

A substantial increase in light vehicle traffic (up to 330 vehicles daily) entering and exiting the Cintra Park compound via Gipps Street would potentially increase travel times for local traffic and for people accessing Concord Oval and St Lukes Park. This impact is expected to be greater on weekends when games are scheduled at Concord Oval. This is considered a minor short term impact on these users.

### 6.3.4 Wattle Street precinct

A section of Reg Coady Reserve would be occupied during construction. No other social infrastructure would be acquired in this precinct, however several social facilities are immediately next or close to the construction surface works and are likely to be the most potentially affected by amenity and access impacts.

#### **Directly affected**

##### *Reg Coady Reserve*

Reg Coady Reserve is part of a wider open space corridor located along Iron Cove Creek. The reserve includes three netball courts, a playground and passive recreational space. A small area of land (665 square metres) in the reserve on the edge of a Wattle Street which is used for passive recreation would be acquired for construction activities. The loss of this small portion of the reserve is considered a minor impact, however the adjacent parkland would also be subject to some noise, visual and other amenity impacts during construction.

## **Indirectly affected**

### *Jehovah's Witnesses Church*

The church is immediately adjacent to the Northcote Street tunnel site. They conduct worship services and bible study meetings daily (except Thursdays) with participation ranging from 10–120 people for each event. They also host another congregation of about 150 participants on Sundays. Services held on Tuesday and Wednesday evenings as well as weekend services have the highest attendance.

The venue has already been designed to minimise traffic noise, with minimal glass facing Wattle Street. The church has advised that Roads and Maritime has provided double glazing to windows in the past. The project is not expected to impact on access to the property (beyond the delays common to general motorists), however loss of on street parking would impact accessibility for some of the congregation who often seek parking in nearby streets. The church may experience visual and amenity impacts from the construction compound and road works. Consultation with the church has not raised any further concerns.

### *The Infants Home, Ashfield*

The Infants Home is a registered charity on Henry Street which creates opportunities for young children with special needs or living in vulnerable circumstances. It provides five child care centres within its grounds, as well as offering targeted services for vulnerable children and children with special needs, and currently provides services to around 300 children.

Its location behind the Bunnings Warehouse on Parramatta Road means it is partially screened from visual and noise impacts from the existing Parramatta Road. Local parking is an ongoing concern for the centre and the families it serves so ensuring construction workers do not impact on the availability of on-street car parking in Henry Street is a key concern. The centre also raised concerns about air quality during construction. It is likely that amenity and parking impacts on the Infants Home would be minor.

### *Haberfield Public School*

Haberfield Public School could potentially be affected by the construction of the interchanges and the construction compound, in relation to noise, vibration, potential safety and accessibility. Road closures, traffic changes (e.g. Walker Street) and the overall amenity and navigability of area may change for school community members, particularly those who walk or cycle.

Consultation with the school has indicated their concern with regard to noise impacts on classes and road safety for students crossing Parramatta Road near Bland Street. Pedestrian safety in crossing Parramatta Road would be maintained with the retention and continued operation of the Bland Street pedestrian bridge. Potential noise impacts would be managed or mitigated when construction environmental management plans are developed. Additionally, the potential for noise attenuation treatments as part of the project may also further reduce construction noise impacts if implemented at the start of construction.

## **6.3.5 Parramatta Road precinct**

The project would result in the acquisition of a commercial property which currently includes the Zongde Buddhist Temple community and spiritual centre, and amenity and access impacts to a number of nearby or adjacent facilities.

## **Directly affected**

### *Zongde Temple*

The Zongde Temple (a registered charity) owns a commercial property at 154 Parramatta Road from which classes and other activities are provided. The temple is involved in the preaching of morality, ethics and virtue, teaching Chinese and Confucian classics and supporting religious practise for Buddhist and Confucian worshippers/learners. The temple serves a community of around 2000 people. Negotiations have been ongoing with the local operators and their associates from China to find temporary alternate accommodations, and explore the possibility of redevelopment of residual land at the conclusion of works for the temple.

Relocation of the temple in the short term would be an inconvenience to their community, however it is expected that suitable alternative accommodation can be found within a similar geographic area.

### **Indirectly affected**

#### *Willows Private Nursing Home*

The home is in close proximity to the Parramatta civil site and its access point. The home is a 40 bed facility with 43 staff which provides high care support to its elderly residents, and welcomes visitors from 8.00 am to 8.00 pm daily. The home would likely be affected by amenity impacts, with noise and resident privacy key concerns to management. As a high care residential facility the impacts of vibration and noise could be detrimental to health and wellbeing of residents. The potential for noise attenuation treatments as part of the project may reduce construction noise impacts if implemented at the start of construction.

#### *Haberfield Aged Care*

The preferred design has avoided the acquisition of this facility. This aged care facility provides residential aged care with 41 beds for low to moderate dependency residents. There are no expected impacts to access, however being located directly opposite the construction compound and works, noise and visual impacts would be expected. The facility is a converted hotel which has been upgraded to address existing noise impacts from Parramatta Road and it is expected that this would mitigate additional construction noise to some extent.

#### *Peek-A-Boo Early Learning Centre*

This child care centre was also previously identified for relocation. However, acquisition is now no longer required under the current project design. The centre provides long day care for 76 children. Noise impacts would be most relevant for children during outdoor play times, as the centre's outdoor areas are otherwise screened from visual impacts. The potential for noise attenuation treatments as part of the project may reduce construction noise impacts if implemented in advance of construction.

#### *Ashfield Park and Bowling Club*

The project no longer requires the acquisition of any land from Ashfield Park. The park would however be affected by noise and visual impacts due to its proximity to the Parramatta Road civil site and construction of the Parramatta Road interchange.

The area of the park closest to the construction site is a passive recreation area, so recreational users (e.g. walkers/joggers/people walking dogs) are expected to experience this impact the most, however users would be able to use other areas of the park which are more remote. Patrons of the Ashfield Park Lawn Bowling Club would also be subject to these amenity impacts which could potentially negatively impact the desirability of the venue during construction.

#### *Yasmar Training Facility*

Yasmar is a heritage listed property that is used for government non-residential training ranging from one day to four weeks, catering for up to 110 people a day and around 15,000 per year. A section of the site is also leased by CoAslt, an Italian language and community service. Yasmar has no vehicular access permitted from Parramatta Road.

The preferred design has avoided property impacts to the site, however being adjacent to the interchange works and opposite the construction site, it is likely to experience amenity impacts, particularly noise impacts which may affect training activities and visual impacts. While it is likely that some users would travel by public transport to the site, proposed short term relocation of bus stops on Parramatta Road (westbound) are relatively minor and unlikely to be an inconvenience.

## 6.4 Access and connectivity

Access and connectivity impacts from the proposal are expected to be localised around surface construction areas, as the majority of the construction footprint would be underground within the main alignment tunnels. Surface construction works such as portals, interchanges, ancillary infrastructure and the establishment of construction sites may result in traffic induced impacts including changes to:

- Property access
- Pedestrian and cyclist access and movements
- Locations of bus stops
- Local roads and intersections
- Travel times due to traffic delays and detours.

Major construction works would be primarily accessed from Parramatta Road and the M4. Construction ancillary facilities would be located to provide the most direct access for heavy vehicles to and from arterial roads such as Parramatta Road, M4, Concord Road, Sydney Street and Wattle Street and to avoid or minimise use of local roads. The *WestConnex M4 East Traffic and Transport Assessment* (AECOM, 2015) (Traffic and Transport Assessment) estimates construction traffic will represent only two per cent of total daily traffic on Parramatta Road. The construction workforce is expected to increase the volume of light vehicles on the surrounding road network. Specific local road impacts would be:

- Minor impacts on Pomeroy Street
- Moderate impacts from the Underwood Road civil and tunnel site (C3) to Underwood Road and Short Street East, as access would be from Short Street East via Underwood Road and Parramatta Road
- Minimal from the Powells Creek civil site (C4) as the construction vehicle access and egress is taken directly to and from the Parramatta Road
- Minor impacts on Ada Street and Alexandra Street
- Minor impacts for road users along Gipps Street including those accessing the adjacent Concord Oval, with substantial increases in light vehicle traffic potentially increasing travel times
- Minor impacts on Orpington Street.

The pedestrian bridge at Pomeroy Street which provides north – south access across the M4 will remain operational throughout construction apart from short term closures that may be required for safety reasons. Similarly the pedestrian bridge on Parramatta Road at Ashfield adjacent to the Bland Street intersection will also remain operational throughout construction except for short term closures that may be required for safety reasons. Users would be provided with advance warning of any short term closures and alternative routes.

At the Bland Street bridge the stairs on the western side of the bridge will be replaced to align down Bland Street, rather than along Parramatta Road, however as the bridge includes an elevator, pedestrian access will be maintained throughout these modifications. In both instances use of these routes will be affected by amenity impacts due to proximity to construction works.

Most construction compounds would provide some parking and there is dedicated car parking available at Concord Oval (250 spaces) and at Railway Place, North Strathfield (50 spaces). However, this is still not likely to be sufficient to accommodate all construction staff. The availability of on street parking is a pressing local issue though the project area. It is proposed to develop a construction car parking strategy which promotes the use of public transport, carpooling and which investigates alternative car parking arrangements. This strategy should aim to ensure that impacts to on-street parking are minimised during the construction period.

The existing cycleway along the M4 between Hill Road and Concord Road would be unavailable during construction, and a detour route to the north of the M4 corridor, based on that used for the M4 Widening project is proposed subject to consultation with Roads and Maritime, local councils and bicycle user groups (refer **Figure 2.3**).

During construction traffic delays due to increased waiting times at intersections may potentially impact motorists, bus passengers, cyclists and pedestrians.

Impacts on bus passengers:

- An increase in bus travel times due to slower travel speeds and increased intersection delays.
- Longer travel times to and from bus stops by supplementary travel modes (e.g. car passenger, walking to/from bus stop,) due to an increase in traffic volumes, slower travel speeds and increased intersection delays
- Reduced reliability of bus services and therefore more likelihood of missing connections with other public transport
- Reduced amenity for bus users waiting at stops
- Reduced pedestrian roadside safety due to an increase in traffic.

Impacts on pedestrians and cyclists:

- Reduced overall pedestrian and cyclist amenity throughout the project area
- Potential adverse effect on pedestrian wait times at signalised intersections if adjustments are made to accommodate increased traffic volumes
- Increased delays at intersections for on road cyclists due to an increase in traffic volumes travelling along the corridor
- Increase in journey time and distance due to closed road shoulders and detours
- Reduced overall amenity throughout the project area.

Construction traffic would result in localised detours, temporary traffic signals and delays, including:

- In the vicinity of Wentworth, Pomeroy, Underwood, Ismay and Allen streets
- Minor impact for residents of Carrington Street and the Concord Baptist Church congregation, who may experience increased travel times due to permanent traffic closure to Carrington Street at the intersection with Concord Road. The impact may potentially be offset by a resultant improvement to amenity through reduced traffic
- Minor impact for road users on Concord Road due to modification to the existing signal control at Concord Road and Sydney Street to facilitate the proposed vehicle movements entering and exiting the Concord Road civil and tunnel sites
- Minor impact for residents of Northcote Street which would be closed at Parramatta Road for the duration of works
- Ramsay Street (east of Wattle Street) experiencing temporary diversions at various stages over 18 months
- Minor impact for residents of Martin Street, which would be closed at the intersection of Wattle Street for the duration of construction
- Minor impact for residents of Walker Avenue with the restriction of left turns from Parramatta Road to Walker Avenue for public traffic while permitting light construction traffic to enter construction compounds via Walker Avenue. This could reduce accessibility for residents while increasing local minor impacts for motorists at the intersection of Bland Street and Parramatta Road. Reduced accessibility could also occur at Bland Street, due to heavy vehicles exiting Parramatta Road's eastern civil site at Bland Street and using the existing signals at Parramatta Road
- A new signalised intersection on Parramatta Road, near Rogers Avenue to provide access to the Parramatta Road eastern civil site.

In the short term, bus passengers may experience longer travel times to and from relocated bus stops. The impacts to bus users include:

- Minor inconvenience as the Underwood Road bus stop under the M4 bridge would be relocated a short distance to the vicinity of Short Street
- Minor impact for bus users in the east and south of the Concord precinct due to the relocation of the Concord Road bus stop near the M4. It would be moved about 200 metres north to the vicinity of Carrington Street and Patterson Street, but would potentially improve accessibility for those nearby the new location. There would also be a minor potential inconvenience for a likely large number of bus stop users from the adjacent Concord Oval, as the bus stop currently near Cintra Park would be relocated east for the duration of construction.
- Relocation of the westbound Orpington Street bus stop should consider the increased distance travelled to access Orpington Street. This is particularly relevant for visitors to the Willows Private Nursing Home travelling by bus, and would be more likely to include higher proportions of elderly or less mobile passengers
- Additionally, closure of Chandos Street for project construction would result in local diversions of vehicular and pedestrian traffic. This closure would have greatest impacts on commuters who currently walk to bus stops on Parramatta Road who, during construction, would need to detour via Julia and Bland streets or Curtis and Orpington streets. Changes in access routes which connect to public transport may result in a mode change to driving during the construction period. This minor social impact is heightened due to the higher levels of relative socio-economic disadvantage in this area between Orpington and Chandos streets.

Rail services in the project corridor and surrounding areas are not expected to be affected by the project, however local traffic delays may affect the reliability of bus services that serve railways stations.

During the construction phase there is potential for impacts on property access routes due to road network changes.

Access to private properties would be maintained at all times, and where direct impacts to property access are unavoidable, consultation would be undertaken with the property owner and/or tenant to develop appropriate alternative access arrangements. This may involve provision of a temporary alternative access point.

Impacts to property access over multiple days are considered to be avoidable, however there may be a requirement for some works (e.g. pavement works) to disrupt access for short periods of time (e.g. several hours on a given day). These potential impacts would be discussed with the property owner and/or tenant to determine any special access requirements. Where impacts are required they would be limited to the shortest period possible.

Property access impacts would be limited to the construction period and therefore would only occur during a relatively short timeframe.

Pedestrian and cyclist connectivity in the vicinity of the Concord interchange will be reduced during construction for those travelling from north to south of the M4 and east to west of Concord Road. Footpaths on the western side of Concord Road in the vicinity of works will be unavailable during construction. Pedestrian and cyclist access from Alexandra and Edward Streets to Concord Road will be maintained with pedestrian access adjoining the construction compounds, however these routes will be longer, with the main destinations for pedestrians and cyclists likely to be Concord Road itself and the relocated bus stop. Continued pedestrian access along Parramatta Road at the Northcote Street compound would need to take into consideration traffic and surveillance safety issues and maintain access for all levels of mobility.

The safety of pedestrians at the Bland Street exit of the Parramatta Road eastern civil site should be considered in developing construction environmental management plans. It is recommended that local consultation (particularly with the Haberfield Primary School) and a pedestrian survey be carried out to inform any safety management procedures for this site.

## 6.5 Amenity

This section considers the findings or project technical assessments related to noise and vibration, air quality, human health visual impact and urban design and heritage. Together, these amenity impacts influence the way residents and workers experience their environment. It affects how and where they choose to travel, spend recreation time both at home and outside the home, how they enjoy outdoor areas, and how much they identify with their environment. This relationship to environment therefore has strong links to physical and psychological well-being. Measures to avoid, mitigate and manage amenity impacts for the best outcomes are therefore important for community well-being.

### 6.5.1 Noise and vibration

The *WestConnex M4 East Noise and Vibration Impact Assessment* (SLR Consulting 2015) (Noise and Vibration Impact Assessment) found that, consistent with most major construction works undertaken in built-up areas, the project has the potential to generate considerable noise, with greatest impacts generated during site establishment works and roadworks. These activities are generally of a shorter duration at any point as the works move along the alignment. However, longer duration impacts would be experienced in the vicinity of compound and tunnel excavation/spoil removal sites. Temporary hoardings, noise walls, acoustic sheds and scheduling of works would be used to minimise these impacts. Noise generated by tunnelling and associated works is predicted to be of a short duration, with primarily short-term impacts at any one location of several days. In locations where the tunnel is less than 40 metre deep (i.e. in the vicinity of Concord Road, to the east of Burwood Road, to the south of Parramatta Road, Ashfield and at Wattle Street), there is the potential for ground borne noise to exceed evening and night time noise criteria for longer periods of up to two weeks.

In most cases noise generated by construction traffic will be negligible due to the use of the arterial road network, however for local roads, Short Street East and Powell Street in Homebush there is the potential for an increase in the number of maximum noise events which will require more consideration of management during detailed design to minimise and mitigate these impacts.

The project also presents the potential for vibration above human comfort vibration goals, however such impacts will be site specific, occur intermittently and should be scheduled to moderate impacts

Much of the project area is already exposed to high noise levels from existing traffic with many properties already exceeding existing noise limits. As a result, the Noise and Vibration Impact Assessment has identified 310 properties that may be eligible for treatments to mitigate primarily existing noise impacts. For most of these properties, including social infrastructure for which lower thresholds of noise are permitted, these treatments could potentially improve existing internal noise conditions.

Noise and vibration impacts can cause stress and anxiety, affect the enjoyment of outdoor spaces, and disturb normal indoor activities. High levels of construction noise at night can also interrupt sleep patterns with consequent impacts on health and well-being. Worst case night time modelling indicates the potential for exceedance of night time noise criteria at some construction compound sites. Developing adequate would be important to

With a construction period of approximately three years, management and monitoring of noise and vibration impacts, especially any outside of standard working hours, would be integral to limiting negative impacts on community well-being. Construction noise and vibration management plans would aim to mitigate noise and vibration impacts at the source, consider the timing and duration of works, especially those with the greatest impacts, consider potential respite periods and include consultation and communication with potentially affected stakeholders. The Noise and Vibration Impact Assessment also suggests further construction noise modelling during detailed design to assess impacts adjacent to tunnelling and ventilation sites, with at property treatments or alternate accommodation considered potentially feasible options if night time noise impacts justify.

## 6.5.2 Visual amenity

The *WestConnex M4 East Urban Design, Landscape Character and Visual Impact Assessment* (AECOM 2015) found that visual impacts to residences in the vicinity of project relate primarily to:

- Removal of existing vegetation and loss of resultant visual amenity
- Properties overlooking construction compounds and work sites.

These impacts would be experienced for the duration of construction by:

- Nearby residents of the Pomeroy Street construction compound and the Underwood Road tunnel and civil site compound (who live on Short Street East, Underwood Road, Ismay Avenue and Allen Street), who would experience high visual impacts from the removal of existing vegetation and loss of visual amenity from Bill Boyce Reserve (Pomeroy Street). Some residents living in multistorey houses would also look directly into the compound
- Residents of Powell Street, especially the adjacent multistorey residential building, who would overlook the compound, and where vegetation removal would open up views to the existing M4
- Residents and pedestrians in Concord Road, Concord Lane, Sydney Street, Edward Street, Alexandra Street, Ada Street, and Franklyn Street, who would experience high visual impacts from the loss of vegetation and the large area occupied by the Concord Road civil and tunnel site compounds
- Taylor Street properties backing onto the Cintra Park tunnel site, which would be subject to low visual impact, as the existing vegetative screen would be retained between the properties and the compound
- Residents of Wattle Street, Walker Avenue, Ramsay Street, Martin Street and Dobroyd Parade, who would be affected by visual impacts from construction works in the area which have been assessed to be high as a result of multiple project elements
- Residents of Northcote Street and Wolseley Street, who would be affected by visual impacts for which are considered low–moderate, as the adjacent properties already directly abut commercial properties, and closure of Northcote Street would reduce traffic in the street over the construction period
- Residential properties to the west of the Parramatta Road eastern civil site, which may experience a low visual impact as many are single-storey, while multistorey dwellings do not have views facing the site
- Users of the Parramatta Road precinct, where the amenity of the precinct is currently low due to the domination of road infrastructure and commercial properties, many of which are derelict. The visual assessment has found that visual impacts to local land users would be low–moderate as most do not currently orientate towards the road due to its current poor amenity.

Visual impacts for pedestrians, users of open space and motorists would be low to moderate, as hoarding would cover the majority of the compound activities, and/or time spent in the areas is of a short duration.

## 6.5.3 Heritage values

The *WestConnex M4 East Non-Aboriginal Heritage Impact Assessment* (Godden Mackay Logan 2015) identified that much of the western part of the Concord precinct forms part of the Powell's Estate Heritage Conservation Area (HCA). The report finds that 11 of the properties to be acquired are within the HCA, with two items of local significance listed on the Canada Bay Council Local Environmental Plan (LEP) 2013, and that this loss would represent a major adverse impact on the heritage significance of the Powell's Estate HCA.

Fifty three residential properties in the Wattle Street precinct to be acquired for the project are part of the Haberfield HCA. The report finds that the impact of the project on the heritage significance of the Haberfield HCA and individual heritage items within it would be significant. These impacts would be mitigated through measures such as development of a heritage landscape management plan for Haberfield Conservation Area to guide the landscaping along the motorway corridor, and design of adjacent project elements to reduce impact on the remaining conservation area.

Two properties to be acquired for the project in Chandos Street (in the Parramatta Road precinct) are also listed as heritage items on Ashfield LEP 2013. They exist in the context of a group of properties of a similar style that collectively comprise an important Federation-era streetscape, the historical significance of which would be reduced by their demolition.

#### 6.5.4 Human health

The *WestConnex M4 East Human Health Risk Assessment* (EnRisks, 2015) (Human Health Risk Assessment) has considered the health risk presented by noise, vibration and air quality changes generated by the project. The report finds that worst case assessments without mitigation would likely generate health impacts for some receivers during some works. Loss of use of outdoor areas, disturbance of sleep, reduced capacity for concentration, interference with speech and other activities would be likely with potential for effects on cardiovascular health if elevated noise at particular locations occurred for extended periods.

Shift workers, families with young children and people working from home are likely to be most affected by noise and vibration impacts. Annoyance and increased stress levels would also occur. Consequently, significant mitigation of noise and vibration during the construction phase of the project will be essential, including measures to reduce noise and vibration, planning for the timing of the most impact intensive works including respite periods, consultation and communication with the local community and affected properties, especially with regard to any out of hours works.

Negative health impacts may occur as a result of traffic changes during construction, property acquisitions, visual changes, noise impacts and changes in access/cohesion of local areas. These may result in increased levels of stress and anxiety. Those most vulnerable to these changes are likely to be the elderly and people from non-English speaking backgrounds. In many cases the impacts identified are either short-term or mitigation and management measures have been identified to minimise the impacts on the community.

### 6.6 Business and economic impacts

The following assessment is drawn from the Economic Impact Assessment.

#### 6.6.1 Business property impacts

The assessment found that 20 buildings for commercial purposes occupied by private businesses would be fully acquired for the project prior to commencement of construction.

The properties that would be fully acquired for the project comprise:

- One motel with 50 guest rooms and a restaurant
- Four commercial offices
- Nine automotive sales and services
- One personal services
- Three homeware sales and services
- Two retail businesses.

The majority of businesses located on land to be acquired for the project are tenants/lessees of their premises. These businesses would be required to vacate their current location and move to an alternate location or close down. Businesses that chose to relocate would be subject to costs associated with relocation and set-up at their new premise. Property owners that also own and operate the business located on their property would be compensated for relocation costs for these businesses under the terms of *Land Acquisition (Just Terms Compensation) Act 1991* and under the *Roads and Maritime Land Acquisition Information Guide* (Roads and Maritime, 2014).

The acquisition of these properties and consequent relocation of businesses would result in impacts to the local economy through loss of business turnover and employment. However local social impacts through loss of access to services or facilities will be very limited as many of the businesses affected service a more regional clientele.

Business property acquisition will impact some business services such as a liquor store and car mechanic which are likely frequently used by the local community. The loss of these services locally is not expected to have a significant social impact as for each business type, several comparable services or retail outlets are located within a few kilometres of the current site. The Economic Impact Assessment also notes that consultation with affected businesses has indicated that the majority of businesses intend to relocate their businesses within the region and continue trading. Given the high levels of commercial property vacancy on Parramatta Road, this may be a viable option for these businesses.

At the completion of the construction period, a number of residual commercial properties would potentially be available for sale and redevelopment as they would not be required during operation of the project. The future use of this residual land would be subject to separate assessment and planning approval.

### 6.6.2 Business amenity and access impacts

During construction, businesses such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities would stand to be the most affected by changes in amenity. It should be noted that those businesses currently located along Parramatta Road or in proximity to the M4 would already experience reduced amenity (such as reduced air quality and increase noise) from traffic volumes along these roads. Due to the existing level of road traffic noise in the vicinity of the project, it is not anticipated that construction traffic on major roads would noticeably impact amenity for businesses located in the project area, including the regionally significant recreation, entertainment, employment and residential area of Sydney Olympic Park.

Businesses located on local roads used for haulage, such as Powell Street, may experience some changes in amenity due to heavy vehicles entering and exiting the compound sites. These impacts are limited to day-time activities as businesses in these locations operate within normal business hours. The magnitude of the impact of amenity would be largely influenced by the construction hours, length of the construction period, the construction activity, proximity to the project and the nature of the business.

### 6.6.3 Economic impacts

During the construction of the project, there is the potential for a boost in the economy due to construction expenditure in the region. Local business would benefit from this expenditure through purchases made by construction businesses and associated workers to build and support the development of the project.

Employment opportunities would grow in the region through the potential increase in business customers and through the increase in demand for construction workers. The increase in demand for labour may increase wages in the region, particularly for construction workers, who would be in high demand.

## 7 Assessment of operational impacts

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### 7.1 Property and household impacts

The social impacts of land acquisition have been discussed in **section 6.2**, as they will be experienced early in the project, with many of those experiencing the social impacts recovering within the short term. As mentioned in **section 6.2.1**, for households unable to relocate locally, social dislocation may result in longer term social impacts. Mitigation measures have been proposed to support vulnerable households to mitigate such impacts.

Following construction, residual land not required for the ongoing operation or maintenance of the project would potentially become available for redevelopment, subject to relevant provisions of Council LEPs and Development Control Plans (DCPs) and state and local planning policies.

The project would not involve the consolidation, rezoning or redevelopment of residual land. However the existence of residual land does raise the potential for future social benefits by delivering housing, open space, improved active travel connectivity, public facilities or mixed use developments.

Residual lands from the project include:

- Homebush precinct - fronting Allen Street, Ismay Avenue and Underwood Road
- Concord precinct - northern side of Sydney Street and the eastern side of Concord Road
- Cintra Park – residual land is intended to be returned to the Crown with potential availability for use as public open space and the carpark area fronting Gipps Street would be fully reinstated for public parking
- Wattle Street precinct – land along Walker Avenue, Wolseley Street and Northcote Street and land fronting Parramatta Road (west of Wattle Street)
- Parramatta Road precinct – some land fronting Chandos Street and Parramatta Road.

### 7.2 Social infrastructure

#### 7.2.1 Homebush precinct

##### *Strathfield Girl Guides Hall*

Strathfield Council would undertake consultation with the operators of the Girl Guides to ensure the needs of the organisation and other users are met in the long term.

##### *Bill Boyce Reserve*

The entire park would be rehabilitated and returned to Strathfield Council for public use at the conclusion of construction works.

##### *Powells Creek/Arnotts Reserve*

The new Powells Creek on-ramp would intrude on the eastern and northern perimeter of the Powells Creek site (Arnotts Reserve) that is proposed for development as open space, using approximately 7 percent of the total reserve area. The ramp would be likely to cause some overshadowing and detract from the visual amenity of the open space.

The new on-ramp would be located in the context of an existing concrete lined drain along the eastern boundary, the elevated M4 to the north and commercial properties along this section of Parramatta Road. In this context the potential visual amenity impacts are not considered to be significant.

The new on ramp and associated landscaping is being designed in consultation with Strathfield Council to enhance the functionality, public safety and visual amenity of the open space. Ensuring the ramp does not create spaces within the park that present safety concerns and exploring opportunities for aesthetic treatments to the ramp would mitigate against these risks.

## 7.2.2 Concord precinct

### *Sydney Cheil Uniting Church*

Operational impacts to the Sydney Cheil Uniting Church would largely be related to reduced visual amenity and increased noise due to its proximity to the new tunnel and ramps and a noise wall. Appropriate landscaping treatments could significantly reduce these impacts for key outdoor areas. Reduced parking is the key concern for the church. WDA is working with the church to explore opportunities for increasing access to green space and parking.

## 7.2.3 Cintra Park precinct

The operational aspects of the project would remain on the site (fresh air supply, a water treatment facility for operations and an electricity distribution substation). The footprint of proposed operational infrastructure at Cintra Park is limited and would only result in minor visual changes for park users. The remainder of the site would be rehabilitated and landscaped and available for return to the Crown for use as a public reserve, resulting in a net gain in public open space. This gain in open space is considered a minor regional benefit due to the potential for the area to be developed into active open space, augmenting existing uses of Concord Oval and the redeveloped St Lukes Park.

The upgraded car park built on the northern side of Concord Oval for construction purposes (providing about 250 car parking spaces) would be wholly available to users of the adjacent sporting fields at the conclusion of construction.

## 7.2.4 Wattle Street precinct

Parts of Reg Coady Reserve would require permanent acquisition to allow for re-alignment of Wattle Street. The reserve forms part of a wider open space corridor which runs along Iron Cove Creek and connects with Timbrell Park. Therefore the permanent loss of approximately 1312 square metres of open space (approximately 12 percent of the reserve area up to Dobroyd Canal) located directly adjacent to Wattle Street/Dobroyd Parade is not considered to be a significant impact on the availability of open space in the local study area.

Impacts on the Jehovah's Witness Church during operation would be related to a change in noise and visual amenity due to the adjacent expanded road infrastructure.

Operational social impacts of the project on The Infants Home and Haberfield Public School are expected to be minor due to minor noise and amenity changes.

## 7.2.5 Parramatta Road precinct

The Zongde Temple would need to be relocated to a location which can deliver financial advantage similar to its existing property (i.e. passive income from advertising, mobile phone tower hosting and other tenants).

Operational social impacts of the project on the adjacent and nearby Haberfield Aged Care, Peek-A-Boo Early Learning Centre, Willows Private Nursing Home, Yasmar, Ashfield Park and Ashfield Bowling Club are expected to be minor–moderate due to traffic noise and amenity changes, in the context of the existing low amenity and high noise environment. The integrated introduction of landscape planting elements would also moderate this visual impact.

## 7.3 Access and connectivity

The Traffic and Transport Assessment has identified large reductions in vehicle delay along the corridor between Homebush Bay Drive in the west, and City West Link and Haberfield/Leichardt in the east. This is evident both within the new project tunnel which would ultimately provide connectivity to the future possible M4–M5 Link, and also on the existing Parramatta Road despite the reduction in capacity due to the provision of kerbside bus lanes. The assessment has also identified benefits on the parallel route along Queens Road and Gipps Street. This improvement would enhance connectivity regionally.

In the medium term, before the possible future M4–M5 Link is completed (2023), the project is expected to significantly reduce traffic on Parramatta Road between the M4 and Dalhousie Street, with small deteriorations elsewhere particularly at the M4 project ramps at Parramatta Road, Ashfield, at Dobroyd Parade and on Parramatta Road to the east of the project. Completion of the future possible M4-M5 Link would rectify much of this congestion, delivering significant traffic improvements for most of Parramatta Road east of the project. These medium term traffic impacts would negatively impact access in these areas and increase travel times. Peak morning travel times are expected to be reduced by six to eight minutes on other strategic routes as a result of the project. On completion of all stages of WestConnex travel time savings are expected to increase to a substantial 10 to 18 minutes.

Travel time savings (or transport efficiency) provide significant social benefits, freeing more time for recreation, social interaction and economic activities, all of which contribute to physical and mental health. With reduced congestion on major roads in the long term, local mobility would also likely be enhanced. Parramatta Road is currently a barrier to many local and regional social networks. Reduced congestion at intersections to cross the corridor and on the road itself would be an incentive for increased movement across the corridor for community interaction, enhancing access to regional social infrastructure such as Sydney Olympic Park and Flemington Markets

### 7.3.1 Public transport

A number of bus routes currently use Parramatta Road within the study area of the project (see **section 1.5**). However, Transport for NSW (TfNSW) has identified the potential for a new high frequency bus route between Burwood and the CBD which would be provided following delivery of the project. The Traffic and Transport study has also indicated that the project could deliver significant travel time savings for buses (between 3–15 minutes during peak periods) between Burwood and Bland Street, with a dedicated bus lane provided east from Burwood on Parramatta Road.

Improvements in public transport availability and especially efficiency would have broad social benefits. The use of public transport includes incidental exercise (e.g. walking to and from bus or train stops) increasing the chance of travellers meeting recommended daily physical activity targets. A more active lifestyle can help reduce the risk of preventable diseases, including coronary heart disease, stroke, type 2 diabetes, obesity and some cancers. It can also help improve mental health, community life, social wellbeing and community safety.

### 7.3.2 Pedestrians and cyclists

Reduced traffic volumes and intersection wait times on Parramatta Road would improve conditions for cyclists and pedestrians. Greater priority for pedestrians at crossings would be possible in tandem with the reductions in traffic volume. Reduced traffic volumes also provide opportunities to improve cycling routes through the study area and these are being investigated as part of the Parramatta Road Urban Transformation Program.

Improved urban amenity and cycling infrastructure could attract more recreational and commuter cyclists, with consequent health benefits. Consideration should also be given for how residual lands could be used to increased connectivity through walking and cycling routes, especially in the Homebush precinct where many local streets terminate at the M4.

The Concord Road intersection would significantly modify pedestrian and cyclist access in the area. Access will be most affected for residents and those moving between the north and northeast of the interchange and the south of the interchange, including the southbound bus stop on Concord Road (as the bus stop will be returned to its original location). Pedestrian and cyclist access in this area would skirt around the outer curve of the on ramps, increasing travel distances. Access to the bus stop from the east will also require use of a pedestrian bridge.

Together these changes would potentially reduce ease of access for public transport users travelling to or from the north and north east of the interchange, particularly in relation to accessing the bus stop which provides connections to Strathfield and Burwood. As walkable bus stop catchment areas are regularly regarded as 400 metres, increasing walking distances could create a disincentive to public transport use, or may disproportionately affect public transport users. As the Concord Road precinct demonstrated lower levels of vehicle ownership and lower median incomes, this may affect more

vulnerable residents. This altered access also has the potential to exacerbate the severance caused by the Concord Road, M4 and Parramatta Road interchange.

### 7.3.3 Property access

Two properties would have permanent changes to their access as a result of the project, these properties are:

- Sydney Cheil Uniting Church located at the corner of Concord Road and Sydney Street (81 Concord Road, Concord). The historic (though not functional) entrance would be acquired, though the existing driveway access on its Sydney Street frontage would be retained
- The apartment block located at 98 Chandos Street, Ashfield – which would have its battle-axe access road relocated slightly offset from the existing route.

Both of these properties would require adjustment to their access driveways to account for permanent changes to the local road network proposed as part of the project. Changes to access points would be planned in consultation with affected property owners, and are not expected to have a social impact.

## 7.4 Amenity

### 7.4.1 Noise and vibration impacts

The Noise and Vibration Impact Assessment found that road traffic noise impacts during operation would result in minor reductions in noise along the M4 and Parramatta Road corridors for 78 per cent of sensitive receivers due to traffic displacement into the new tunnels. These areas include the unmodified M4 to the east of the tunnel portals and Parramatta Road between Concord Road and Wattle Street.

A minor increase in noise levels of less than 2.0 dB (which is generally unnoticeable to the average person) is expected at approximately 18 per cent of sensitive receivers

The project would utilise noise walls and pavement treatments to reduce noise. The project area is already exposed to high noise levels from road traffic along the existing arterial road network with many properties already experiencing exceedances of noise limits.

There are 310 instances where noticeable noise increases could be experienced, primarily as a result of the acquisition of adjacent properties which had previously acted as noise barriers to these properties or where new road noise sources or traffic volumes increase.

These properties are eligible for assessment for at property treatments to mitigate noise impacts. For most of these properties, including social infrastructure for which lower thresholds of noise are permitted, these treatments could potentially improve internal noise conditions from existing conditions.

Traffic displacement from the M4 and along sections of Parramatta Road is expected to deliver traffic noise amenity benefits supportive of potential urban renewal opportunities in the corridor.

### 7.4.2 Visual impacts

Where surface works have been undertaken, some visual amenity and heritage impacts would remain, largely due to:

- Loss of vegetation screening
- New road infrastructure – interchanges, tunnel ramps, bridges/flyovers and new noise walls
- Closer proximity to new road infrastructure for some properties
- Ancillary operational facilities such as ventilation facilities, the motorway control centre, electricity sub-stations and the water treatment facility
- Loss of heritage items and changes to streetscapes.

These impacts are primarily experienced along the M4 corridor in Homebush, at the western and eastern ventilation facilities, Concord Road interchange, and Parramatta Road and Wattle Street interchanges. Project design and landscaping plans aim to minimise visual intrusion of project elements and respond to the existing and desired character of these areas.

Changes to the amenity of a street or suburb can negatively impact the sense of belonging and identity of its residents and consequently their cohesion and connectedness. The heritage values of areas such as the Powells Estate in North Strathfield and Haberfield, are also a significant contributor to local character and community sense of place. Impacts to heritage assets affect not only the value of the assets, but the value communities place on the quality of their environment, and their connections to it, both past and present.

### 7.4.3 Human health

Air quality impacts are of significant community concern with regard to the project. The Human Health Risk Assessment found that the project is expected to result in a decrease in total pollutant levels in the community. The project is expected to result in a redistribution of impacts associated with vehicle emissions. For much of the community this will result in an improvement (or decreased concentrations and health impacts), however for a number of areas where traffic on the surface roads is expected to increase as a result of the project, a small increase in pollutant concentration may occur. Potential health impacts associated with changes in air quality (specifically nitrogen dioxide and particulates) are low and essentially negligible within the community.

The Human Health Risk Assessment notes that where property treatments are required to mitigate traffic noise, these measures are to protect people from adverse health impacts where they spend most of the day (i.e. indoors). These treatments assume that residents take up these measures and where they do, they keep external windows and doors shut and have minimal use of outdoor areas.

In urban areas particularly where noise is dominated by road traffic noise, access to outdoor green-space areas that are not (or not perceived to be) impacted by noise have been found to significantly improve well-being and lower levels of stress. Impacts on the use and enjoyment of outdoor areas due to increased noise may result in increased levels of stress at individual properties.

Where specific residents/properties do not take up the recommended architectural treatments to mitigate noise indoors there is the potential for noise levels at these properties to exceed the relevant guidelines/criteria. In these situations there is the potential for adverse health effects, particularly annoyance and sleep disturbance, to occur.

## 7.5 Business and economic impacts

The following assessment is drawn from the Economic Impact Assessment.

The project has the potential to have positive and negative impacts on amenity. Businesses located at the eastern and western portals and west of Concord Road are likely to experience increases in noise, reduced air quality and decreases in visual amenity due to increased traffic volumes and the introduction of new infrastructure. Businesses located along Parramatta Road, between Concord Road and Wattle Street, would experience decreases in noise, increases in air quality and improved visual amenity due to the reduction in vehicles, particularly heavy vehicles, on Parramatta Road.

As the majority of traffic currently using Parramatta Road would be diverted into a tunnel due to the project, businesses that are reliant on passing trade would be affected by the project. It has been estimated that there could be an annual reduction of around \$7.3 million in output and around 33 full-time equivalent jobs due to loss in passing trade. However this does not take into account the potential increase in passing trade for businesses located along Parramatta Road, west of Concord Road, from an increase in traffic volumes. A total of five businesses were identified as potentially benefitting from an increase in passing trade, comprising of services stations, a car wash and cafes/restaurants.

Greater accessibility to businesses in the area by public transport is expected as the project facilitates the introduction of bus lanes along the Parramatta Road corridor. The project would also improve network efficiency and increase capacity, delivering travel time savings and provide more efficient movement of freight and commercial vehicles, thereby reducing operational costs.

Cumulative impacts to the economy and businesses are most likely to result from the concurrent operation of the wider WestConnex project and the Parramatta Road Urban Renewal Strategy. The completion of the full WestConnex project would facilitate job growth and enable freight to efficiently move through and across Sydney. The freight industry and commercial commuters would benefit greatly by enabling the efficient movement of traffic between western and south-western Sydney and interstate and international markets through connections with the wider National Land Transport Network, Sydney Airport and Port Botany.

The project would facilitate the removal of a significant amount of traffic from Parramatta Road and would help to facilitate the Parramatta Road Urban Renewal Strategy. The Strategy aims to improve amenity and increase accessibility to businesses along Parramatta Road. Improvements in public and active transport and improvements in public amenity have the potential to drive residential and mixed use development and attract new and different types of businesses into the area.

## 8 Cumulative impacts

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The impacts of the project would, by design, interact with other planned projects in the region. Other key existing and likely future actions of relevance to the project include;

- Other WestConnex projects such as the current M4 Widening project (current widening of the M4 between Church Street and Homebush Bay Drive expected to be completed by 2019), the possible future M4–M5 Link (a further tunnel stage from City West Link to St Peters and the New M5 (extending the M5 East from Beverley Hills to St Peters by tunnel)
- Parramatta Road Urban Transformation Program – a strategy to renew the urban corridor from the Sydney CBD to the City of Parramatta.

Construction of the project and M4 West (Parramatta to Homebush) would overlap, resulting in extended durations of construction impacts. At a local and regional level, for commuters, public transport users, pedestrians and cyclists, social impacts related to travel delays, diversions and inconvenience, exposure to visual and noise amenity impacts would be prolonged.

Additionally, if the M4–M5 Link proceeds, the Wattle Street precinct would again potentially be subject to construction impacts. However, the project has sought to limit future additional land acquisition for construction of the M4/M5 Link by developing the tunnel stubs and ventilation facility for this stage, thereby reducing surface work requirements at a later date.

The project and WestConnex scheme overall are integral to the realisation of the Parramatta Road Urban Renewal Strategy. UrbanGrowth and Transport for NSW are the key organisations engaged in the development and evolution of the Strategy. The Strategy aims to reduce traffic volumes on Parramatta Road, with consequent amenity improvements thereby facilitating the growth and renewal of the corridor as a place to live, work and recreate.

The project would be instrumental in delivering some of the amenity and accessibility improvements planned for three of the proposed urban renewal precincts; Homebush, Burwood and Kings Bay, and together with the M4 Widening would also benefit the Auburn renewal precinct. These four precincts are expected to account for sixty per cent of the 51,600 new residents the program expects to accommodate by 2031.

Development of these urban renewal precincts 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. 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 confidence. Potential cumulative impacts should be assessed at a later stage when more detailed information is available.

## 9 Management of impacts

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The management and mitigation measures recommended in this SIA focus on avoiding or reducing negative social impacts, and enhancing potential benefits and increasing social sustainability for local and regional communities. These measures are summarised below.

The amenity of the communities in which the project would be constructed and operate has the potential to be impacted by several social and environmental changes, and the impact assessments in **section 6** and **section 7** have outlined the potential for these impacts in the various project precincts. These assessments and the mitigations below have been drawn from the relevant specialists reports prepared for the project in regard to:

- Noise and vibration
- Visual impacts and urban design
- Traffic and transport
- Non-Aboriginal heritage
- Air quality
- Human health.

### 9.1 Pre-construction and ongoing stakeholder engagement

Stakeholder and community involvement in program planning and ongoing environmental management would be key to avoiding, minimising and mitigating the social impacts of the project.

A project Community Consultation Framework has been developed and is included in the *WestConnex M4 East Environmental Impact Statement*. Implementation of the framework would include ongoing consultation with key social stakeholders including directly and indirectly affected social infrastructure providers. The framework would ensure that local residents, businesses and workers are provided timely and clear information in regard to local changes and progression of project construction and operation. Project communication would consider the cultural and linguistic diversity in the project local study area in communicating project information effectively in community languages (i.e. through translation, use of interpreters, specific language broadcast services and cultural organisations).

The framework would also provide opportunities for specific key stakeholders discussed in the SIA to have input into the development and refinements of construction management plans. The framework would also provide for community feedback and monitoring through the availability of telephone and online feedback mechanisms. The framework will guide the development of the Community Involvement Plan.

### 9.2 Construction

#### 9.2.1 Property and household impacts

The proposed project requires the full acquisition of 161 residential properties and the associated relocation of 168 households by the end of the first quarter of 2016. The project land acquisition process is being undertaken in accordance with the *Land Acquisition (Just Terms Compensation) Act NSW* and the *Roads and Maritime Guide to Land Acquisition and Compensation*, and a number of additional support services are also being made available by WDA and RMS to affected households.

Given the significant social risks associated with the relocation process, a number of additional measures are recommended which focus on supporting relocating households to find replacement housing in the locality (wherever possible), to ensure eligible households have equitable access to support services, and to provide social support to those moving outside their social networks.

These support services would include:

- Continue supporting home owners to obtain alternate independent property valuations, with a commitment from Roads and Maritime to ensure property owners would not be temporarily left out of pocket (i.e. property valuation fees to be paid at the time the invoice is due if this is before settlement)
- Provide relocation support services to assist vulnerable households that must relocate (both renters and owners) and land owners. These services could include:
  - Assistance with identifying alternate properties
  - Social support for households relocating within the area and to other areas providing contacts and information in regard to social services, facilities and logistical matters (e.g. the logistics of moving including required administrative tasks)
- Continuation and advertising of the WestConnex Assist counselling program
- Continuing to promote the availability of first language support for households with English as a second language to all affected households.

### 9.2.2 Social infrastructure

Measures to mitigate potential impacts on social infrastructure would include:

- Continued consultation with all key social infrastructure providers to assist them and their clients in planning for, and adapting to, the changes expected during the construction period
- Notification of any traffic and access changes during construction period provided to emergency services well in advance of the changes occurring
- Consult with Strathfield Council and Strathfield Girl Guides to assist identifying and accessing temporary premises
- Continue to support the Zongde Temple in planning for relocation in the short and long term.
- Develop plans for the restoration of Bill Boyce and Reg Coady reserves to at least their pre-construction condition in consultation with the relevant Councils and local communities
- Liaise with the property owners and the congregation of users at the Sydney Cheil Uniting Church to provide alternate land for car parking
- Developing plan for permanent altered access to the Sydney Cheil Uniting Church in consultation with the property owners and pastor to minimise impacts to the function of the facility for its congregation
- Consulting with users of Concord Oval and St Lukes Park in accordance with the Community Consultation Plan.
- Consult with social infrastructure (specifically aged care and child care facilities) affected by the project in regard to any respite periods (where reasonable and feasible) for the most intrusive construction activities undertaken during the day.

### 9.2.3 Access and connectivity

Measures to address potential connectivity and access issues created by construction of the project would include:

- Considering (in consultation with Haberfield Public School and Ashfield Council) pedestrian safety at the egress point for the Parramatta Road civil site at Bland Street, as this heavy vehicle exit would be in close proximity to a pedestrian overpass. A traffic management and safety plan should be prepared as part of the CEMP, with particular attention to Bland Street in Ashfield
- Consulting with project affected social infrastructure providers in developing construction traffic management plans, including notification to local emergency services about changes to local road networks, particularly road closures

- Relocating Orpington Street bus stop in consultation with the Willows Private Nursing Home to minimise walking distance between the relocated bus stop and the nursing home where practical
- Explore the options to increase pedestrian and cyclist connectivity along the M4 alignment particularly in the vicinity of Underwood Road and Allen Street to provide improved opportunities for active lifestyles and contribute to offsetting the amenity impact of the project corridor
- Developing a car parking strategy that promotes public transport use and carpooling, and investigates opportunities to provide alternative parking arrangements while minimising impacts on on-street car parking
- Notifying local residents, business owners, social infrastructure providers and bus passengers of traffic management procedures. Ongoing consultation with communities would provide information on planned construction activities, changes to property access, and changes to any bus stop arrangements.

## 9.2.4 Amenity

Measures to address amenity impacts due to construction would include:

- Implementing at property noise treatments (for operational noise impacts) in advance of or at the early stages of construction. The potential for at property noise treatments should be investigated during the pre-construction phase and implemented where feasible for all properties likely to be significantly impacted by construction noise to reduce the impacts as much as possible. This should be implemented as soon as is practical, preferably before construction works commence
- Supporting beautification of construction compound sites through temporary plantings, decorated hoardings and the like to assist in reducing visual impacts. Consultation with the community in planning and implementing these approaches would also contribute to sustaining community cohesion and identity throughout the construction period
- Providing support for local community development activities, such as community events, to assist with restoring and increasing community cohesion during construction
- Consulting with local communities to develop options and plans for the reuse of residual land for open public spaces, or as part of the public domain to increase community connectedness and sense of belonging through landscaped areas with public art etc.

## 9.3 Operation

### 9.3.1 Access and connectivity

Measures to address potential connectivity and access issues created by operation of the project would include:

- Exploring opportunities for providing improved pedestrian and cyclist connectivity especially in the vicinity of Wentworth Street, Underwood Road and Allen Street, Homebush.
- WDA liaise with Transport for NSW in regard to improving pedestrian access in the vicinity of the Concord Road interchange, and specifically access to the south bound Concord Road bus stop.

### 9.3.2 Amenity

Measures to address amenity impacts due to operation of the project would include:

- Supporting beautification of operational facilities and spaces through public art and landscaping to assist in reducing visual impacts associated with these facilities. Consultation with the community in planning and implementing these approaches would also contribute to building community cohesion and identity following the construction period
- Providing support for local community development activities, such as community events, to assist with restoring and increasing community cohesion post construction
- Considering legacy projects which deliver social benefits, such as developing residual land as open space areas. Legacy projects should be identified and developed in consultation with local Councils

- Maximising opportunities for tree planting to those areas within the project corridor where this is feasible and appropriate within an overall design framework.

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# Appendix A Case studies of social impact assessments for similar projects

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## Introduction

This is a summary of SIAs that have been prepared for other similar projects, including the types of impacts identified for communities and recommended mitigation measures. The SIAs reviewed are:

- East West Link – Melbourne
- Lane Cove Tunnel – Sydney
- Cross City Tunnel – Sydney
- CLEM7 – Brisbane
- Legacy Way – Brisbane.

## East West Link – Eastern Section, Linking Melbourne Authority

### Project overview

The East West Link – Eastern Section project by the Victorian Government through the Linking Melbourne Authority proposed an 18-kilometre cross-city road connection from the Eastern Freeway to the Western Ring Road in Melbourne. Similar to the project, the proposal included two 4.4-kilometre tunnels between the Eastern Freeway and CityLink, within a highly urbanised area with established communities, shopping and commercial centres, industrial areas, parks and reserves, and community and recreational facilities.

The following review of the East West Link – Eastern Section was drawn from the SIA of the Comprehensive Impact Statement (CIS) (Linking Melbourne Authority, 2013). It was approved by the Minister for Planning in June 2104, and a the construction contract was awarded in September 2014, but was subsequently suspended by the new Victorian Government in December 2014

### Consultation

The consultation process and social assessment involved the following:

- Demographic analysis of the region and designated precincts
- Analysis of the results from the online East West Link – Eastern Section community survey
- Conduct and analysis of the findings from focus groups
- Conduct and analysis of the findings from interviews with a representative sample of households in the areas of primary impact
- Multiple public displays and public information sessions.

### Social impacts and benefits

The SIA considered the potential social impacts and benefits for the broader region given that the East West Link would serve people across Melbourne. In addition, it identified six precincts of impact. Potential social impacts to the assets and values of each precinct were determined and detailed. These included:

#### *Construction*

- Property acquisition and relocation of residents
- Temporary changes to access and movement for cyclists and pedestrians
- Temporary changes to local traffic movement
- Uncertainty about the impacts of tunnelling activities beneath properties

- Temporary changes to access to public open space, recreational and sporting facilities.

### *Operation*

- Impacts from the acquisition of properties including the impacts on vulnerable residents
- Impacts on perceptions of the amenity of public open space
- Impacts on amenity in some specific areas that would feature elevated structures and other project infrastructure.

### **Impact mitigation and management**

The SIA found that potential social impacts would be severe in some individual streets however at the suburb level would be rated as a minor impact. Severe social impacts related to the required acquisition of residential properties. The SIA also identified performance requirements for Melbourne Linking Authority to avoid, minimise and manage impacts as follows:

- Offer support and counselling services as appropriate to affected landowners and tenants with particular attention paid to the circumstance and needs of vulnerable residents
- Work with sporting clubs, community facilities and local councils to explore potential relocation of sporting and recreational facilities
- Work with relevant government agencies to plan any new facilities that are suitable for future use where community facilities would need to be relocated or replaced
- Implement a community involvement plan to keep residents informed about the process and provide opportunities for local councils and community groups to raise concerns during construction and operational phases
- Monitor and manage the analysis of on-line survey results and ongoing interviews with affected landowners whose properties may be acquired.

### **Lane Cove Tunnel**

#### **Project overview**

The Lane Cove Tunnel is a 3.6-kilometre twin tunnel motorway in Sydney running under Epping Road. It links the M2 Motorway at North Ryde with the Gore Hill Freeway at Artarmon and is an alternate route to Epping Road. Similar to the project, the Lane Cove Tunnel project included a tunnel across a highly urbanised area with a limited amount of property acquisition. The tunnel became operational in 2007.

The study area was broken into three distinct precincts including:

- West of the Pacific Highway (including the tunnel, Epping Road and the surrounding environs)
- East of the Pacific Highway (Gore Hill Freeway widening)
- Falcon Street ramps.

#### **Consultation**

The consultation process included forming five focus groups throughout the concept design stage and preparation of the EIS. These focus groups comprised representatives from various major stakeholder groups to identify key community concerns. The community's concerns included:

- Tunnel ventilation and associated air quality
- Epping Road and tunnel traffic and transport/urban design
- Cycling, pedestrian and public transport
- Gore Hill Freeway widening
- Falcon Street ramps.

The consultation findings highlighted the valuable contribution of community consultation to the development and refinement of environmental mitigation measures.

## **Social impacts and benefits**

The social impacts associated with the Lane Cove Tunnel were anticipated to be positive. The most significant anticipated effects included the decongestion of traffic on the Epping Road corridor, reductions in journey times, and improved access, particularly from the Hills District and North Ryde to the lower North Shore, the city and the Northern Beaches.

By reducing traffic on Epping Road, it was also expected to lead to less traffic filtering off into local streets. As a result of the reduction in traffic, improvements were expected in air quality, noise and safety. Safety was expected to be enhanced as a result of improved traffic flow and also by reducing the traffic build up at major intersections. The Lane Cove Tunnel was expected to improve the attractiveness of public transport services as well as pedestrian, cyclist and resident environments along Epping Road.

It was predicted that improvements to surface areas would make it more accessible and in turn reduce severance between the Lane Cove north area and community services and facilities south of Epping Road and close to the Lane Cove shops.

Overall, it was concluded that the social benefits would outweigh the negative impacts. The Lane Cove Tunnel project was considered equitable, as it was expected to reduce the burden of impacts on local residents suffering poor amenity.

## **Impact mitigation and management**

In accordance with legislation, development was guided by a project environmental management plan, which was designed to minimise project impacts, including social impacts. It included specific mitigations as well as monitoring, auditing and reporting requirements.

## **Sydney Cross City Tunnel**

### **Project overview**

The Cross City Tunnel is a 2.1-kilometre motorway that runs east-west below Sydney's CBD between Darling Harbour and Rushcutters Bay/Kings Cross, linking the Western Distributor at the western end to New South Head Road at the eastern end. It includes underground links between the Cross City Tunnel and the Eastern Distributor, allowing for movement between the two motorways. Traffic from the Eastern suburbs can use the west-bound Cross City Tunnel, exiting at Sir John Young Crescent to access the city and harbour crossings.

Unlike the project, property impacts for the Cross City Tunnel were always expected to be extremely minimal, occurring in a CBD environment with no need for any complete property acquisition but rather a small number of partial property acquisitions.

The following review of was drawn from the Director General's report of the *Proposed Cross City Tunnel: Kings Cross to Darling Harbour* (NSW Department of Urban Affairs and Planning 2001).

### **Consultation**

The Cross City Tunnel EIS addressed four main precincts: the Darling Harbour, Central, Hyde Park and Eastern Precincts. Its consultation program raised a number of key issues across the different precincts.

Numerous individuals, particularly those in the Eastern precinct (Woolloomooloo, Kings Cross and Darlinghurst) expressed concern over the likely construction impacts in light of some negative experiences during the construction of the Eastern Distributor. The local community called for new measures to avoid repeating those outcomes, such as frequent night time works and insufficient consultation.

The Department of Housing voiced concerns that public housing tenants in the Eastern Precinct would be significantly affected by construction impacts and that ongoing liaison and consultation would be required to minimise impacts. The Department of Housing also highlighted the potential for displacement of low income residents and possible reductions in the facilities and community services required by these people.

Submissions from groups including South Sydney City Council, the Sydney Church of England Girls Grammar School, individuals and community groups expressed concern over potential displacement of prostitution and drug related activities from William Street into the surrounding area, which would put them in closer vicinity of some schools.

### **Social impacts and benefits**

Social impacts of Cross City Tunnel were assessed for the construction phase (mainly adverse) and operational phase (mainly positive). The social impacts that were investigated included changes in:

- Air quality
- Noise
- Travel opportunities
- Social character
- Safety and security
- Views
- Pedestrian amenity
- Local open space
- Access.

The Director General's report summarised the community impacts to include the potential to:

- Cause the displacement of prostitution into William Street
- Further reduce the quality of life in the inner city
- Result in the displacement of low income people and increase the segregation and stigmatisation of those that remain
- Primarily benefit private vehicle drivers at the disproportionate expense of local residents who would suffer the brunt of construction impacts
- Restrict pedestrian movement in certain areas during construction
- Be the product of a flawed EIS and community consultation process if the outcome is predetermined
- Have not included adequate consultation of people from non-English speaking backgrounds
- Negatively impact on the prices of properties in the vicinity
- Ineffectively address environmental issues of surrounding areas.

### *Construction*

The Cross City Tunnel was expected to result in largely adverse impacts on individuals and the community during construction through changes in:

- Access
- Noise
- Vibration
- Dust
- Traffic.

These impacts would be accentuated close to the main construction work sites such as at tunnel portals and surface works areas. It was predicted that the Cross City Tunnel would lead to improvements in the environment and amenity of the surrounding area, owing to improvements in public transport access and improved pedestrian accessibility as well as reductions in surface traffic, noise and air pollution.

Overall it was assessed that the Cross City Tunnel would have a net social benefit during operation, and benefits would be most significant along William Street and the surrounding area.

### *Operation*

The EIS also identified that potentially negative impacts may arise due to the operations of the Cross City Tunnel, including:

- Accelerated gentrification of the Eastern Precinct
- Displacement of lower income residents affected by higher rents
- Street sex-workers moving into William Street and surrounding streets due to reduced traffic flow and improved pedestrian access.

### **Impact mitigation and management**

A number of recommendations were issued in the EIS and by the Director General to reduce impacts. During construction, the proposed mitigation measures included:

- Having most construction work occur during normal construction hours and any work outside of normal hours to meet strict noise criteria
- Monitoring of noise, vibration and air quality throughout construction
- Implementing an extensive communication strategy inclusive of notifications, briefings, community liaison groups and a 24-hour complaints telephone number
- Appointing Independent Community Liaison Representatives to liaise with the community and the Environmental Management Representative when unacceptable impacts are reported.

During operation, a key recommendation was for the proponent to cooperate with the local Steering Group on street prostitution and other relevant groups to develop measures to address issues of greatest concern to the community.

### **CLEM7, Brisbane City Council**

#### **Project overview**

The North-South Bypass Tunnel or CLEM7 is a 6.8-kilometre toll road that opened in March 2010. It links the Pacific Motorway (M3) and Ipswich Road at Woolloongabba to Lutwyche Road and the Inner City Bypass at Bowen Hills in Brisbane, Queensland. The CLEM7 includes twin, two-lane tunnels, which span 4.8 kilometres.

CLEM7 shares a number of common features to the project because it is a large-scale road infrastructure project which involved constructing a tunnel in a highly urbanised environment in Brisbane. It was constructed between 2006 and 2010.

The following review was drawn from the Coordinator General's report on the Environmental Impact Statement (EIS) for the proposed North-South Bypass Tunnel Project.

#### **Consultation**

The CLEM7's public information and consultation process included:

- Public displays and concept design displays
- Project newsletters for distribution
- Community information sessions
- Formation and meetings of three community reference groups
- Formation and meetings of an air quality focus group
- Individual property owner consultations
- Major stakeholder and Government agency briefings
- Establishment of a free-call project information line

- Project website.

### **Impact mitigation and management**

The findings of the consultation process were integrated to the project concept design process and informed concept design changes to mitigate these potential impacts. Strategies were formulated to optimise community benefits and minimise adverse impacts. Impacts were addressed through strategies relating to traffic and transport, air quality, noise vibration, cultural heritage and social environment, which included the preparation of:

- Traffic management plans
- Landscape management plan
- Community information program
- Community consultative committees
- Safety management plans.

### **Legacy Way (previously Northern Link)**

#### **Project overview**

The Legacy Way project in Brisbane consists of a five-kilometre tunnel from the Toowong Roundabout to the Inner City Bypass. It is scheduled for completion by 2016 and will provide two two-lane links from the Western Freeway at Toowong with the Inner City Bypass (ICB) at Kelvin Grove

Similar to the project, Legacy Way is occurring in a highly urbanised environment, requires residential and commercial property acquisition and involves the temporary occupation of open green space during construction (Brisbane Botanical Gardens).

The following information has been extracted from the Northern Link EIS (SKM 2008).

#### **Consultation**

The consultation process for the project resulted in 200 public submissions and 12 submissions from government. Over 80 per cent of submissions explicitly made reference to local connection/access points, with impacts of concern close to these points identified to include:

- Amenity and liveability (44%)
- Pedestrian and cycle access (39%)
- Traffic movements (61%).

Other key issues raised in significant proportions of stakeholder submissions included:

- Impacts on air quality (51%)
- Noise and vibration impacts (43%)
- Construction impacts (33%)
- Property impacts (31%)
- Filtration of ventilations outlets (31%)
- Visual impacts (28%)
- Project alternatives (24%).

#### **Social impacts and benefits**

Social impacts associated with Legacy Way were identified across construction and operation. The assessment discussed potential impacts and benefits using a narrative approach referencing other technical studies for details on the likely significance of impacts.

The overall benefits were identified to include:

- Reduced traffic congestion (improved travel times and amenity)
- Reduced heavy vehicles on surface roads (reduced noise and fumes and improved safety)
- Improved local amenity (due to above factors and a reduction in existing rat running traffic)
- Improved access to community facilities (improved connectivity)
- Increased future employment opportunities
- Improved cross-city commuting times
- Attracting businesses to locate near surface connections through reduced transport and freight costs.

### *Construction*

During construction, impacts were identified on local amenity, access and connectivity and quality of life. The specific impacts predicted included:

- Noise, dust and vibration (including noise and dust associated with the loading, handling and removal of spoil)
- Sleeping disturbance
- Changes in local character due to the location of worksites
- Temporary changes to local access and connectivity for pedestrians, cyclists and motorists.

### *Operation*

During operations, social impacts associated with Legacy Way were anticipated to include:

- Noise from traffic entering and exiting the tunnel, particularly in newly exposed areas
- Disruptions to views or visual amenity as a result of the location of surface infrastructure (e.g. ramps)
- The closure of local streets.

## **Impact mitigation and management**

Strategies were formulated to optimise community benefits and minimise adverse impacts of Legacy Way. Impacts were addressed through strategies relating to design development, crime prevention, public transport and active transport strategies and included:

- Implementing management measures to minimise noise and dust
- Maintaining safe access for pedestrians and cyclists near construction sites
- Enforcing prohibition of construction worker parking on residential streets
- Considering peak use times of key community facilities when temporarily cutting access
- Reinstating open spaces as soon as practical.

The EIS documentation reports that ongoing community participation in planning and environmental management monitoring is expected to help avoid or otherwise minimise social impacts. Impacts were therefore also to be mitigated using consultation strategies and other applicable sections of the project's EMPs.

EMPs, which are required to be prepared by contractors for both construction and operation of Legacy Way, were to be used to identify measures that minimise environmental impacts, meet specified environmental objectives and performance criteria, and protect the environmental values of the study corridor.

## **Other mitigation measures identified in case studies of social impact assessments for similar projects**

Lessons learned elsewhere indicate that the adoption of mitigation measures can contribute to managing the social impacts from major road projects. A review of similar projects in Australia suggests that these measures could include:

- Planning for most construction work to occur during normal construction hours and for any work outside of normal hours to meet strict noise criteria
- Monitoring of noise, vibration and air quality throughout construction
- Implementing an extensive communications strategy that includes advance notifications, briefings, community liaison groups and a 24-hour complaints telephone number
- Appointing independent community representatives to act as liaisons between the community and the Environmental Management Representative when disruptive and unwanted impacts are reported.

## Appendix B Demographic indicators

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**Table B1 Demographic indicators for the local study areas**

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Population:														
Total Persons	2093	100	3693	100%	245	100%	2703	100%	2244	100%	258,326	100%	4,391,674	100%
Age groups*:														
0 to 4 years	127	6%	192	5%	20	8%	162	6%	138	6%	16,814	7%	298,901	7%
5 to 11 years	126	6%	180	5%	26	11%	245	9%	135	6%	18,968	7%	382,759	9%
12 to 17 years	114	5%	221	6%	10	4%	169	6%	97	4%	16,693	6%	325,761	7%
18 to 24 years	320	15%	604	16%	16	7%	220	8%	211	9%	27,790	11%	418,841	10%
25 to 34 years	610	29%	1,010	27%	21	9%	330	12%	502	22%	49,461	19%	676,888	15%
35 to 49 years	424	20%	663	18%	66	27%	639	24%	504	22%	55,319	21%	960,970	22%
50 to 59 years	197	9%	336	9%	30	12%	362	13%	219	10%	29,959	12%	537,646	12%
60 to 69 years	78	4%	230	6%	21	9%	252	9%	181	8%	20,074	8%	394,342	9%
70 to 84 years	85	4%	232	6%	30	12%	263	10%	175	8%	18,169	7%	314,495	7%
85 and over years	18	1%	26	1%	4	2%	63	2%	80	4%	5078	2%	81,073	2%
Median Age (years)	31		32		44		40		36		34		36	
Cultural Diversity:														
Indigenous persons	10	0.5%	3	0.1%	-	0.0%	14	0.5%	15	0.7%	1,190	0.5%	54,747	1.2%
Persons born in non-main English speaking countries	931	44%	1984	54%	64	26%	801	30%	962	43%	110,737	43%	1,156,222	26%

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Language spoken at home other than English	1089	52%	2266	61%	113	46%	964	36%	1136	51%	138,389	54%	1,425,535	32%
Household characteristics:														
Family households	500	79%	851	70%	69	86%	727	75%	536	64%	63,633	73%	1,112,635	73%
Lone person household	99	16%	222	18%	8	10%	195	20%	259	31%	18,760	21%	343,810	23%
Group household	37	6%	143	12%	3	4%	49	5%	46	5%	5,105	6%	64,952	4%
Average household size (number of persons)	2.8		2.8		2.9		2.7		2.4		2.8		2.7	
Family Characteristics:														
Total families	516		907		71		731		554		66,319		1,152,551	
Couple family with children	242	47%	378	42%	36	51%	380	52%	244	44%	32,292	49%	563,887	49%
Couple family without children	182	35%	359	40%	26	37%	232	32%	206	37%	22,764	34%	385,716	33%
One parent family	69	13%	128	14%	9	13%	107	15%	81	15%	9421	14%	181,216	16%
Other family	23	4%	42	5%	-	0%	12	2%	23	4%	1842	3%	21,732	2%
Other characteristics:														
Need for assistance	49	2.3%	100	2.7%	7	2.9%	122	4.5%	158	7.0%	11,788	4.6%	192,325	4.4%
Dwellings:														
Separate House	246	36%	703	52%	76	87%	573	55%	145	16%	40,845	44%	926,062	56%
Semi-detached, terrace house, townhouse	142	21%	30	2%	6	7%	189	18%	108	12%	9991	11%	194,169	12%

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Flat, unit or apartment	254	37%	472	35%	-	0%	204	20%	580	62%	36,148	39%	391,889	24%
Other dwellings	-	0%	14	1%	-	0%	-	0%	4	0%	382	0%	7004	0%
Not stated	-	0%	-	0%	-	0%	-	0%	5	1%	127	0%	2274	0%
Total occupied private dwellings	642	95%	1219	91%	82	94%	966	93%	842	90%	87,493	94%	1,521,398	93%
Unoccupied private dwellings	36	5%	122	9%	5	6%	74	7%	89	10%	5775	6%	118,801	7%
Tenure Type:														
Fully owned	114	18%	297	25%	31	40%	379	40%	204	25%	26,078	31%	462,150	31%
Owned with a mortgage	253	40%	374	32%	27	35%	301	32%	243	30%	26,353	31%	529,907	36%
Rented (Total):	258	41%	494	42%	19	25%	263	28%	376	46%	32,076	38%	480,608	33%
Real estate agent	207	80%	372	75%	12	63%	181	69%	319	85%	22,601	70%	299,835	62%
State or territory housing authority	16	2.6%	8	0.7%	3	3.9%	30	3.2%	6	0.7%	2576	3.0%	69,047	4.7%
Person not in same household	29	11%	91	18%	4	21%	43	16%	35	9%	5073	16%	82,565	17%
Housing co-operative/community/church group	6	2%	3	1%	-	0%	-	0%	6	2%	585	2%	9866	2%
Other landlord type	-	0%	10	2%	-	0%	3	1%	7	2%	772	2%	11,732	2%
Landlord type not stated	-	0%	10	2%	-	0%	6	2%	3	1%	469	1%	7563	2%
Other Tenure Type	6	2%	3	1%	-	0%	-	0%	3	1%	543	2%	11,790	2%
Not stated	10	4%	41	8%	3	16%	21	8%	19	5%	2448	8%	36,943	8%
Household Income:														
Median Household income (\$/weekly)	1626		1346		2028		1670		1292		1424		1447	

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Labour Force:														
Labour force participation	1233	69%	1964	61%	120	63%	1406	63%	1196	62%	127,832	60%	2,188,853	62%
Total employed	1165	94%	1815	92%	112	93%	1345	96%	1113	93%	119,799	94%	2,063,266	94%
Employed full-time	807	69%	1104	61%	87	78%	861	64%	730	66%	78,349	65%	1,358,189	66%
Employed part-time	285	24%	621	34%	25	22%	397	30%	316	28%	34,388	29%	584,778	28%
Unemployed persons	68	5.5%	149	7.6%	8	6.7%	61	4.3%	83	6.9%	8033	6.3%	125,587	5.7%
Not in labour force	410	23%	941	29%	61	32%	663	30%	551	29%	71,613	33%	1,149,800	32%
Occupation:														
Managers	107	9%	188	10%	14	12%	223	17%	140	13%	16,093	13%	273,916	13%
Professionals	277	24%	520	29%	31	27%	411	31%	353	32%	34,376	29%	526,564	26%
Technicians and trades	175	15%	231	13%	20	18%	120	9%	116	11%	13,269	11%	251,471	12%
Community and personal service	158	14%	155	9%	6	5%	113	8%	127	12%	9725	8%	182,059	9%
Clerical and administrative	172	15%	249	14%	21	18%	232	17%	147	13%	18,618	16%	333,435	16%
Sales	115	10%	185	10%	11	10%	119	9%	94	9%	10,770	9%	185,951	9%
Machinery operators and drivers	52	4%	64	4%	3	3%	46	3%	45	4%	5153	4%	118,136	6%
Labourers	81	7%	168	9%	8	7%	69	5%	57	5%	9068	8%	151,324	7%
Not stated	32	3%	41	2%	-	0%	3	0%	20	2%	2722	2%	40,413	2%
Educational attainment:														
Completion of Year 12 (or equivalent)	1201	67%	2193	68%	100	52%	1265	57%	1266	66%	131,194	61%	1,935,166	55%
Without post-school qualifications	631	35%	1133	35%	89	46%	855	39%	590	31%	82,646	39%	1,436,030	40%

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Mobility:														
Lived at same address 1 year ago	1433	68%	2484	67%	225	92%	2281	84%	1668	74%	198,594	77%	3,513,769	80%
Lived at same address 5 years ago	733	35%	1437	39%	151	62%	1660	61%	979	44%	123,451	48%	2,319,489	53%
Transport:														
Households without a motor vehicle	50	8%	211	18%	6	8%	96	10%	159	20%	12,948	15%	184,242	12%
One motor vehicle	297	47%	554	47%	28	37%	402	43%	457	56%	37,607	44%	584,187	40%
Two motor vehicles	212	33%	318	27%	30	40%	340	36%	155	19%	25,765	30%	500,581	34%
Three motor vehicles	52	8%	70	6%	11	15%	66	7%	28	3%	6048	7%	140,633	10%
Four or more motor vehicles	24	4%	24	2%	-	0%	34	4%	16	2%	2412	3%	66,229	4%
Journey to work (by one method only):														
Train	364	33%	702	42%	11	10%	150	12%	316	31%	28,653	26%	283,760	15%
Bus	7	1%	43	3%	12	11%	154	13%	83	8%	5790	5%	119,783	6%
Ferry	3	0%	3	0%	-	0%	-	0%	8	1%	930	1%	9175	0%
Tram (includes light rail)	-	0%	-	0%	-	0%	-	0%	6	1%	112	0%	1920	0%
Taxi	4	0%	4	0%	-	0%	-	0%	12	1%	318	0%	5984	0%
Car, as driver	553	51%	695	42%	70	64%	710	59%	442	44%	58,502	53%	1,138,129	60%
Car, as passenger	59	5%	78	5%	13	12%	74	6%	49	5%	5778	5%	106,703	6%
Truck	6	1%	9	1%	-	0%	6	0%	7	1%	866	1%	21,977	1%
Motorbike/scooter	3	0%	6	0%	-	0%	16	1%	13	1%	630	1%	12,645	1%
Bicycle	6	1%	12	1%	-	0%	13	1%	13	1%	905	1%	15,624	1%
Other	12	1%	3	0%	-	0%	-	0%	3	0%	541	0%	9473	1%
Walked only	41	4%	69	4%	-	0%	46	4%	28	3%	3885	4%	84,553	4%

	Homebush precinct		Concord precinct		Cintra Park precinct		Wattle Street precinct		Parramatta Road precinct		Region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Worked at home	29	3%	46	3%	3	3%	44	4%	33	3%	3812	3%	81,612	4%

Note: \* Minor variations can be found between total recorded population and population by age groups in ABS data. These minor variations can compound when amalgamated into custom precincts such as those presented above, such that total populations and population sums calculated by other measures may vary by small amounts.

**Table B2 Demographic indicators for the study region**

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Population:														
Total Persons	41,214	100%	73,738	100%	32,423	100%	75,763	100%	35,188	100%	258,326	100%	4,391,674	100%
Age groups:														
0 to 4 years	2400	6%	5641	8%	1652	5%	5197	7%	1924	5%	16,814	7%	298,901	7%
5 to 11 years	2719	7%	6220	8%	2107	6%	5397	7%	2525	7%	18,968	7%	382,759	9%
12 to 17 years	2236	5%	5344	7%	2131	7%	4297	6%	2685	8%	16,693	6%	325,761	7%
18 to 24 years	3959	10%	8793	12%	4116	13%	6675	9%	4247	12%	27,790	11%	418,841	10%
25 to 34 years	7861	19%	15,122	21%	6137	19%	13,287	18%	7054	20%	49,461	19%	676,888	15%
35 to 49 years	9324	23%	15,269	21%	6333	20%	17,491	23%	6902	20%	55,319	21%	960,970	22%
50 to 59 years	4847	12%	8212	11%	3755	12%	9011	12%	4134	12%	29,959	12%	537,646	12%
60 to 69 years	3235	8%	4729	6%	2624	8%	6835	9%	2651	8%	20,074	8%	394,342	9%
70 to 84 years	3398	8%	3553	5%	2757	9%	6069	8%	2392	7%	18,169	7%	314,495	7%
85 and over years	1234	3%	855	1%	812	3%	1504	2%	673	2%	5078	2%	81,073	2%
Median Age (years)	37		31		35		37		33		34		36	
Cultural Diversity:														
Indigenous persons	233	0.6%	448	0.6%	120	0.4%	286	0.4%	103	0.3%	1190	0.5%	54,747	1.2%
Persons born in non-main English speaking countries	15,721	38%	39,977	54%	15,827	49%	21,744	29%	17,468	50%	110,737	43%	1,156,222	26%
Language spoken at home other than English	18,305	44%	52,376	71%	19,185	59%	27,113	36%	21,410	61%	138,389	54%	1,425,535	32%
Household Characteristics:														
Family households	10,096	66%	17,192	78%	7,652	71%	20,076	72%	8617	76%	63,633	73%	1,112,635	73%

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Lone person household	4181	27%	3760	17%	2209	21%	6459	23%	2151	19%	18,760	21%	343,810	23%
Group household	1019	7%	1128	5%	867	8%	1481	5%	610	5%	5105	6%	64,952	4%
Average household size (number of persons)	2.5		3.1		2.8		2.5		2.9		2.8		2.7	
Family Characteristics:														
Total families	10,422		18,303		8054		20,558		8982		66,319		1,152,551	
Couple family with children	4613	44%	9627	53%	3874	48%	9545	46%	4633	52%	32,292	49%	563,887	49%
Couple family without children	3945	38%	5331	29%	2651	33%	8025	39%	2812	31%	22,764	34%	385,716	33%
One parent family	1530	15%	2804	15%	1251	16%	2546	12%	1290	14%	9421	14%	181,216	16%
Other family	334	3%	541	3%	278	3%	442	2%	247	3%	1842	3%	21,732	2%
Other characteristics:														
Need for assistance	2452	5.9%	3319	4.5%	1684	5.2%	2,921	3.9%	1412	4.0%	11,788	4.6%	192,325	4.4%
Dwellings:														
Separate House	5859	36%	10,995	47%	5631	50%	12,752	42%	5608	47%	40,845	44%	926,062	56%
Semi-detached, terrace house, townhouse	1836	11%	2671	11%	1198	11%	3372	11%	914	8%	9,991	11%	194,169	12%
Flat, unit or apartment	7478	46%	8334	36%	3824	34%	11699	39%	4813	40%	36,148	39%	391,889	24%
Other dwellings	92	1%	54	0%	60	1%	138	0%	38	0%	382	0%	7,004	0%
Not stated	30	0%	24	0%	14	0%	54	0%	5	0%	127	0%	2,274	0%

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total occupied private dwellings	15,295	94%	22,078	95%	10,727	94%	28,015	92%	11,378	95%	87,493	94%	1,521,398	93%
Unoccupied private dwellings	1037	6%	1183	5%	646	6%	2371	8%	538	5%	5,775	6%	118,801	7%
Tenure Type:														
Fully owned	4407	30%	5505	26%	3641	35%	9268	34%	3257	30%	26,078	31%	462,150	31%
Owned with a mortgage	4240	29%	7105	34%	2763	27%	8691	32%	3554	32%	26,353	31%	529,907	36%
Rented (Total):	6141	42%	8586	41%	3,925	38%	9273	34%	4151	38%	32,076	38%	480,608	33%
Real estate agent	4622	75%	5824	68%	2,702	69%	6540	71%	2913	70%	22,601	70%	299,835	62%
State or territory housing authority	231	1.6%	836	3.9%	310	3.0%	740	2.7%	459	4.2%	2576	3.0%	69,047	4.7%
Person not in same household	972	16%	1,432	17%	664	17%	1451	16%	554	13%	5073	16%	82,565	17%
Housing co-operative/ community/church group	159	3%	131	2%	84	2%	118	1%	93	2%	585	2%	9866	2%
Other landlord type	92	1%	236	3%	94	2%	279	3%	71	2%	772	2%	11,732	2%
Landlord type not stated	65	1%	127	1%	71	2%	145	2%	61	1%	469	1%	7563	2%
Other Tenure Type	122	2%	135	2%	69	2%	141	2%	76	2%	543	2%	11,790	2%
Not stated	387	6%	749	9%	330	8%	642	7%	340	8%	2448	8%	36,943	8%
Household Income:														
Median Household income (\$/weekly)	1413		1160		1310		1817		1421		1424		1447	
Labour Force:														
Labour force participation	21,970	63%	31,627	53%	16,191	59%	40,423	64%	17,621	60%	27,832	60%	2,188,853	62%

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Total employed	20,623	94%	28,907	91%	15,096	93%	38,682	96%	16,491	94%	119,799	94%	2,063,266	94%
Employed full-time	13,353	65%	18,667	65%	9259	61%	26,407	68%	10,663	65%	78,349	65%	1,358,189	66%
Employed part-time	6118	30%	8244	29%	4989	33%	10,126	26%	4911	30%	34,388	29%	584,778	28%
Unemployed persons	1347	6.1%	2720	8.6%	1095	6.8%	1741	4.3%	1130	6.4%	8033	6.3%	125,587	5.7%
Not in labour force	10,617	30%	23,268	39%	9692	35%	18,500	29%	9536	32%	71,613	33%	1,149,800	32%
Occupation:														
Managers	2527	12%	2770	10%	1715	11%	7095	18%	1986	12%	16,093	13%	273,916	13%
Professionals	6683	32%	6015	21%	4229	28%	12,336	32%	5113	31%	34,376	29%	526,564	26%
Technicians and trades	2087	10%	4105	14%	1718	11%	3564	9%	1795	11%	13,269	11%	251,471	12%
Community and personal service	1884	9%	2418	8%	1350	9%	2751	7%	1322	8%	9725	8%	182,059	9%
Clerical and administrative	3219	16%	4139	14%	2350	16%	6344	16%	2566	16%	18,618	16%	333,435	16%
Sales	1786	9%	2511	9%	1509	10%	3441	9%	1523	9%	10,770	9%	185,951	9%
Machinery operators and drivers	749	4%	2335	8%	575	4%	884	2%	610	4%	5153	4%	118,136	6%
Labourers	1356	7%	3717	13%	1267	8%	1586	4%	1142	7%	9068	8%	151,324	7%
Not Stated	328	2%	900	3%	382	3%	677	2%	435	3%	2722	2%	40,413	2%
Educational attainment:														
Completion of Year 12 (or equivalent)	22,108	63%	32,845	55%	17,594	64%	39,105	62%	19,542	66%	131,194	61%	1,935,166	55%

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Without post-school qualifications	11,957	34%	27,609	47%	10,724	39%	21,542	34%	10,814	37%	82,646	39%	1,436,030	40%
Mobility:														
Lived at same address 1 year ago	32,017	78%	55,548	75%	25,390	78%	58,591	77%	27,048	77%	198,594	77%	3,513,769	80%
Lived at same address 5 years ago	20,023	49%	33,469	45%	16,496	51%	36,780	49%	16,683	47%	123,451	48%	2,319,489	53%
Transport:														
Households without a motor vehicle	3140	21%	3161	15%	2177	21%	2820	10%	1650	15%	12,948	15%	184,242	12%
One motor vehicle	7329	49%	9392	44%	4371	42%	11,859	43%	4656	42%	37,607	44%	584,187	40%
Two motor vehicles	3450	23%	6492	31%	2779	27%	9765	36%	3279	30%	25,765	30%	500,581	34%
Three motor vehicles	666	4%	1538	7%	745	7%	2124	8%	975	9%	6048	7%	140,633	10%
Four or more motor vehicles	262	2%	582	3%	303	3%	808	3%	457	4%	2412	3%	66,229	4%
Journey to work (by one method only):														
Train	6397	34%	7783	29%	4905	35%	4835	14%	4733	31%	28,653	26%	283,760	15%
Bus	1106	6%	305	1%	525	4%	3509	10%	345	2%	5790	5%	119,783	6%
Ferry	16	0%	62	0%	13	0%	830	2%	9	0%	930	1%	9175	0%
Tram (includes light rail)	32	0%	30	0%	16	0%	23	0%	11	0%	112	0%	1920	0%
Taxi	70	0%	90	0%	24	0%	104	0%	30	0%	318	0%	5984	0%

	Ashfield LGA		Auburn LGA		Burwood LGA		Canada Bay LGA		Strathfield LGA		Study region		Greater Sydney Region	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Car, as driver	8316	44%	15,058	56%	6279	45%	20,780	59%	8069	52%	58,502	53%	1,138,129	60%
Car, as passenger	808	4%	1778	7%	656	5%	1669	5%	867	6%	5778	5%	106,703	6%
Truck	103	1%	236	1%	126	1%	285	1%	116	1%	866	1%	21,977	1%
Motorbike/scooter	162	1%	73	0%	64	0%	274	1%	57	0%	630	1%	12,645	1%
Bicycle	282	1%	120	0%	81	1%	371	1%	51	0%	905	1%	15,624	1%
Other	73	0%	154	1%	59	0%	177	0%	78	1%	541	0%	9473	1%
Walked only	817	4%	846	3%	708	5%	1033	3%	481	3%	3885	4%	84,553	4%
Worked at home	690	4%	560	2%	448	3%	1583	4%	531	3%	3812	3%	81,612	4%

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## Appendix C Social infrastructure list

**Table C1 Aged care**

Map reference number	Name	Description
1	Linburn Nursing Home	Residential aged care providing 62 high care beds including 1 respite and 8 dementia beds.
2	Ainsley Aged Care	Residential aged care providing 70 high care beds.
3	Woodfield Terraces Retirement Village	46 high care beds including 25 dementia beds, 57 low care beds.
4	Bupa Aged Care Ashfield	70 beds including 31 dementia beds.
5	Ashfield Presbyterian Aged Care	Residential aged care facility providing 84 high care, 73 low care, 2 respite, and 20 dementia care beds.
6	Kitty Doyle Retirement Village	No data available.
7	Chandos Nursing Home	Consultation required to establish number of beds and services.
8	Parkview Nursing Home	59 beds.
9	The Willows Private Nursing Home	Residential aged care providing 60 low care beds and one respite bed.
10	Haberfield Presbyterian Aged Care	Residential aged care facility providing 41 beds for low to medium dependency residents.
11	Wyoming Aged Care Facility	80 high care beds.
12	Woodfield Retirement Village and Nursing Home	46 high care beds including 25 dementia beds, 57 low care beds.
13	St Joan of Arc Villa	50 beds including 4 respite beds.
14	Lewisham Nursing Home and Hostel	96 beds. 12 beds cater for secure dementia.

**Table C2 Childcare**

Map reference number	Name	Description
15	Fiona Childcare Centre – North Strathfield	Long day care, early learning program, before school care, after school care, and school holiday/vacation care, long day care for 90 children. Out of school hours care: 46 approved places.
16	Lighthouse Childcare (North Strathfield) Pty Ltd	Long day care, occasional care, before school care, after school care and school holiday/vacation care for 142 children.
17	MLC School OSHC	Before school care, after school care and school holiday/vacation care for 45 approved places.
18	SMOOSH Concord	Before school care, after school care and school holiday/vacation care for 60 approved places.
19	Burwood Montessori Academy Pty Ltd	Long day care and early learning program for 48 children.
20	Gymbaroo	Provides educational playgroup classes for parents and their children, from babies to pre-schoolers. Classes are provided over ten weeks, 45 minutes each. Located in the hall of St Lukes Anglican Church.
21	St Anthony's Family Care - Early Learning Centre	Long day care and early learning program for 46 children.

Map reference number	Name	Description
22	Headstart Early Learning Centre Five Dock	Long day care and early learning program for 86 children.
23	St John's Preschool Ashfield	Pre-school operated from St John's Anglican Church.
24	Little V.I.P's Childcare and Preschool	Long day care and early learning program for 40 children.
25	The Infants Home	This site houses five separately licensed early childhood education and care centres, each providing care for about 180 children per day, including vulnerable children and those with special needs. The centres include: <ul style="list-style-type: none"> <li>• Murray House – babies and toddlers</li> <li>• Gorton House – babies, toddlers and pre-schoolers</li> <li>• Johnson House – babies</li> <li>• Robinson House – toddlers and pre-schoolers</li> <li>• Rigby House – babies</li> </ul> The Infants Home also manages local family day care services (66 providers registered) The first stage of the new centre opened on 1 July 2013, aiming to provide a 240 place integrated early education and care centre.
26	Chaya's Family Day Care	Family day care for 6 weeks to 12 year olds
27	Nurjahan's Family Day Care	Family day care for 1–12 year olds.
28	Peek-a-Boo Early Learning Centre	Recently opened Long day care Monday to Friday. There are 76 children enrolled at this centre.
29	Goodstart Early Learning	Provides Long day care, early learning program and occasional care for 57 children.
30	UnitingCare Ella Children's Centre	Long day care for 42 children.
31	Haberfield Baptist Church Preschool	Preschool operated from Haberfield Baptists Church.

**Table C3 Community facilities**

Map reference number	Name	Description
32	Flemington Markets	Provides a combination of fresh produce and community markets. The facility covers 42 ha and operates 24 hours per day, seven days a week.
33	Strathfield Men's Shed	Provides a meeting place for men to share skills and activities.
34	Strathfield Guide Hall	Hall for use by Strathfield Girl Guides activities, targeted towards girls and women over 5 years.
35	Concord Community Centre	Spaces for hire including meeting rooms and a larger centre.
36	Five Dock Library	Local branch library.
37	Yasmar Training Facility	NSW Juvenile Justice facility, and listed on the state heritage register.
38	Haberfield Library	Local branch library.

Map reference number	Name	Description
39	Ella House	Located on the St David's Uniting Church Haberfield site, Ella House is a community centre providing a range of services, particularly in aged care and respite, along with training, social and respite activities for young people with intellectual and physical disabilities.

**Table C4 Education**

Map reference number	Name	Description
40	Homebush Public School	K-6 primary school, 437 enrolments (2014)
41	The Macdonald College	Years 3–12 college for academic and performing arts, 268 enrolments (2014)
42	TAFE NSW Western Sydney Institute – Open Training and Education Network (OTEN) Strathfield	Provides distance TAFE NSW courses.
43	Methodist Ladies College School	Years K–12 college, 1161 enrolments (2014)
44	St Mary's Catholic Primary School	Years K–6 primary school, 526 enrolments (2014)
45	Concord Public School	Years K–6 primary school, 261 enrolments (2014)
46	Concord High School	Years 7–12 high school, 929 enrolments (2014)
47	Lucas Gardens School	Provides educational programs for students with intellectual and physical disabilities, some of whom also have sensory impairments and complex medical conditions. The school operates six classes from K–12. 32 enrolments (2014).
48	Burwood Girls High School	Years 7–12 high school, 1193 enrolments (2014)
49	Rosebank College	Non-government high school, 1102 enrolments (2014)
50	Domremy Catholic College	Non-government high school, 628 enrolments (2014)
51	Haberfield Public School	Years K–6 primary school, 615 enrolments (2014)
52	St Joan of Arc Primary School	Years K–6 primary school, 325 enrolments (2014)
53	Dobroyd Point Public School	Years K–6 primary school, 251 enrolments (2014). Also provides OOSH and vacation care.

**Table C5 Emergency services**

Map reference number	Name	Description
54	Concord Fire Station	NSW Fire and Rescue
55	Strathfield Police Station	NSW Police. Part of Flemington LAC.
56	Burwood Fire Station	NSW Fire and Rescue
57	St John Ambulance Australia (NSW)	St John Ambulance Australia (NSW)
58	Burwood SES	SES Unit
59	Canada Bay SES	SES Unit
60	Five Dock Police Station	NSW Police. Part of Burwood LAC.

Map reference number	Name	Description
61	Ashfield Police Station	NSW Police. Part of Ashfield LAC.
62	Ashfield Fire Station	NSW Fire and Rescue
63	Summer Hill Ambulance Station	NSW Ambulance
64	Ashfield Leichhardt SES	SES Unit

**Table C6 Health facilities**

Map reference number	Name	Description
65	Concord Repatriation General Hospital	Principal referral facility and teaching hospital. Major services provided include colorectal and laparoscopic surgery, gastroenterology, geriatrics and rehabilitation medicine, bone and joint services, cancer services, haematology, respiratory medicine and sleep studies, molecular biology and genetics, and those provided through the internationally acknowledged Statewide Burns Service, in which Concord plays a major part.
66	Strathfield Private Hospital	Private hospital with 85 beds for various surgical procedures.
67	St John of God Burwood Hospital	Private psychiatric hospital with 86 beds.
68	Dame Edith Walker Hospital	Heritage site/buildings, with some buildings uses for Concord Hospital.
69	St John of God Medical Centre	
70	Burwood Chest Clinic	Medical centre
71	Concord Private Hospital	Private hospital
72	Dental Evolutions Sydney	Dental clinic
73	Ramsay Street Medical Centre	Medical centre

**Table C7 Open space**

Map reference number	Name	Description
74	Wentworth Road Park	Local playground and park
75	Bill Boyce Reserve	Local park
76	Ismay Reserve	Local park
77	Powells Creek open space	Passive recreational space
78	Allen Street Reserve	Local park
79	Arnotts Reserve	Local park

**Table C7 Religious services**

Map reference number	Name	Description
80	St Michael's Serbian Orthodox Church	
81	Uniting Church in Australia	Uniting Church services including Sunday services
82	Our Lady of the Assumption Catholic Church	Catholic Church services throughout the week
83	Jehovah's Witnesses Kingdom Halls	Cantonese congregation
84	Sydney Russian Seventh Day Adventist Church	Christian worship services
85	Concord Baptist Church	Services on Sundays at 9.30am. Other activities onside throughout the week.
86	Sydney Cheil Uniting Church	Korean church
87	St Andrew's Anglican Church	Anglican Church
88	Church of Living Water	Church services
89	St Luke's Concord Anglican Church	Anglican Church with services on Sundays at 9am
90	St Joseph's Maronite Catholic Church, Croydon	Maronite Catholic Church, provides Arabic and English Services, services: Monday to Friday 9am and 6pm, Saturday 6pm, Sunday 8–11am and 7pm
91	St John's Anglican Church, Ashfield	Anglican Church with services held on Sundays. The St John's Preschool also operates from here.
92	Uniting Church in Australia	Uniting Church services including Sunday services
93	Jehovah's Witnesses Kingdom Halls	Jehovah's Witnesses worship services and Bible study meetings throughout the week
94	Zongde Buddhist Temple	Buddhist temple
95	Church of Jesus Christ of Latter Day Saints	Church services
96	St David's Uniting Church	Uniting Church services including Sunday services and activities/programs through the week
97	Kwan Yin Kur Temple	Buddhist temple
98	St Oswalds Anglican Church Haberfield	Anglican Church with services held on Sundays.
99	Haberfield Baptist Church	Services on Sundays at 10.30am and 6pm. Operates the Haberfield Baptist Preschool.
100	St Joan of Arc's Catholic Church	Catholic Church services throughout the week

**Table C6 Sport and recreation**

Map reference number	Name	Description
101	Sydney Olympic Park	Local, regional and international level sporting facilities, as well as informal facilities such as walking and cycling trails, picnic areas and parks.
102	Concord Oval	Owned by the Crown with City of Canada Bay responsible for management. The West Harbour Rugby Union Football Club is located at the oval, providing junior, senior and women's teams, with club members ranging from 5 to 35 years. Consultation with the club reveals that club games attract over 2000 spectators, with over 20,000 attending games in the finals season. Between 45 and 55 per cent of club players are of Pacific Islander origin. West Tigers Rugby League Club uses the oval for training and community events but not for matches. The Inter Lions Soccer Club also uses the oval on Sundays.
103	St Lukes Park	Playing fields and amenities. The West Harbour Rugby Union Football Club uses St Lukes Park for training.
104	Cintra Park Hockey Facility	Hockey field managed by Briars at Greenlees Sporting Club in Concord. Home field for Briars Hockey Club, providing men's, women's and juniors teams.
105	Cintra Park Tennis	12 synthetic grass courts/two synthetic clay courts, BBQ facilities and large clubhouse.
106	Western Suburbs Leagues Bowling Club, Reg Coady Reserve	Three bowling greens.
107	Ashfield Bowling Club, Sydney Olympic Park	Lawn bowls, clubhouse and hospitality venue.
108	Reg Coady Reserve, Haberfield Tennis Centre	Three netball courts, children's playground and rest area (19,708m <sup>2</sup> ).
109	Ashfield Park, Wests Sports Club	5.84ha including a football field with a cricket pitch in the centre, amenities building (changing rooms), spectator stands, Ashfield Bowling Club (two greens), passive recreation with children's playgrounds, picnic rotunda and BBQ area. There are also formal flower beds and a war memorial.
110	Haberfield Tennis Centre	Ten tennis courts: eight synthetic grass and two tru-flex cushion courts.

# Appendix D Council consultations

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## Introduction

Between May and July 2014, the project team consulted with four local councils on the project's preliminary concept design which would be directly affected by the proposal (i.e. the project passes through the LGA). These were Ashfield, Burwood, Canada Bay and Strathfield councils. These councils also made submissions to Planning and Infrastructure on the project's preliminary concept design. A summary of the potential impacts and proposed mitigations identified by each council is provided below. WDA also consulted with Auburn Council in July 2015. The results of that consultation are summarised in the section 5.5.1.

It is noted that the preliminary concept design involved impact on public open space (Ashfield Park), heritage items (e.g. Yasmar) and sensitive social infrastructure (e.g. relocation of Haberfield Aged Care and Peek-a-Boo Child Care Centre). The current design represents a reduced impact to these key social infrastructure assets which are highly valued by the local community. As a result, some issues below may not be relevant to the current proposal.

## Strathfield Council

A meeting was held on 22 May 2014 with Strathfield Council's Community Services Manager. The key outcomes of the meeting were:

### *Local community characteristics*

- Strathfield LGA has a culturally and linguistically diverse (CALD) community. Historically the LGA had a high number of Russian and Italian residents, though these groups have been declining
- There are pockets of highly disadvantaged residents within the LGA, particularly near the Sydney Markets (south of Flemington Railway Station). This area has a high number of new migrants, including people from Indian, Tamil and Chinese backgrounds
- It is the vulnerable communities to the north of the LGA that will be most affected by construction impacts and the on/off ramps for WestConnex
- Regarding the area bounded by Parramatta Road, Underwood Road and Homebush Bay Road:
  - It contains primarily long term residents
  - Many do not have high disposable incomes and have assumed that they can fund their retirement by selling their home. However their homes are likely to decrease in value as a result of the WestConnex project
  - These residents are already quite cut off from Strathfield Town Centre. Those to the north of the motorway will now be even more cut off.

### *Community values*

- The community values historical homes
- Concern was raised about potential loss of open space at Wentworth Reserve.

### *Social infrastructure*

- There are a number of high profile/elite schools with 'fly in, fly out' students
- The Girl Guides Hall on Ismay Avenue is well-used by a range of groups
- Men's Shed on Pomeroy Street
- Residents in the north of Parramatta Road prefer to go to Concord for shops and schools than cross Parramatta Road. These residents also have convenient access to Rhodes Shopping Centre
- There is considerable use of Bicentennial Park for recreation
- Direct Factory Outlet (DFO)
- There is a proposal to locate a Korean Garden in Mason Park, which would draw people from across Sydney, potentially increasing traffic impacts.

### *Construction issues*

- The disruption associated with construction will occur at the same time as the development of the former Ford Factory on Birnie Avenue. This has the potential to result in substantial traffic problems
- There are already significant traffic issues on Underwood Road (particularly due to DFO), these will be compounded during construction
- Pedestrians have difficulty crossing Centenary Drive to access Flemington railway station and Flemington Markets, and this may become more difficult with construction works in the area.

### *Mitigation measures*

- It was suggested that:
  - People need to be compensated for the loss of value to their homes
  - WDA could acquire more homes than necessary, pay existing owners a 'reasonable' price, and then package land for sale to developers for high density housing
  - Extensive landscaping could improve visual amenity
  - New cycle paths could ensure residents have good connectivity to other areas.

### *Further consultation*

- It was suggested that residents need to be consulted directly (including the Chinese, Indian and Korean communities)
- It was noted that the United Indian Association represents 13 Indian organisations
- Council has regular precinct based community consultation at the Girl Guides Hall
- The Men's Shed could also be consulted, though it was noted that there membership is somewhat narrow so there feedback may not be representative of the broader community.

### *Council's submission*

In addition, Strathfield Council raised the following concerns in their submission:

- The need to ensure the proposal addresses existing traffic congestion and issues
- Location of ventilation stacks and need to locate them away from residential areas
- Noise, vibration and amenity impacts on local residents during construction and operation
- Visual impacts of new road infrastructure and the impact of this on local character
- The financial impact of tolls on community members
- Concerns about impacts on local heritage and biodiversity
- The need to ensure the design does not reduce accessibility of adjacent residential and commercial areas.

### **Burwood Council**

A meeting was held on 12 June 2014 with Burwood Council representatives from Corporate Governance and Community Services, Community Services and Library, and Community Development Coordinator. The key outcomes of the meeting were:

#### *Local community characteristics*

- Burwood LGA has a mix of dwelling types with 'Old Burwood' (older freestanding homes on large blocks) and 'New Burwood' (medium to high density units). About 48 per cent of the residents live in medium or high density dwellings, with the northern end of the LGA relatively high in density.
- Burwood LGA has a large CALD community with a large percentage (59 per cent) speaking a language other than English at home. Key CALD groups include Chinese, Korean, Tamil (growing) and Nepalese backgrounds
- Many of Burwood's CALD community members may not speak or read in English and may also not be literate in their own language

- It is perceived that a number of people from CALD backgrounds in the LGA do not trust government (through past experiences in countries of origin), are not well connected with the broader community and may not speak up even if they have valid issues and concerns. It would be hard to get appropriate information to and from these people
- There has historically been a large Italian community in Burwood LGA, many of whom still live in homes that have substantially increased in value. Many of these residents have become asset rich but are retired and often income poor
- Approximately 20 per cent of households in the Burwood LGA do not own a car, compared to approximately 12 per cent in Western Sydney. A high proportion utilise public transport such as the three railway stations in the LGA
- There may be people living in boarding houses in the north west of the LGA, and if so, it is important that they be involved in communication and planning processes
- The high number of schools, shops, cinemas and the train station all contribute to large numbers of young people visiting the north of the LGA, especially after school hours, during school holidays and on weekends
- Sense of identity and connection can vary considerably between older and newer residents
- Vulnerable groups in the LGA include:
  - Older people
  - People from CALD backgrounds
  - People with disabilities
  - Young people
  - People in boarding houses.

#### *Social infrastructure*

- Burwood Park is heavily used and highly valued, particularly by people from CALD backgrounds
- There are a number of schools between the railway line and Parramatta Road, including MLC, Burwood Girls High, Croydon Public and Holy Innocents Primary School
- There are two hospitals in the north west of the LGA: Strathfield Private Hospital and St John of God Hospital
- Burwood is a regional hub with good public transport, resulting in a large numbers of visitors, from both neighbouring LGAs and further afield
- Council is currently conducting an open space and social infrastructure study which shows that open space per capita is very low compared to other LGAs, particularly Canada Bay LGA (which adjoins the Burwood LGA to the north)
- There are two community centres between the railway line and Parramatta Road, one in Burwood Park and one underneath Council's offices on Elsie Street.

#### *Construction and operational impacts*

- Noise, vibration and dust may affect those in the north-west corner of the LGA during construction
- There is likely to be increased traffic through the Burwood LGA during construction as people try to avoid Parramatta Road
- Visitors who travel to Burwood by bus or car may have their journey disrupted during construction, as will residents who travel by bus or car
- The biggest issue for the Burwood community is the location of exhaust stacks, and the health concerns that these may raise for those who live, work or go to school near them.

#### *Opportunities and mitigation measures*

- Double glazing of windows and insulation may alleviate noise impacts
- There is an opportunity to improve the streetscape along Parramatta Road

- There is a need to link WestConnex and the Parramatta Road Revitalisation clearly for residents so people can see benefits flowing from WestConnex. This should also be within a reasonable timeframe so the connection between any disruptions felt and the positive outcomes is tangible
- Timing of construction works (day/night) will be critical. Where possible residents should have some say in this
- Negative impacts should be spread evenly
- It was suggested that Council could assist with engagement of those who are difficult to reach via standard communication and consultation mechanisms. Translators would be essential to this process
- Delivery of additional open space via the project would be an excellent outcome
- Improving pedestrian crossings of Parramatta Rd would help people to access open space in Canada Bay LGA
- It would be beneficial to identify short term wins resulting from consultation and deliver on these quickly to show the community that they've been heard and their ideas acted upon
- It is important that there is a good communication strategy throughout construction. This should include:
  - Signage on roads
  - Community meetings/information sessions with interpreters present
  - Written information translated into community languages.

#### *Council's submission*

In addition, Council raised the following concerns in their submission on

- Ensure adequate consultation with, and compensation and support for those residents whose properties will be acquired
- Concern about the potential for increased traffic on the local road network after the WestConnex project is complete
- The need to limit negative impacts on the heritage of local areas, and the need to retain local character
- Ensure the proposal reduces traffic on Burwood Road but encourages more buses, in line with Council's strategies for the Burwood Town Centre.

#### **City of Canada Bay Council**

A meeting was held on 1 July 2014 with City of Canada Bay Council representatives from Corporate Strategy, Place Management, and Community Project. The key outcomes of the meeting were:

#### *Local community characteristics*

- High population growth in the LGA – this is expected to continue
- The corridor (Parramatta Road) is made up of different types of residents – some older, well established homes with empty nesters, and newer apartments
- The Strathfield Triangle is a new development area with small apartments, 100 per cent rented, primarily new residents, culturally and linguistically diverse (primarily Asian). Language barriers can be an issue for these residents
- There is potential for change in the built form in the future, particularly around Rhodes and Concord West. This may lead to change in community profile, however still high numbers of families with children are expected
- English proficiency is high according to ABS data however new immigrants may have difficulty
- Large number of businesses along Parramatta Road.

### *Community values*

- Resident action groups have formed who are against WestConnex
- Connection to public open space is important
- Recreational amenity – walking and cycling particularly along the foreshore
- Safety – commuting cyclists, BayBUG promotes cycling and safety.

### *Social infrastructure*

- A new DEC school is due to open in 2015 (term one) in Canada Bay – this will incorporate a community health centre, child care and sports fields for community use
- Many boarding houses along Queen Street
- Schools in the area include: Lucas Gardens Special Needs School – on Parramatta Road, undergoing a \$10 million upgrade; Rosebank College; St Mary's in Concord
- Five Dock Leisure Centre – key recreational precinct including many sports and activities (e.g. martial arts, personal training). Already high congestion around this area at all times of the day, particularly after work hours
- Concord Oval – there is a new master plan which proposes consolidation of surrounding open space.

### *Social impacts*

- Benefits associated with taking traffic off Parramatta Road – enables renewal of Parramatta Road
- Urban renewal could result in disbursement of brothels (not registered) into surrounding residential areas
- Potential for street trees to be impacted during construction.

### *Opportunities and mitigation measures*

- Public art could help to soften hard infrastructure associated with the project as well as celebrate local stories and history e.g. Concord Oval has strong history and stories for local community; also celebrate local Aboriginal culture and stories
- An integrated public art project could be established with the other Councils along the corridor
- Wayfinding and signage during construction – help to ensure pedestrians and cyclists know how to move around the local area when footpaths/bus stops are closed
- Signage could also integrate art or design and communication messages updating community on project progress
- Social media apps could also be used to provide project updates, road closures, changes to public transport, etc
- Pop-up cafes and shops could activate streets during construction, particularly providing economic opportunities for local businesses (e.g. construction workers buying local food options)
- Parking strategy to ensure construction vehicles do not park in local streets which impacts access for residents to homes, social infrastructure, etc
- Work with Burwood LAC to identify opportunities to address crime issues through CPTED initiatives and urban design
- Adjoining areas could be included in new design – opportunity to refresh older areas e.g. if there is road maintenance works in an area close to WestConnex road works, these could be streamlined to broaden the area being improved and make them consistent
- Clarity around reporting/addressing issues – WDA could establish agreement with Councils to ensure there is clear messages to the community on how complaints/issues should be addressed
- Plant street trees to enhance the streetscape as part of urban design.

### *Council submission*

In addition, Council raised the following matters in their submission:

- Benefits including a reduction in traffic volumes on Parramatta Road allowing for increased public transport and urban design improvements, and improvements to bicycle and general accessibility
- Opposition to the potential use of Concord Oval as a construction compound site due to impacts on national, regional and local sporting teams
- Air, noise and vibration impacts on the community during construction
- Air quality and noise impacts during operation of the tunnel
- Impact of property acquisition on community cohesion.

### **Ashfield Council**

A meeting was held on 11 June 2014 with Ashfield Council representatives from Planning and Environment, Corporate and Community Services, Community Programs and Services, and Social Planning. The key outcomes of the meeting were:

#### *Local community characteristics and values*

- Ashfield LGA has a CALD community, including significant Chinese, Korean, Indian and Italian populations. There is a mix of new arrivals and established residents. Language barriers can be an issue for these residents
- Haberfield has an older, mostly Italian population
- Many community members prefer face to face engagement. Older residents and residents who speak another language at home other than English may not have access to technology
- There is a high proportion of boarding houses mostly around the town centre. These are provided by Housing NSW, community housing and private providers. Many international students live in these and there are issues with overcrowding
- Ashfield LGA is fourth densest LGA in Sydney, with Ashfield Park the most densely populated area
- Many people socialise in parks, library and other public facilities. Public and open spaces are limited in the LGA.

#### *Social infrastructure*

- There is heavy demand for social infrastructure in the LGA due to it being densely populated
- Social infrastructure in the immediate vicinity of Parramatta Road includes primary and high schools, childcare centres and aged care facilities. The LGA also has a Migrant Resource Centre, libraries and an aquatic centre
- The Infants Home and Yasmar are important heritage sites. Many community members want increased access to the Yasmar site
- The Exodus Foundation – Rev Bill Cruise – provides meals and services to homeless people in Ashfield
- Council provides English language/conversation classes, which are very heavily utilised
- Council also provides a range of health and wellbeing activities and programs. There is increasing demand on these.

#### *Social impacts*

- Already significant traffic congestion around Infants Home – likely to become worse during construction
- Liveability – impacts on traffic flow, pedestrian access – important links to Parramatta Road and Ashfield train station
- Connectivity between two sides of the LGA i.e. north and south of Parramatta Road. The community is already divided by Parramatta Road

- Access to schools, childcare, aged care facilities – mobility of older people a potential impact
- Ageing population – mobility, connectivity, isolation – these could be impacted by the project including during construction.
- Tunnel entries – potentially increase poor pedestrian access or cause new issues
- Pedestrian safety – pedestrian access very important particularly for older people
- Cycling is already a challenge – accessibility
- Increased travel time during construction – impact on wellbeing of families, extended time away from families due to increased commute
- Connectivity issues between Haberfield and the southern side of Parramatta Road.

#### *Opportunities and mitigation measures*

- There is only one existing safe pedestrian crossing over Parramatta Road – potential opportunity to provide more
- Increase community access to Yasmar – improve facilities onsite. Provide public open space onsite
- Improve connections between Ashfield and Haberfield suburbs – this could be something creative and interesting e.g. New York High Line
- Increase open space – through residual properties. However must be a good size and useable
- Provide new/upgraded community facilities/spaces.

#### *Points for consideration by Ashfield Council*

- Type of development project/s that could be considered as compensation to local residents affected by the project developments. Ideas included:
  - More green space such as parks, playgrounds
  - High line
  - Community centre/s.
- Spaces should be located where it is easily accessible, safe and user friendly for residents.

#### *Council submission*

In addition, Council raised the following concerns in their submission on

- Potential community concern about the health and wellbeing impacts on local residents resulting from tunnel exhaust emissions, as well as visual impacts of ventilation stacks
- Concern about loss of public open space at Ashfield Park, decreased access to the park, the need to maintain pedestrian access across Haberfield Road, and the need to ensure historic features are conserved
- Noise and vibration impacts on residents
- Concern about impact on heritage value of the Yasmar site
- Potential physical and mental health implications of the proposal.

#### **Auburn Council**

WDA and the Environmental Assessment team held a meeting with Auburn Council representatives in July 2015. The key issues raised at the meeting with relevance to the social impact assessment were related to alternate routes for cycleway and increased engagement needs with bicycle user groups.

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# Appendix E Consultation with social infrastructure providers

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## Introduction

Between June and August 2015, WDA consulted with social infrastructure providers on the current proposal, including those directly affected (i.e. by property acquisition) and those indirectly affected by impacts such as changes to access and amenity. Previous consultations that were held by the project team with these social infrastructure providers in 2014 are also included, where relevant. The following sections provide a summary of the potential impacts and proposed mitigations identified by each social infrastructure provider from these consultations.

## Briars Hockey Club

The Briars Hockey Club uses Cintra Park every week night from 3pm to 10pm and weekends. The season runs from February to October. The Club's main club house is located on Wellbank Street at Greenlees Sporting Club. Cintra Park is also used by the Sydney Hockey Association (top level) for training.

In 2014, the project team consulted the Briars Hockey Club to discuss the potential impacts should Cintra Park be used as a construction compound site. The Club stated that they would be prepared to move for the M4 East proposal providing that their relocation needs were met.

## Inter Lions Soccer Club

The Inter Lions Soccer Club is a local soccer club with about 500 members, which competes in local and NSW competitions. The Club holds games all day on Sundays with players and supporters parking on Loftus Street. Concord Oval is their home ground. They raise funds for the club by charging admission and running a canteen during matches. It is a community club, and members join because it is local.

In 2014, the project team consulted the Club, which raised concern about their relocation should Concord Oval be used as a construction site. This would lead the Club's loss of identity and lack of options for the Club to relocate.

WDA consulted the Club again in 2015. The Club did not indicate any concerns about the proposal.

## West's Tigers Club

The West Tigers Club leases Concord Oval from City of Canada Bay Council for daily training activities. The Club employs 50 full time staff (sales, finance, coaching and administration) and has 100-120 players.

In 2014, the project team consulted the Club about their potential relocation due to the proposed use of Concord Oval as a construction site. The Club stated that Concord Oval did not fully meet their needs. They used the Oval for training and community events only and were discussing with neighbouring Councils about alternative grounds for their use.

In 2015, WDA consulted the Club again, which identified the following potential impacts during construction:

- Realigning and construction works at St Lukes ovals one, two and three. They weren't aware of the Cintra Park Hockey Field relocation to St Lukes three. West's Tigers use these grounds for training sessions for the three lower grade squads. If they have to find alternate training fields this will disrupt their training schedules especially if the new location is a distance from Concord Oval, which is where their gym facilities are. Alternate training fields would also incur costs
- Concern that dust and air quality might impact upon health of their elite players
- Concern that construction noise might cause issues during training sessions if the coaching staff and players are unable to hear each other

- Construction workers using Concord Oval car park would inconvenience Wests Tigers staff and players
- Concern that potential traffic changes on Parramatta Road could inconvenience staff, players, and deliveries.

The club suggested the following mitigation measures:

- Clear communication and advanced notification of the works intended for St Lukes Ovals one, two, and three
- Potential noise walls.

### **West Harbour Rugby Union Football Club**

The West Harbour Rugby Union Football Club uses Concord Oval every Saturday from April to September with trial matches starting in March. Its members range from 5 to 35 years. The Club's games attract around 2,000 people and the grand final for Sydney Rugby around 20,000 people. Hosting the grand final generates significant income for the Club. There is also an indoor café that is popular with spectators. They also use training fields in St Lukes Park and have gym on site at Concord Oval which is popular with its members, around half of whom are Pacific Islanders.

In 2014, the project team consulted the Club to discuss their potential relocation from Concord Oval if it were to be used as a construction site. The Club raised the following concerns:

- Loss of income due to potential relocation. Club Burwood is also a major sponsor because the grounds are close.
- Loss of existing access to training fields, gym and club house across the road. 45-55% of players in the club are Pacific Islander people, who access this gym because they cannot afford gym membership elsewhere. The Club has also committed to extending the gym.
- Difficulty finding an alternative and viable venue in the same area.

The Club suggested that an underutilised car park or Burwood bus depot could be explored as potential construction sites.

### **St Andrew's Anglican Church, Strathfield**

St Andrew's Anglican Church staff includes four ministers, seven student ministers, two wardens and one parish administrator for their Strathfield and Enfield churches. The site is used 15 hours each week. Activities include:

- Sunday 9am service (100 adults, 65 kids)
- Sunday 11am Korean language service (180 adults, 85 kids)
- 4pm service (50–60 university students)
- Tuesday night meeting (30–40 people).

The church identified the following potential impacts during construction and operation:

#### *Construction*

- Concern that construction workers will use local roads for parking and inconvenience church members
- Concern that any increase in heavy vehicle traffic and noise levels on Parramatta Road could interrupt church activities.

#### *Operation*

- Concern that three lanes in each direction in the main tunnels may be inadequate for future demand and the Concord Road/Parramatta Road interchange could remain congested. Traffic congestion could impact on the Church with regard to noise and parking.

The Church suggested that temporary sound barriers could address amenity impacts during construction.

## **Concord Baptist Church**

The Concord Baptist Church employs two full time pastors and a number of volunteers. One pastor lives in rectory next door to the church. Activities on the site include:

- 9.30am Sunday service
- Bible study groups
- Playgroups for kids
- Seniors groups
- Choir rehearsals
- Prayer nights.

The church raised concern about the proposed permanent closure of Carrington Street, which would require church members to use other local roads to access Concord Road however this was considered a minor impact.

The church also indicated that some members have expressed concerns about the potential impact on air quality around ventilation outlets.

## **Ashfield Lawn Bowls Club**

The Ashfield Lawn Bowls Club is currently operating under a licence from Ashfield Council. The club identified the following potential impacts during construction and operation:

### *Construction*

- Bus stop relocation (route 406) may impact patrons' convenience
- Concern that construction worker parking may take up all parking spaces
- Concern that spoil trucks may cause undue impact
- Concern that works over an extended period may impact business
- Concern that deliveries cannot access the club via Parramatta Road.

### *Operation*

- Motel and residence demolition may reduce potential patronage
- Possible increase of traffic on Orpington Street and lowered amenity for patrons
- Decrease in available on-street parking and access for patrons (currently around 20 spaces).

The club suggested the following mitigation measures:

- Advance signage at the bus stop and inside buses on route 406. Move stop a minimal distance
- Introduce resident parking stickers and timed parking. Investigate worker shuttle service
- Ensure Orpington Street is not to be used as a haulage route (elderly people and children in vicinity)
- Promote club as a lunch venue to workers and a meeting place for the project
- Provide route information to club to notify suppliers and service providers
- Discuss promotions for workers during construction and ways to relaunch the club once normal traffic conditions resume
- Monitor feedback from club post-opening and discuss with Ashfield Council if a pre-emptive LATM scheme is needed
- Unlikely to require further action as removal of car yard will free up spaces on street.

## **The Willows Private Nursing Home**

The Willows Private Nursing Home provides high care support for its elderly residents, 24 hours a day, seven days a week. It has 40 beds and employs 43 staff. Activities on the site include:

- Community bus trips for residents a few times a year
- Visiting times are from 8am to 8pm, 7 days a week. Weekends are busiest
- Delivery of supplies during the first half of each month
- Rubbish removal on Wednesdays.

The nursing home identified the following potential impacts during construction:

- Concern that deliveries cannot access home via Parramatta Road
- Concern that emergency services (ambulance, fire) and patient transport cannot access home via Parramatta Road
- Noise (particularly demolition) may distress patients
- Concern that construction impacts over an extended period may distress residents
- Impact on staff access
- Bus stop relocation (route 406) may impact visitors' convenience
- Worksite sight lines may infringe privacy for residents.

It also suggested the following mitigation measures:

- Provide route information to home to notify suppliers and service providers
- Route changes will be communicated directly to emergency services
- Schedule activities to occur later in day where possible. Identify as sensitive receivers and monitor noise regularly. Provide respite periods in consultation with home
- Provide special attention to residents and brief staff on timing and impact of works so that families can be informed
- Investigate whether a right turn can be installed from Parramatta Road to Ormond Street
- Whilst numbers of visitors using buses is unknown, advance signage can be installed at bus stop and inside buses on route 406. Move stop a minimal distance.

## **Yasmar Training Facility**

The Yasmar Training Facility is a heritage listed site, which is owned and maintained by Crown Lands. The majority of the site is leased by Juvenile Justice and a small section by CoAslt Italian Language and Community Services. Yasmar is a NSW Government non-residential staff training facility for up to 110 people at a time and 15,000 per year. Seven staff members operate the facility from 7am to 6pm. Training ranges from one day to four week blocks.

Vehicle access from Parramatta Road into the site is prohibited. Staff and users park on surrounding local streets, including Chandos Street.

Yasmar identified the following potential impacts during construction:

- Philip Lodge across Parramatta Road is to be demolished, affecting up to 10 trainees per week who stay there
- Bus stop relocation may impact trainees' convenience
- Impact on pedestrian access from detours.

Yasmar suggested the following mitigation measures:

- Find out when lodge intends to close so that Yasmar can identify alternative accommodation

- Signage can be installed at bus stop and inside buses on route 406. Move stop a minimal distance
- Ensure wayfinding to Yasmar is clear.

### **Jehovah's Witnesses Kingdom Hall**

The Jehovah's Witnesses Kingdom Hall conducts worship services and Bible study meetings at the following times:

- Monday 9am (10–12 attendees)
- Tuesday 9am and 7.30pm (80–90 attendees per session)
- Wednesday 9am, 1.15pm (10–12 attendees)
- Wednesday 7.30pm (100–120 attendees)
- Friday 9am and 1.15pm (10–12 attendees)
- Saturday 9am (20–25 attendees)
- Saturday 4pm (120 attendees)
- Sunday 10am (more than 100 attendees)
- Sunday 1pm (150 attendees from another congregation who use their facility).

Most attendees park in the Hall's off-street car parking area. Others park on Wattle Street, Northcote Street and other surrounding streets.

The Jehovah's Witnesses have designed their facility to minimise traffic noise, with minimal glass facing Wattle Street and in the past they received Roads and Maritime assistance with double glazing. No further issues or concerns were raised.

### **Haberfield Presbyterian Aged Care**

Haberfield Presbyterian Aged Care is a 41-bed residential aged care for low to medium dependency residents. The aged care employs 27 staff, including 19 permanent full time and part time plus eight casual staff. The facility has double glazing and air conditioning.

The aged care raised concern about potential amenity impacts during construction, such as noise and dust, however its current noise mitigation measures (e.g. double glazing and air conditioning) are considered sufficient to address these.

The aged care considered any operational impacts would be negligible. It identified that improvements to the streetscape would appeal to potential residents.

### **The Infants Home**

The Infants Home is attended by 300 children daily. Their key concerns during construction and operation include:

#### *Construction*

- Traffic impacts in the area, including
  - Impact on parking on local streets for families and employees. It is difficult to park in the local area as there is no kiss and ride facility
  - Haulage routes
  - Right turn into Frederick Street from Parramatta Road.

#### *Operation*

- Impact on air quality, visibility of smoke, potential malfunction/breakdown, and need for continuous air quality monitoring of the Parramatta Road ventilation facility.

## **Peek a Boo Early Learning Centre Haberfield**

No information is available as WDA has been unable to make contact with the centre at the time of preparing this report. WDA will continue attempts to contact the centre in the coming weeks.

## **Sydney Cheil Uniting Church**

There are several services and Sunday School on Sundays, which are attended by a large worship of around 300–350 people throughout the day. Services are held in English and Korean due to a large Korean community worship. The church has a large catchment area with local residents attending as well people within a 10–15 kilometre radius.

On weekdays, various groups hold their activities within the site:

- Bible study
- Youth
- Children
- Music
- Mothers.

Most outdoor activities on Sundays, such as lunch after the service, are contained within the eastern part of the site, which has a pergola.

The church identified the following potential impacts during construction and operation:

### *Construction*

- Property impact. The western part of the site that will be affected by strip acquisition includes a green space (with a children's playground and sandpit) and car parking spaces
- This is the only green space within the site, which is regularly used by the Mothers Group with children. There is a sheltered concrete area within the site that will not be affected but this is not considered suitable for children
- There is limited car parking within the site and strip acquisition would remove four car parking spaces. In the past, surrounding residents have expressed that there is insufficient parking in local streets. The church is concerned that loss of four spaces would worsen this situation.

### *Operation*

- Acknowledges it is already a high traffic area. Main concerns are loss of outdoor space, change of traffic flow, amenity (noise, visual) and parking
- Most patrons drive into the site from Sydney Street. Some turn from Concord Road into Sydney Street however the change in access here is considered a minor impact
- The church is not concerned about receiving compensation, rather land to supplement the loss of amenity and parking. The church has had previous discussions with Roads and Maritime to explore if they can acquire unused parkland/residual land adjacent/near the site to replace the loss of car parking. When Sydney Street near Concord Road is closed, will there be residual land that the church could swap with the acquired strip
- Views from the church currently look out on to houses and greenery. To reduce noise and protect visual privacy, the church wants a noise wall constructed before construction starts.

## **Haberfield Public School**

Haberfield Public School raised concerns related to:

- Air quality including the request for a higher outlet if it improves the air quality for the children at the primary school
- Road safety, particularly during construction but also during operation as children cross Parramatta Road near Bland Street

- Construction noise and impacts on classes and potential mitigation from any noise impacts
- Request to be part of the consultative committee on air quality
- Request to have an air quality monitor at the school before construction starts.

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# Appendix F Project land requirements

## LEGEND

Individual buildings column

For residential properties/lots this is the number of individual dwellings

For commercial properties/lots this is the number of commercial buildings

Property No.	Lot/DP or SP	Lot Ref. No.	Location	Existing land use	Ownership	Full or partial	Construction	Operation	Area of lot to be acquired (m <sup>2</sup> )	Individual buildings*
<b>Homebush Bay Drive interchange, including Homebush Bay Drive civil site (C1)</b>										
1	1/DP883387	1	Homebush	Vacant/transmission line easement (Ausgrid property)	Ausgrid	Partial		✓	10,600 (14.8% of lot)	-
2	101/DP749563	2	Homebush West	M4 off-ramp and reserve	Roads and Maritime	Full		✓	8,507	-
3	N/A	3	Homebush West	M4 reserve	Roads and Maritime	Full		✓		-
<b>M4 widening and realignment, including Pomeroy Street civil site (C2)</b>										
4	SP85957	4	Verley Drive, Homebush	Residential property (access driveway)	Private	Partial (air)		✓	40 (0.6% of lot)	-
5	9/DP264402	5	Pomeroy Street, Homebush	Bill Boyce Reserve (public recreation)	Strathfield Council	Full	✓ (Leased)		4,266	-
6	24/DP225456	6	Homebush	M4 reserve	Roads and Maritime	Full		✓	4,786	-
7	14/DP264402	7	Homebush	M4 reserve	Roads and Maritime	Full		✓	10,109	-
8	15/DP264402	8	Homebush	M4 reserve	Roads and Maritime	Full		✓	2,992	-
9	16/DP264402	9	Homebush	M4 reserve	Roads and Maritime	Full		✓	17,362	-
10	17/DP264402	10	Homebush	M4 reserve	Roads and Maritime	Full		✓	15,663	-
11	12/DP1061157	11	Short Street, Homebush	M4 reserve	Roads and Maritime	Full		✓	207	-
12	13/DP1061157	12	Short Street, Homebush	M4 reserve	Roads and Maritime	Full		✓	7	-
13	N/A	13	Verley Drive, Homebush	M4 reserve	Roads and Maritime	Full		✓		-

14	N/A	14	Wentworth Road, Homebush	M4 reserve	Roads and Maritime	Full		✓		-
<b>Western tunnel dive and portal, including Underwood Road tunnel and civil site (C3)</b>										
15	20/DP103170 2	15	Short Street, Homebush	Residential	Private	Full	✓		518	1
16	9/DP958678	16	Short Street, Homebush	Residential	Private	Full	✓		420	1
17	D/DP15312	17	Underwood Road, Homebush	Residential	Private	Full	✓		557	1
18	C/DP15312	18	Underwood Road, Homebush	Residential	Roads and Maritime	Full	✓	✓	540	1
19	101/DP87468 1	19	Underwood Road, Homebush	Residential	Private	Full	✓	✓	934	2
	3/DP130612	20			Private	Full	✓	✓	590	
	X/DP359920	21			Private	Full	✓		133	
20	100/DP87468 1	22	Ismay Avenue, Homebush	Strathfield Guide Hall	Private	Full	✓		554	-
21	38/DP15312	23	Ismay Avenue, Homebush	Residential	Private	Full	✓		461	1
22	39/DP15312	24	Ismay Avenue, Homebush	Residential	Private	Full	✓		485	1
23	40/DP15312	25	Ismay Avenue, Homebush	Residential	Roads and Maritime	Full	✓		489	1
	B/DP397762	26	Ismay Avenue, Homebush	Residential	Roads and Maritime	Full	✓	✓	131	
24	41A/DP32173 9	27	Ismay Avenue, Homebush	Residential	Private	Full	✓		496	1
25	42B/DP32173 9	28	Ismay Avenue, Homebush	Residential	Private	Full		✓	524	1
26	2/DP609880	29	Underwood Road, Homebush	Residential	Roads and Maritime	Full		✓	32	-
27	6/DP15561	30	Allen Street, Homebush	Residential	Private	Full	✓		457	1
28	5A/DP15561	31	Allen Street, Homebush	Residential	Private	Full	✓		604	1
29	5/DP15561	32	Allen Street, Homebush	Residential	Roads and Maritime	Full	✓		563	1
30	4A/DP15561	33	Ismay Avenue, Homebush	Residential	Private	Full	✓		432	1
31	4/DP15561	34	Ismay Avenue, Homebush	Residential	Private	Full	✓		516	1
32	3/DP15312	35	Ismay Avenue, Homebush	Residential	Private	Full		✓	560	1
33	18/DP264402	36	Homebush	M4 reserve	Roads and Maritime	Full		✓	2,687	-
34	101/DP10300 38	37	Short Street, Homebush	M4 reserve	Roads and Maritime	Full		✓	654	-
35	17/DP711389	38	Homebush	M4 reserve	Roads and Maritime	Full		✓	491	-

36	10/DP260729	39	Homebush	M4 reserve	Roads and Maritime	Full		✓	266	-
37	7/DP260729	40	Homebush	M4 reserve	Roads and Maritime	Full		✓	940	-
38	21/DP711389	41	Homebush	M4 reserve and Underwood Road road reserve	Roads and Maritime	Full		✓	5,016	-
39	18/DP711389	42	Homebush	Underwood Road road reserve	Roads and Maritime	Full		✓	253	-
40	2/DP301919	43	Homebush	M4 reserve	Roads and Maritime	Full	✓	✓	737	-
41	A/DP397762	44	Homebush	M4 reserve	Roads and Maritime	Full		✓	478	-
42	23/DP559425	45	Homebush	M4 reserve	Roads and Maritime	Full		✓	498	-
43	2/DP612409	46	Homebush	M4 reserve	Roads and Maritime	Full		✓	1,004	-
44	1/DP612409	47	Homebush	M4 reserve	Roads and Maritime	Full		✓	255	-
45	B/DP318010	48	Homebush	M4 reserve	Roads and Maritime	Full		✓	575	-
46	43/DP15312	49	Ismay Avenue, Homebush	M4 reserve	Roads and Maritime	Full		✓	485	-
47	44/DP15312	50	Homebush	M4 reserve	Roads and Maritime	Full		✓	500	-
48	45/DP15312	51	Homebush	M4 reserve	Roads and Maritime	Full		✓	470	-
49	46/DP15312	52	Homebush	M4 reserve	Roads and Maritime	Full		✓	514	-
50	1/DP126150	53	Homebush	M4 reserve	Roads and Maritime	Full		✓	817	-
51	2/DP126150	54	Homebush	M4 reserve	Roads and Maritime	Full		✓	804	-
52	13/DP711389	55	Homebush	M4 reserve	Roads and Maritime	Full		✓	1,074	-
53	2/DP15312	56	Homebush	M4 reserve	Roads and Maritime	Full		✓	547	-
54	14/DP711389	57	Homebush	M4 reserve	Roads and Maritime	Full		✓	851	-
55	N/A	58	Short Street, Homebush	M4 reserve	Roads and Maritime	Full		✓		-
56	N/A	59	Underwood Road, Homebush	Underwood Road road reserve	Roads and Maritime	Full		✓		-
57	N/A	60	Ismay Road, Homebush	M4 reserve	Roads and Maritime	Full		✓		-
<b>Powells Creek civil site (C4) and North Strathfield construction car parking site</b>										
58	2/DP1002876	61	Parramatta Road, Homebush	Arnotts Reserve (not open to public)	Strathfield Council	Partial	✓ (lease)	✓	1,280 (perm) (8% of lot)	-
									3,220 (lease) (20.1% of lot)	
59	1/DP1002876	62	North Strathfield	Vacant/commercial	Private	Partial (air)		✓	245 (1% of lot)	-
60	103/DP71798 3	63	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		181	-

61	106/DP71798 3	64	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		18	-
62	100/DP71798 3	65	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		231	-
63	105/DP71798 3	66	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		61	-
64	15/DP262881	67	George Street, North Strathfield	Pylon for overhead M4 Motorway	Roads and Maritime	Full	✓		34	-
65	101/DP71798 3	68	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		324	-
66	104/DP71798 3	69	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		190	-
67	102/DP71798 3	70	George Street, North Strathfield	Car park	Roads and Maritime	Full	✓		1,635	-
68	23/DP711389	71	Homebush	M4 reserve	Roads and Maritime	Full		✓	9,116	-
69	11/DP731362	72	Homebush	M4 reserve	Roads and Maritime	Full		✓	5,405	-
70	N/A	73	M4 Motorway between near Powells Creek and Sydney Street	M4 reserve (viaduct)	Roads and Maritime	Full		✓		-
<b>Concord Road interchange, including Concord Road civil and tunnel site (C5) and Queen Street cycleway ramp</b>										
71	35/DP1835	74	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	223	1
	36/DP1835	75	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	211	
	37/DP1835	76	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	222	
	38/DP1835	77	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	207	
72	A/DP403812	78	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	238	1
73	B/DP403812	79	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	206	1
74	2/DP533421	80	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	223	1
75	1/DP533421	81	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	209	1

76	43/DP1835	82	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	226	1
	44/DP1835	83	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	218	
77	45/DP1835	84	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	219	1
	46/DP1835	85	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	219	
	47/DP1835	86	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	229	
78	48/DP1835	87	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	223	1
79	49/DP1835	88	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	216	1
80	50/DP1835	89	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	245	1
81	57/DP1835	90	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	218	2
	56/DP1835	91	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	250	
82	55/DP1835	92	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	238	2
	54/DP1835	93	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	203	
83	1/DP126473	94	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	194	2
	2/DP126473	95	Concord Road, North Strathfield	Residential	Private	Full	✓	✓	210	
84	10/DP719909	96	Sydney Street, North Strathfield	Residential	Private	Full	✓	✓	438	1
85	11/DP719909	97	Sydney Street, North Strathfield	Residential	Roads and Maritime	Full	✓	✓	522	1
86	10/DP747076	98	Sydney Street, North Strathfield	Residential	Private	Full	✓		768	1
87	3/DP319089	99	Sydney Street, North Strathfield	Residential	Private	Full		✓	449	1

88	2/DP319089	100	Sydney Street, North Strathfield	Residential	Private	Full		✓	461	1
89	1/DP319089	101	Sydney Street, North Strathfield	Residential	Private	Full		✓	539	1
90	1/DP125985	102	Young Street, North Strathfield	Residential	Private	Full		✓	276	2
	2/DP1835	103	Young Street, North Strathfield	Residential	Private	Full		✓	238	
91	1/DP115469	104	Young Street, North Strathfield	Residential	Private	Full		✓	482	1
92	1/DP934474	105	Young Street, North Strathfield	Residential	Private	Full		✓	65	1
	1/DP930533	106	Young Street, North Strathfield	Residential	Private	Full		✓	520	
93	1/DP931432	107	Young Street, North Strathfield	Residential	Private	Full		✓	490	1
94	2/DP115469	108	Young Street, North Strathfield	Residential	Private	Full		✓	501	1
95	5/DP703453	109	Concord Road, North Strathfield	Residential	Roads and Maritime	Full		✓	293	1
	4/DP703453	110	Concord Road, North Strathfield	Residential	Roads and Maritime	Full		✓	266	
96	3/DP703453	111	Concord Road, North Strathfield	Residential	Roads and Maritime	Full		✓	269	1
	2/DP703453	112	Concord Road, North Strathfield	Residential	Roads and Maritime	Full		✓	252	
97	1/SP 7775	113	Concord Road, North Strathfield	Residential	Private	Full		✓	920	1
98	2/SP 7775	113			Roads and Maritime					1
99	3/SP 7775	113			Private					1
100	4/SP 7775	113			Private					1
101	1/SP 7775	113			Private					1
102	4/DP34203	114	Concord Road, Concord	Residential	Roads and Maritime	Full		✓	711	No impacts on buildings on this property
103	5/DP34203	115	Concord Road, Concord	Residential	Private	Partial		✓	90	No impacts

									(12.3% of lot)	on buildings on this property
104	9/DP7594	116	Concord Road, Concord	Residential	Canada Bay Council	Partial		✓	148 (22.4% of lot)	No impacts on buildings on this property
	8/DP7594	117	Concord Road, Concord	Residential	Canada Bay Council	Partial		✓	192 (28.7% of lot)	
105	7/DP963608	118	Concord Road, Concord	Residential	Roads and Maritime	Full	✓	✓	545	1
106	1/DP126626	119	Concord Road, Concord	Residential	Roads and Maritime	Full	✓	✓	531	1
107	1/DP985123	120	Concord Road, Concord	Residential	Roads and Maritime	Full	✓	✓	551	1
108	2/DP958842	121	Concord Road, Concord	Residential	Private	Full	✓	✓	529	1
109	1/DP958842	122	Concord Road, Concord	Residential	Private	Full	✓	✓	526	1
110	1/DP310934	123	Concord Road, Concord	Church	Private	Partial		✓	440 (28.1% of lot)	No impacts on buildings on this property
111	2/DP7594	124	Concord Road, Concord	Residential	Roads and Maritime	Full		✓	682	1
112	1/DP7594	125	Concord Road, Concord	Residential	Private	Full		✓	698	1
113	96/DP7594	126	Sydney Street, Concord	Residential	Private	Full		✓	592	1
114	95/DP7594	127	Sydney Street, Concord	Residential	Private	Full		✓	554	1
115	94/DP7594	128	Sydney Street, Concord	Residential	Private	Full		✓	557	1
116	6/DP4500	129	Concord Road, Concord	Residential	Private	Full		✓	640	1
117	5/DP4500	130	Concord Road, Concord	Residential	Private	Full		✓	682	1
118	4/DP4500	131	Concord Road, Concord	Residential	Private	Full		✓	676	1
119	7/DP4500	132	Edward Street, Concord	Residential	Private	Full		✓	476	1
120	1/DP301817	133	Edward Street, Concord	Residential	Private	Full		✓	414	1
121	2/DP301817	134	Edward Street, Concord	Residential	Private	Full		✓	531	1
122	41/DP4500	135	Edward Street, Concord	Residential	Private	Full		✓	484	1
123	42/DP4500	136	Edward Street, Concord	Residential	Private	Full		✓	488	1
124	C/DP370133	137	Edward Street, Concord	Residential	Private	Full		✓	413	1
125	18/DP719909	138	Concord Road, Concord	Open space	Roads and Maritime	Full		✓	511	-
126	19/DP719909	139	Concord Road, Concord	Open space	Roads and Maritime	Full		✓	322	-
127	20/DP719909	140	Concord Road, Concord	Open space	Roads and Maritime	Full		✓	463	-
128	21/DP719909	141	Alexandra Street, Concord	Open space	Roads and Maritime	Full		✓	1251	-

129	22/DP719909	142	Alexandra Street, Concord	Open space	Roads and Maritime	Full		✓	244	-
130	23/DP719909	143	Alexandra Street, Concord	Open space	Roads and Maritime	Full		✓	189	-
131	50/DP785451	144	Parramatta Road, Concord	Commercial	Private	Partial		✓	230 (<0.1% of lot)	No impacts on buildings on this property
132	14/DP719909	145	North Strathfield	M4 reserve	Roads and Maritime	Full		✓	399	-
133	37/DP719909	146	Concord	Vacant/Ada Street/M4	Roads and Maritime	Full		✓	775	-
134	N/A	147	Young Street, North Strathfield	Local road	Canada Bay Council	Partial		✓	■	-
135	N/A	148	Bridge Lane, North Strathfield	Local road	Canada Bay Council	Partial		✓	■	-
136	N/A	149	Taylor Lane, North Strathfield	Local road	Canada Bay Council	Partial		✓	■	-
137	N/A	150	Sydney Street, Concord (east of Concord Road)	Local road	Canada Bay Council	Partial		✓	■	-
138	N/A	151	Edward Lane, Concord	Local road	Canada Bay Council	Partial		✓	■	-
139	N/A	152	Edward Street, Concord	Local road	Canada Bay Council	Partial		✓	■	-
140	N/A	153	Alexandra Street, Concord	Local road	Canada Bay Council	Partial		✓	■	-
<b>Cintra Park tunnel site (C6)</b>										
141	7301/DP1159 824	154	Parramatta Road, Concord	Concord Oval and Cintra Park	The State of NSW	Partial	✓	✓	27,877 (43% of lot)	-
	7302/DP1159 824	155	Parramatta Road, Concord	Concord Oval and Cintra Park	The State of NSW	Full		✓	679	
<b>Northcote Street tunnel site (C7)</b>										
142	64/DP4612	156	Parramatta Road, Haberfield	Commercial	Private	Full	✓		693	1
	63/DP4612	157	Parramatta Road, Haberfield	Commercial	Private	Full	✓		682	
143	50/DP719977	158	Parramatta Road, Haberfield	Commercial	Private	Full	✓		455	1
	51/DP719977	159	Parramatta Road, Haberfield	Commercial	Private	Full	✓		444	
	52/DP719977	160	Parramatta Road, Haberfield	Commercial	Private	Full	✓		415	

144	53/DP719977	161	Parramatta Road, Haberfield	Commercial	Private	Full	✓		642	1
	54/DP719977	162	Parramatta Road, Haberfield	Commercial	Private	Full	✓		631	
145	115/DP4612	163	Wolseley Street, Haberfield	Residential	Private	Full	✓		701	1
146	114/DP4612	164	Wolseley Street, Haberfield	Residential	Private	Full	✓		694	1
147	1/DP933225	165	Northcote Street, Haberfield	Residential	Private	Full	✓		569	1
148	1/DP933407	166	Northcote Street, Haberfield	Residential	Private	Full	✓		856	1
149	55/DP719977	167	Parramatta Road, Haberfield	Commercial	Private	Full	✓		586	1
	56/DP719977	168	Parramatta Road, Haberfield	Commercial	Private	Full	✓		603	
	57/DP719977	169	Parramatta Road, Haberfield	Commercial	Private	Full	✓		591	
	58/DP719977	170	Parramatta Road, Haberfield	Vacant/Commercial	Private	Full	✓		246	
150	B/DP391272	171	Northcote Street, Haberfield	Residential	Private	Full	✓		659	1
151	A/DP391272	172	Northcote Street, Haberfield	Residential	Private	Full	✓		728	1
152	1/DP239458	173	Wattle Street, Haberfield	Commercial	Private	Full	✓		238	1
	2/DP239458	174	Wattle Street, Haberfield	Commercial	Private	Full	✓		312	
<b>Eastern ventilation facility site (C8)</b>										
153	1/DP655550	175	Parramatta Road, Haberfield	Commercial	Private	Full		✓	362	1
	B/DP306471	176	Parramatta Road, Haberfield	Commercial	Private	Full		✓	346	
	C/DP306471	177	Parramatta Road, Haberfield	Commercial	Private	Full		✓	348	
154	D/DP306471	178	Parramatta Road, Haberfield	Residential	Private	Full		✓	339	1
155	E/DP306471	179	Parramatta Road, Haberfield	Residential	Private	Full		✓	339	1
156	X/DP384779	180	Parramatta Road, Haberfield	Residential	Private	Full		✓	416	1
157	Y/DP384779	181	Parramatta Road, Haberfield	Residential with commercial business	Private	Full		✓	326	1
158	B/DP433998	182	Parramatta Road,	Commercial	Private	Full		✓	1,066	1

			Haberfield							
159	1/DP342078	183	Parramatta Road, Haberfield	Commercial	Private	Full		✓	560	1
160	2/DP342078	184	Walker Street, Haberfield	Residential	Private	Full		✓	374	2
161	F/DP306471	185	Wattle Street, Haberfield	Residential	Private	Full		✓	615	1
162	1/DP946115	186	Wattle Street, Haberfield	Residential	Private	Full		✓	652	1
163	1/DP946514	187	Wattle Street, Haberfield	Residential	Private	Full		✓	656	1
164	511/DP880007	188	Wattle Street, Haberfield	Residential	Private	Full		✓	504	1
165	512/DP880007	189	Wattle Street, Haberfield	Residential	Private	Full		✓	475	1
166	1/SP6334	190	Wattle Street, Haberfield	Residential	Private	Full		✓	1,009	1
167	2/SP6334	190			Private					1
168	3/SP6334	190			Private					1
169	4/SP6334	190			Private					1
170	5/SP6334	190			Private					1
171	6/SP6334	190			Private					1
172	7/SP6334	190			Private					1
173	8/SP6334	190			Private					1
174	A/DP443459	191	Walker Street, Haberfield	Residential	Private	Full		✓	414	1
175	B/DP443459	192	Walker Street, Haberfield	Residential	Private	Full		✓	527	1
176	8/DP1756	193	Walker Street, Haberfield	Residential	Private	Full		✓	945	1
177	A/DP106839	194	Walker Street, Haberfield	Residential	Private	Full		✓	469	1
178	B/DP106839	195	Walker Street, Haberfield	Residential	Private	Full		✓	472	1
<b>Wattle Street and Walker Avenue civil site (C9)</b>										
179	49/DP1756	196	Wattle Street, Haberfield	Residential	Private	Full		✓	1,020	1
180	148/DP129987	197	Wattle Street, Haberfield	Residential	Private	Full		✓	660	1
181	1/SP7612	198	Wattle Street, Haberfield	Residential	Private	Full		✓	1,296	1
182	2/SP7612	198			Private					1
183	3/SP7612	198			Private					1
184	4/SP7612	198			Private					1
185	5/SP7612	198			Private					1
186	6/SP7612	198			Private					1
187	7/SP7612	198			Private					1
188	8/SP7612	198			Private					1

189	9/SP7612	198			Private					1
190	10/SP7612	198			Private					1
191	1/DP129933	199	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	937	1
192	A/DP396733	200	Walker Street, Haberfield	Residential	Private	Full	✓		470	1
193	B/DP396733	201	Walker Street, Haberfield	Residential	Private	Full	✓		487	1
194	1/DP955345	202	Walker Street, Haberfield	Residential	Private	Full	✓		625	1
195	1/DP953328	203	Walker Street, Haberfield	Residential	Private	Full	✓		645	1
196	12/DP130584	204	Walker Street, Haberfield	Residential	Private	Full	✓		629	1
197	13/B/DP1756	205	Walker Street, Haberfield	Residential	Private	Full	✓		956	2
198	45/DP1756	206	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	1058	1
199	1/DP420234	207	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	477	1
200	2/DP420234	208	Wattle Street, Haberfield	Residential	Private	Full		✓	580	1
201	B/DP437965	209	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	544	1
202	A/DP437965	210	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	543	1
203	1/SP6501	211	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	1,077	1
204	2/SP6501	211			Private					1
205	3/SP6501	211			Private					1
206	4/SP6501	211			Private					1
207	5/SP6501	211			Private					1
208	6/SP6501	211			Private					1
209	7/SP6501	211			Roads and Maritime					1
210	8/SP6501	211			Roads and Maritime					1
211	2/DP552460	212			Allum Street, Haberfield					Vacant
212	1/SP6270	213	Wattle Street, Haberfield	Residential	Private	Full		✓	1,285	1
213	2/SP6270	213			Private					1
214	3/SP6270	213			Private					1
215	4/SP6270	213			Private					1
216	5/SP6270	213			Private					1
217	6/SP6270	213			Private					1
218	7/SP6270	213			Private					1
219	8/SP6270	213			Private					1
220	9/SP6270	213			Private					1
221	10/SP6270	213			Private					1
222	1/DP930245	214	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	688	2
223	1/DP930244	215	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	698	1
224	C/DP900892	216	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	429	1

225	B/DP900892	217	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	438	1
226	B/DP108707	218	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	434	1
227	A/DP108707	219	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	443	1
228	1/DP115472	220	Walker Street, Haberfield	Residential	Private	Partial		✓	80 (9.2% of lot)	No impacts on buildings on this property
229	1/DP947287	221	Walker Street, Haberfield	Residential	Private	Partial		✓	70 (10.1% of lot)	No impacts on buildings on this property
230	1/DP945634	222	Walker Street, Haberfield	Residential	Private	Partial		✓	60 (8.6% of lot)	No impacts on buildings on this property
231	36/DP1756	223	Wattle Street, Haberfield	Residential	Private	Full		✓	1,142	2
232	1/DP110050	224	Wattle Street, Haberfield	Residential	Private	Full		✓	846	2
233	1/DP972376	225	Wattle Street, Haberfield	Residential	Private	Full		✓	959	7
234	1/DP971047	226	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	887	1
235	1/DP130041	227	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	782	1
236	2/DP105187	228	Ramsey Street, Haberfield	Residential	Roads and Maritime	Full		✓	525	1
237	1/DP105187	229	Ramsey Street, Haberfield	Residential	Private	Full		✓	572	1
238	1/DP973730	230	Ramsey Street, Haberfield	Residential	Roads and Maritime	Full		✓	742	1
239	1/DP115470	231	Ramsey Street, Haberfield	Residential	Private	Full		✓	831	1
240	2/DP115470	232	Ramsey Street, Haberfield	Residential	Roads and Maritime	Full		✓	547	1
241	1/DP129909	233	Ramsey Street, Haberfield	Residential	Roads and Maritime	Full		✓	519	1
242	2/DP218274	234	Ramsey Street, Haberfield	Residential	Roads and Maritime	Full		✓	501	1
243	3/DP218274	235	Ramsey Street, Haberfield	Residential	Private	Full		✓	514	1
244	147/DP4701	236	Ramsey Street, Haberfield	Residential	Private	Full		✓	694	1
245	2/DP129909	237	Wattle Street, Haberfield	Residential	Private	Full		✓	564	1
246	3/DP129909	238	Wattle Street, Haberfield	Residential	Roads and Maritime	Full		✓	362	-
247	A/DP100913	239	Martin Street, Haberfield	Residential	Roads and Maritime	Full		✓	331	-
248	W/DP100914	240	Martin Street, Haberfield	Residential	Roads and Maritime	Full		✓	524	1
249	161/DP4701	241	Martin Street, Haberfield	Residential	Private	Full		✓	696	1
250	162/DP4701	242	Martin Street, Haberfield	Residential	Private	Full		✓	709	1
251	11/DP364004	243	Wattle Street, Haberfield	Vacant	Roads and Maritime	Full		✓	508	-

252	10/DP978018	244	Martin Street, Haberfield	Residential	Roads and Maritime	Full		✓	508	1
253	31/DP872944	245	Wattle Street, Haberfield	Residential	Private	Partial		✓	8 (1% of lot)	No impacts on buildings on this property
254	1/DP129911	246	Wattle Street, Haberfield	Vacant	Roads and Maritime	Full		✓	470	-
255	5/DP733249	247	Wattle Street, Haberfield	Reg Coady Reserve	Ashfield Council	Full		✓	505	-
	1/DP169385	248	Wattle Street, Haberfield	Reg Coady Reserve, Dobroyd Parade, Reserve	Ashfield Council	Full		✓	1,083	
	N/A	249	Wattle Street, Haberfield	Reg Coady Reserve	Ashfield Council	Full		✓	-	
256	4/DP852452	250	Wattle Street, Haberfield	Reg Coady Reserve	State of NSW	Partial	✓ (Lease)	✓	225 (perm) (4.2% of lots)	-
	9/DP852452	251	Wattle Street, Haberfield	Reg Coady Reserve	State of NSW	Partial	✓ (lease)	✓	867 (lease) (16.1% of lots)	
257	N/A	252	Allum Street, Haberfield	Local road	Ashfield Council	Partial		✓	-	-
258	N/A	253	Martin Street, Haberfield	Local road	Ashfield Council	Partial		✓	-	-
<b>Parramatta Road civil site (C10)</b>										
259	10/DP115060 8	254	Parramatta Road, Haberfield	Commercial	Private	Full		✓	543	1
260	52/DP112203 9	255	Parramatta Road, Ashfield	Overbridge	Roads and Maritime	Full		✓	32	-
261	53/DP112203 9	256	Parramatta Road, Ashfield	Overbridge	Roads and Maritime	Full		✓	39	-
262	50/DP112203 9	257	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	635	-
	51/DP112203 9	258	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	591	
	3/DP5010	259	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		449	
	1/DP973337	260	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		387	
	6/DP965245	261	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		484	
	1/DP965245	262	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	3,341	
	2/DP965245	263	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	676	
	3/DP965245	264	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	702	

263	2/DP1023083	265	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,905	1
264	1/DP963236	266	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full		✓	804	-
	2/DP668831	267	Chandos Street, Ashfield	Vacant/Commercial	Private	Full		✓	203	
265	SP66454	268	Chandos Street, Ashfield	Residential	Private	Partial		✓	800 (16.1% of lot)	-
266	1/DP120051	269	Chandos Street, Ashfield	Residential	Private	Full	✓	✓	766	1
267	2/DP214209	270	Chandos Street, Ashfield	Residential	Private	Full	✓	✓	467	1
268	1/DP214209	271	Chandos Street, Ashfield	Residential	Private	Full	✓	✓	468	1
269	1/SP65838	272	Chandos Street, Ashfield	Residential	Private	Full	✓	✓	1,331	1
270	2/SP65838	272			Private					1
271	3/SP65838	272			Private					1
272	4/SP65838	272			Private					1
273	5/SP65838	272			Private					1
274	6/SP65838	272			Private					1
275	4/DP18382	273	Parramatta Road, Ashfield	Commercial	Private	Full		✓	436	1
276	3/DP18382	274	Parramatta Road, Ashfield	Residential	Private	Full		✓	484	4
277	2/DP18382	275	Parramatta Road, Ashfield	Residential	Private	Full		✓	483	5
278	1/DP18382	276	Parramatta Road, Ashfield	Residential	Private	Full		✓	483	4
279	B/DP438636	277	Parramatta Road, Ashfield	Residential	Private	Full		✓	318	1
280	A/DP438636	278	Parramatta Road, Ashfield	Residential	Private	Full		✓	284	1
281	B/DP433769	279	Parramatta Road, Ashfield	Residential	Private	Full		✓	807	1
282	A/DP433769	280	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,042	1
283	11/DP439	281	Parramatta Road, Ashfield	Commercial	Private	Full		✓	929	1
284	10/DP439	282	Parramatta Road, Ashfield	Commercial	Private	Full		✓	944	1
285	A/DP504990	283	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,138	1
286	B/DP504990	284	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	1,162	1
287	11/DP610044	285	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	3,228	1
288	1/DP130606	286	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓	✓	253	1
	2/DP130606	287	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓		30	
	3/DP130606	288	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓		93	
	4/DP439	289	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓	✓	967	
289	3/DP439	290	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	922	1
290	5/DP33945	291	Parramatta Road, Ashfield	Commercial	Private	Full		✓	553	1
291	N/A	292	Chandos Street, Ashfield	Local Road	Ashfield Council	Partial		✓		-

# Appendix

# N

Economic impact assessment

WestConnex

# WestConnex Delivery Authority

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WestConnex M4 East

Economic Impact Assessment

September 2015

**Prepared for**

WestConnex Delivery Authority

**Prepared by**


*AECOM Australia*

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<b>Title</b>	<b>Project title</b> <b>Document type</b>
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Prepared by:	AECOM Australia Pty Ltd
Authorised by AECOM Australia Pty Ltd:	Jay Stricker Industry Director – Transport
Signed:	
Date	

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# Glossary of abbreviations

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<b>Term</b>	<b>Meaning</b>
ABS	Australian Bureau of Statistics
BTS	Bureau of Transport Statistics
CBD	Central Business District
CCTV	Close Circuit Television
DFO	Direct Factory Outlets
EIA	Economic Impact Assessment
EIS	Environmental Impact Statement
EP&A	Environmental Planning and Assessment
FTE	Full-time Equivalent
GCCSA	Greater Capital City Statistical Area
GRP	Gross Regional Product
GSP	Gross State Product
IST	Intelligent Transport Systems
LGA	Local Government Area
NSW	New South Wales
Roads and Maritime	(NSW) Roads and Maritime Services
SA2	Statistical Area 2
SEARs	Secretary's Environmental Assessment Requirements
VMS	Variable Message Signs
WDA	WestConnex Delivery Authority

# Executive summary

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The WestConnex Delivery Authority (WDA), on behalf of the NSW Roads and Maritime Services (Roads and Maritime), is seeking approval to upgrade and extend the M4 Motorway from Homebush Bay Drive at Homebush to Parramatta Road and City West Link (Wattle Street) at Haberfield (the project).

The purpose of this report is to undertake an assessment of the potential impacts of the project on local businesses and the regional economy. The Economic Impact Assessment (EIA) considers the potential direct, indirect and cumulative economic impacts of the project (where relevant) to businesses, customers, commercial road users (including freight transport operators) and the economy. The potential impacts on the economy include changes in the level of economic activity, changes in productivity/efficiency, changes in employment and changes in number and size of businesses.

The methodology for this assessment was developed with consideration of the Secretary's Environmental Assessment Requirements (SEARs) and the Roads and Maritime Environmental Impact Assessment Practice Note - Socio-economic Assessment (EIA-N05 (Roads and Maritime, 2013)). This assessment provides an overview of the existing economic environment in which the project is located and the businesses potentially impacted by the project. The potential impacts are the outcome of the interaction between the project and the existing environment and are considered from local and regional perspectives.

Through economic multipliers it was determined that construction expenditure would contribute a total of \$1.8 billion of output, \$420 million of household income, around 4,120 full-time equivalent (FTE) jobs and \$690 million value added to the NSW economy per average year of construction. Operational expenditure was estimated to contribute a total of \$39 million in output, around \$9 million in household income, 110 FTE jobs and \$18 million in value added per year of operation of the project.

A total of 23 properties that are either currently used for, or zoned for, business activity would be fully acquired for the project prior to commencement of construction. These properties currently contain a total of 20 buildings used for private purposes, including a motel, commercial offices, automotive sales and services businesses, a funeral service business, homeware sales and services businesses and retail businesses. The acquisition of this land would result in impacts to the local economy through loss of business turnover and employment.

All businesses located on land to be fully acquired are located adjacent to Parramatta Road, toward the eastern end of the project in the suburbs of Ashfield and Haberfield. Many of these businesses serve a wider catchment area so their relocation will not significantly disadvantage the local community. In addition the affected businesses in this area do not generally provide complementary or supplementary goods or services, therefore the viability of adjacent or surrounding businesses should not be affected.

The acquisition of property would occur under the terms of Land Acquisition (Just Terms Compensation) Act 1991 and under the Roads and Maritime Land Acquisition Information Guide (Roads and Maritime, 2012).

At the completion of the construction period, a number of these properties would potentially be available for sale and redevelopment as they will not be required during operation. Some of these properties fronting Parramatta Road in Haberfield and Ashfield are currently zoned for business use and would provide an opportunity for commercial development in the future. The future use of this residual land would be subject to separate assessment and planning approval.

A significant part of construction activity would occur underground, which would limit the extent of impacts to businesses along the corridor. Businesses such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities would stand to be the most affected by amenity impacts. Due to the nature of businesses located in proximity to works, amenity impacts such as increased noise and dust levels and detrimental changes to visual amenity are expected to be limited.

Due to the existing level of road traffic noise in the vicinity of the project, it is anticipated that construction traffic on major roads will not noticeably impact amenity for businesses located in the study area. The magnitude of the impact of amenity would be largely influenced by the construction hours, length of the construction period, the construction activity, proximity to the project and the nature of the business.

Construction traffic is estimated to reach a maximum of 1,260 heavy vehicles and 920 light vehicles per day during the peak construction period. Increased construction traffic will affect network performance by increasing travel times and increasing intersection delays. Businesses that are reliant on deliveries may experience longer transit times during the construction period. Freight and commercial vehicles that use Parramatta Road and the M4 may also experience longer transit times and decreased efficiencies over the construction period.

Access to property not acquired or leased for the project would be maintained at all times during construction. Where impacts on property access are unavoidable as a result of construction activities, consultation would be undertaken with the property owner and/or tenant to develop appropriate alternative access arrangements.

The majority of the construction ancillary facilities nominated for the project would have parking for staff based at those sites. It is anticipated that potential impacts on parking for customers and staff of businesses located near construction ancillary facilities would be mitigated with the implementation of a construction car parking management strategy.

During operation of the project, businesses located along Parramatta Road, east of Concord Road and not located adjacent to the eastern or western portal, will experience decreased noise levels, improved air quality and improved visual amenity due to the reduction in vehicles, particularly heavy vehicles on Parramatta Road. Businesses located at the eastern and western portals and west of Concord Road are likely to experience increases in noise, reduced air quality and decreases in visual amenity due to increased traffic volumes and the introduction of new infrastructure.

As the majority of traffic currently using Parramatta Road would be diverted into a tunnel due to the project, businesses that are reliant on passing trade will be affected by the project. It has been estimated that there could be an annual reduction of around \$7.3 million in output and around 33 full-time equivalent jobs due to loss in passing trade. This equates to a loss of 19 per cent of total output and full-time equivalent employment of the businesses reliant on passing trade. Reductions in passing trade would potentially be offset to some degree by improved amenity and accessibility for the businesses affected.

This assessment does not take into account the potential increase in passing trade for businesses located along Parramatta Road, west of Concord Road, from an increase in traffic volumes. A total of five businesses were identified as potentially benefitting from an increase in passing trade, comprising of services stations, a car wash and cafes/restaurants.

The operation of the project would improve network efficiency, delivering travel time savings and provide more efficient movement of freight and commercial vehicles, thereby reducing operational costs. The operation of the project would also provide increased road capacity along the M4/ Parramatta Road corridor, which is a key corridor for the movement of freight between Sydney Airport/ Port Botany and the western suburbs, particularly for those businesses located in the vicinity of M4, and commercial vehicle movements between major centres.

Cumulative impacts are most likely to result from the concurrent construction and operation of the wider WestConnex project. Construction fatigue is likely to arise for motorists and users of the M4 due to the extended construction timeframe associated with the M4 Widening and M4 East projects and the M4-M5 link. There would also be potential traffic congestion and delays for customers and staff of businesses such as Flemington Markets and Homebush DFO and for people visiting the Sydney Olympic Park precinct during construction.

Construction expenditure associated with the concurrent construction of the New M5 project is likely to intensify employment and economic stimulus impacts in the region.

During operation, cumulative impacts to the economy and businesses are most likely to result from the concurrent operation of the wider WestConnex project and the Parramatta Road Urban Transformation Program.

The completion of WestConnex will facilitate job growth and enable freight to efficiently move through and across Sydney. The freight industry and commercial commuters will benefit greatly by enabling the efficient movement of traffic between western and south-western Sydney and interstate and international markets through connections with the wider National Land Transport Network, Sydney Airport and Port Botany. WestConnex will also improve regional accessibility to businesses such as Flemington Markets, Homebush DFO and the Sydney Olympic Park precinct.

The project will facilitate the removal of a significant amount of traffic from Parramatta Road and enable the Parramatta Road Urban Transformation Program. This Program has the potential to provide a more amenable environment for living and working and to improve accessibility within the Parramatta Road corridor. As a result this will help to stimulate housing and employment growth and generate economic activity which will be of benefit to existing and new businesses along Parramatta Road.

A number of mitigation measures have been proposed to minimise any impacts that would be associated with construction or operation of the project.

Overall, the positive impacts on businesses and the economic benefits of the project are expected to outweigh any negative impacts that cannot be satisfactorily mitigated.

# 1 Introduction

---

## 1.1 Overview of the project

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to upgrade and extend 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. These proposed works are described as the M4 East project (the project). The location of the project is shown in **Figure 1.1**.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). The project was declared by the Minister for Planning to be State significant infrastructure and critical State significant infrastructure and an environmental impact statement (EIS) is therefore required.

The project is a component of WestConnex, which is a proposal to provide a 33 kilometre motorway linking Sydney's west and south-west with Sydney Airport and the Port Botany precinct. The location of WestConnex is shown in **Figure 1.2**. The individual components of WestConnex are:

- M4 Widening – Pitt Street at Parramatta to Homebush Bay Drive at Homebush (planning approval granted and under construction)
- M4 East (the subject of this report)
- New M5 – King Georges Road at Beverly Hills to St Peters (planning application lodged and subject to planning approval)
- King Georges Road Interchange Upgrade (planning approval granted and work has commenced)
- M4–M5 Link – Haberfield to St Peters, including the Southern Gateway and Southern Extension (undergoing concept development and subject to planning approval).

Separate planning applications will be lodged for each individual component project. Each project will be assessed separately, but the impacts of each project will also be considered in the context of the wider WestConnex.

The NSW Government has established the WestConnex Delivery Authority (WDA) to deliver WestConnex. WDA has been established as an independent public subsidiary corporation of Roads and Maritime. Its role and functions are set out in Part 4A of the *Transport Administration (General) Regulation 2013* (NSW). WDA is project managing the planning approval process for the project on behalf of Roads and Maritime. However, for the purpose of the planning application for the project, Roads and Maritime is the proponent.

## 1.2 Project location

The project is generally located in the inner west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield local government areas (LGAs). The project travels through 10 suburbs: Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield.

The project is generally located within the M4 and Parramatta Road corridor, which links Broadway at the southern end of the Sydney central business district (CBD) and Parramatta in Sydney's west, about 20 kilometres to the west of the Sydney CBD. This corridor also provides the key link between the Sydney CBD and areas further west of Parramatta (such as Penrith and western NSW).

The western end of the project is located at the interchange between Homebush Bay Drive and the M4, about 13 kilometres west of the Sydney CBD. The project at this location would tie in with the M4 Widening project in the vicinity of Homebush Bay Drive.

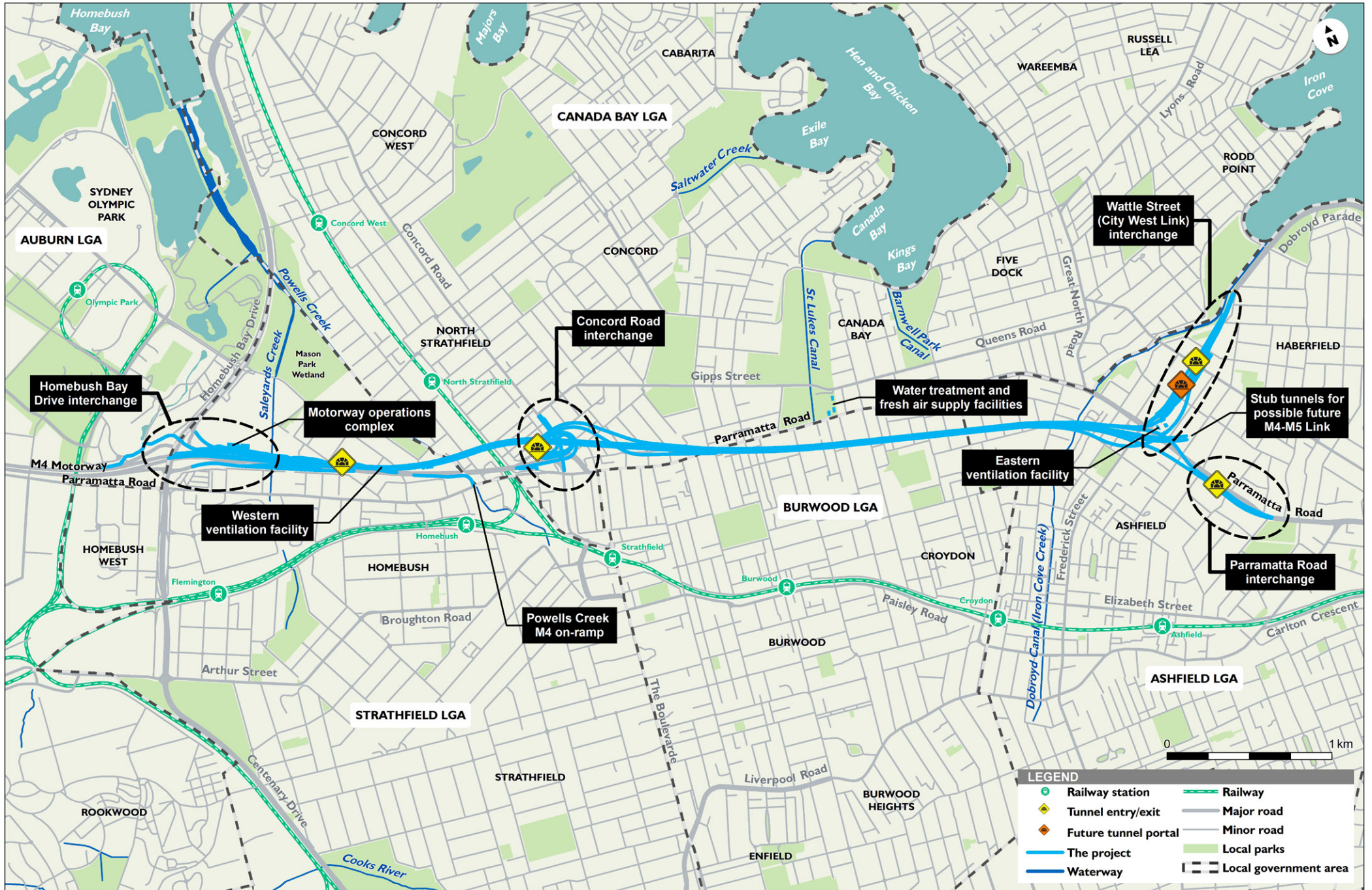


Figure 1.1 Local context of the project



Figure 1.2 WestConnex

The tunnel dive structures would start at the centre of the M4, west of the existing pedestrian footbridge over the M4 at Pomeroy Street, and would continue underground to the north of the existing M4 and Parramatta Road, before crossing beneath Parramatta Road at Broughton Street at Burwood. The tunnels would continue underground to the south of Parramatta Road until the intersection of Parramatta Road and Wattle Street at Haberfield. Ramps would connect the tunnels to Parramatta Road and Wattle Street (City West Link) at the eastern end of the project. The tunnels would end in a stub connection to the possible future M4–M5 Link (M4–M5 Link), near Alt Street at Haberfield.

The project would include interchanges between the tunnels and the above ground road network, along with other surface road works, at the following locations:

- M4 and Homebush Bay Drive interchange at Sydney Olympic Park and Homebush (Homebush Bay Drive interchange)
- Powells Creek, near George Street at North Strathfield (Powells Creek M4 on-ramp)
- Queen Street, near Parramatta Road at North Strathfield (Queen Street cycleway westbound on-ramp)
- M4 and Sydney Street, Concord Road and Parramatta Road interchange at North Strathfield (Concord Road interchange)
- Wattle Street (City West Link), between Parramatta Road and Waratah Street at Haberfield (Wattle Street (City West Link) interchange)
- Parramatta Road, between Bland Street and Orpington Street at Ashfield and Haberfield (Parramatta Road interchange).

### 1.3 Secretary's environmental assessment requirements

The NSW Department of Planning and Environment (DP&E) has issued a list of Secretary's Environmental Assessment Requirements (SEARs) that inform the environmental impact assessment.

**Table 1.1** displays the SEARs that are specific to the social and economic impact assessments and also provides a cross reference to the relevant section(s) of this report which address these requirements.

The economic impact assessment (EIA) will address the economic requirements raised under the social and economic SEARs for the project. The Technical Report: Social Impact Assessment and **Chapter 7** (Consultation) of the EIS will address the social and community consultation SEARs for the project.

In December 2013, the then NSW Department of Planning and Infrastructure sought input from government agencies ('Agency Letters') into the preparation of Director General Requirements (now 'SEARs') for the project. Economic and business impact issues were not raised in the Agency Letters for this project and, as such, the SEARs have guided the economic assessment.

**Table 1.1 How SEARs have been addressed in this report**

<b>SEARs</b>	
<b>Social and Economic</b>	
<b>Requirement</b>	<b>Section where addressed in EIS</b>
<ul style="list-style-type: none"> <li>impacts on directly affected properties and land uses, including impacts related to access, land use, property acquisition (including relations and expenses for those properties acquired) and amenity related changes;</li> </ul>	<ul style="list-style-type: none"> <li><b>Section 6</b> and <b>Section 7</b> of this report</li> <li>Technical Report: Social Impact Assessment of the EIS</li> </ul>
<ul style="list-style-type: none"> <li>social and economic impacts to businesses in the vicinity of the project, including Parramatta Road and other, and to the community associated with traffic, access, property, public domain and amenity related changes;</li> </ul>	<ul style="list-style-type: none"> <li><b>Section 6</b> and <b>Section 7</b> of this report</li> <li>Technical Report: Social Impact Assessment of the EIS</li> </ul>
<ul style="list-style-type: none"> <li>social impact assessment for Concord Oval, including details of existing uses, proximity of sporting club membership and fan bases to Concord Oval, consideration of relocation options and offsets for affected clubs, and consideration of alternative sites (including the Burwood bus depot site); and</li> </ul>	<ul style="list-style-type: none"> <li>Technical Report: Social Impact Assessment of the EIS</li> </ul>
<ul style="list-style-type: none"> <li>a draft Community Consultation Framework identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback and procedures for resolving community complaints. Key issues that should be addressed in the draft framework should include: <ul style="list-style-type: none"> <li>traffic management (including property access, pedestrian access),</li> <li>landscaping/urban design matters,</li> <li>construction activities, including out of hours work, and</li> <li>noise and vibration mitigation and management.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Chapter 7 (Consultation) of the EIS</li> </ul>

### 1.4 Purpose of this report

Construction and operation of the project are expected to have both beneficial and adverse impacts on businesses and commercial road users within and in the vicinity of the study area and the wider economy. The purpose of this report is to identify and assess the economic impacts of the project and to identify management and mitigation measures to address the identified impacts.

The EIA considers the direct, indirect and cumulative impacts (where relevant) on the following:

- Businesses
- Customers
- Commercial road users including freight transport operators

- The economy, including changes in the level of economic activity, changes in productivity/efficiency, changes in employment and changes in number and size of businesses.

This assessment provides an overview of the existing economic environment in which the project is located and the businesses potentially impacted by the project. The potential impacts are the outcome of the interaction between the project and the existing environment and are considered from local and regional perspectives.

An assessment of impacts on property owners, residents and the community are addressed in the Technical Report: Social Impact Assessment of the EIS.

## 1.5 Structure of this report

This report is structured as follows:

- **Section 1** Introduction – outlines the M4 East project and presents the purpose of the report;
- **Section 2** Proposed project - describes the key features of the project and the associated construction activities;
- **Section 3** Methodology – describes the methodology employed for the EIA;
- **Section 4** Existing environment – presents the current economic characteristics of the study area;
- **Section 5** Consultation and key stakeholders – outlines the key economic issues identified through consultation with key stakeholders and identifies where these issues are addressed in the report;
- **Section 6** Assessment of construction impacts - describes the potential economic impacts resulting from the construction of the project;
- **Section 7** Assessment of operational impacts - describes the potential economic impacts resulting from the operation of the project;
- **Section 8** Mitigation and management - provides a summary of recommended environmental mitigation, management and monitoring responsibilities in relation to business impacts of the Project;
- **Section 9** Conclusion;
- **Section 10** References;
- **Appendix A** Economic profile – provides a detailed set of data tables for the economic characteristics of the study area; and
- **Appendix B** Business Acquisition - describes the expected impacts to business from acquisition.

## 2 Proposed project

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### 2.1 Project features

The project would comprise the construction and operation of the following key features:

- Widening, realignment and resurfacing of the M4 between Homebush Bay Drive and Underwood Road at Homebush
- Upgrade of the existing Homebush Bay Drive interchange to connect the western end of the new tunnels to the existing M4 and Homebush Bay Drive, while maintaining all current surface connections
- Two new three-lane tunnels (the mainline tunnels), one eastbound and one westbound, extending from west of Pomeroy Street at Homebush to near Alt Street at Haberfield, where they would terminate until the completion of the M4–M5 Link. Each tunnel would be about 5.5 kilometres long and would have a minimum internal clearance (height) to in-tunnel services of 5.3 metres
- A new westbound on-ramp from Parramatta Road to the M4 at Powells Creek, west of George Street at North Strathfield
- An interchange at Concord Road, North Strathfield/Concord with on-ramps to the eastbound tunnel and off-ramps from the westbound tunnel. Access from the existing M4 to Concord Road would be maintained via Sydney Street. A new on-ramp would be provided from Concord Road southbound to the existing M4 westbound, and the existing on-ramp from Concord Road northbound to the existing M4 westbound would be removed
- Modification of the intersection of the existing M4 and Parramatta Road, to remove the left turn movement from Parramatta Road eastbound to the existing M4 westbound
- An interchange at Wattle Street (City West Link) at Haberfield with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. The project also includes on- and off-ramps at this interchange that would provide access to the M4–M5 Link. In addition, the westbound lanes of Wattle Street would be realigned
- An interchange at Parramatta Road at Ashfield/Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. In addition, the westbound lanes of Parramatta Road would be realigned
- Installation of tunnel ventilation systems, including ventilation facilities within the existing M4 road reserve near Underwood Road at Homebush (western ventilation facility) and at the corner of Parramatta Road and Wattle Street at Haberfield (eastern ventilation facility). The eastern ventilation facility would serve both the project and the M4–M5 Link project. Provision has also been made for a fresh air supply facility at Cintra Park at Concord
- Associated surface road work on the arterial and local road network, including reconfiguration of lanes, changes to traffic signalling and phasing, and permanent road closures at a small number of local roads
- Pedestrian and cycle facilities, including permanently re-routing a portion of the existing eastbound cycleway on the northern side of the M4 from west of Homebush Bay Drive to near Pomeroy Street, and a new westbound cycleway on-ramp connection from Queen Street at North Strathfield to the existing M4
- Tunnel support systems and services such as electricity substations, fire pump rooms and tanks, water treatment facilities, and fire and life safety systems including emergency evacuation infrastructure
- Motorway operations complex on the northern side of the existing M4, east of the Homebush Bay Drive interchange
- Provision of road infrastructure and services to support the future implementation of smart motorway operations (subject to separate planning approval)

- Installation of tolling gantries and traffic control systems along the length of the project
- Provision of new and modified noise walls
- Provision of low noise pavement for new and modified sections of the existing M4
- Temporary construction ancillary facilities and temporary works to facilitate the construction of the project.

An overview of the project at completion is shown in **Figure 2.1**.

The project does not include work required for reconfiguring Parramatta Road as part of the urban transformation program. The project does not include ongoing motorway maintenance activities during operation. These would be subject to separate assessment and approval as appropriate.

## 2.2 Construction activities

### 2.2.1 Overview

Construction activities associated with the project would generally include:

- Enabling and temporary works, including construction power, water supply, ancillary site establishment, demolition works, property adjustments and public 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 complex 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.

The project assessed in this report does not include surveys, sampling or investigation to inform the design or assessment, such as test drilling, test excavations, geotechnical investigations, or other tests. It also does not include adjustments to, or relocation of, existing utilities infrastructure undertaken prior to commencement of construction. These would be subject to separate assessment and approval as appropriate.

### 2.2.2 Construction footprint

The total area required for construction of the project, including construction ancillary facilities, is referred to as the 'construction footprint'. The construction footprint would be about 65 hectares in total, comprising about 48 hectares at the surface and about 17 hectares below ground.

In addition to below ground works, surface works would be required to support tunnelling activities and to construct surface infrastructure such as interchanges, tunnel portals, ventilation facilities, ancillary operations buildings and facilities, and new cycleway facilities near the Homebush Bay Drive interchange and Queen Street at North Strathfield.

The overall surface construction footprint generally aligns with the operational footprint, with the locations of future operational ancillary facilities being used to support construction work. Some additional areas adjacent to the operational footprint (around the portals and on- and off-ramps, and also at the tunnel mid-point) would also be required during the construction stage only to facilitate construction.

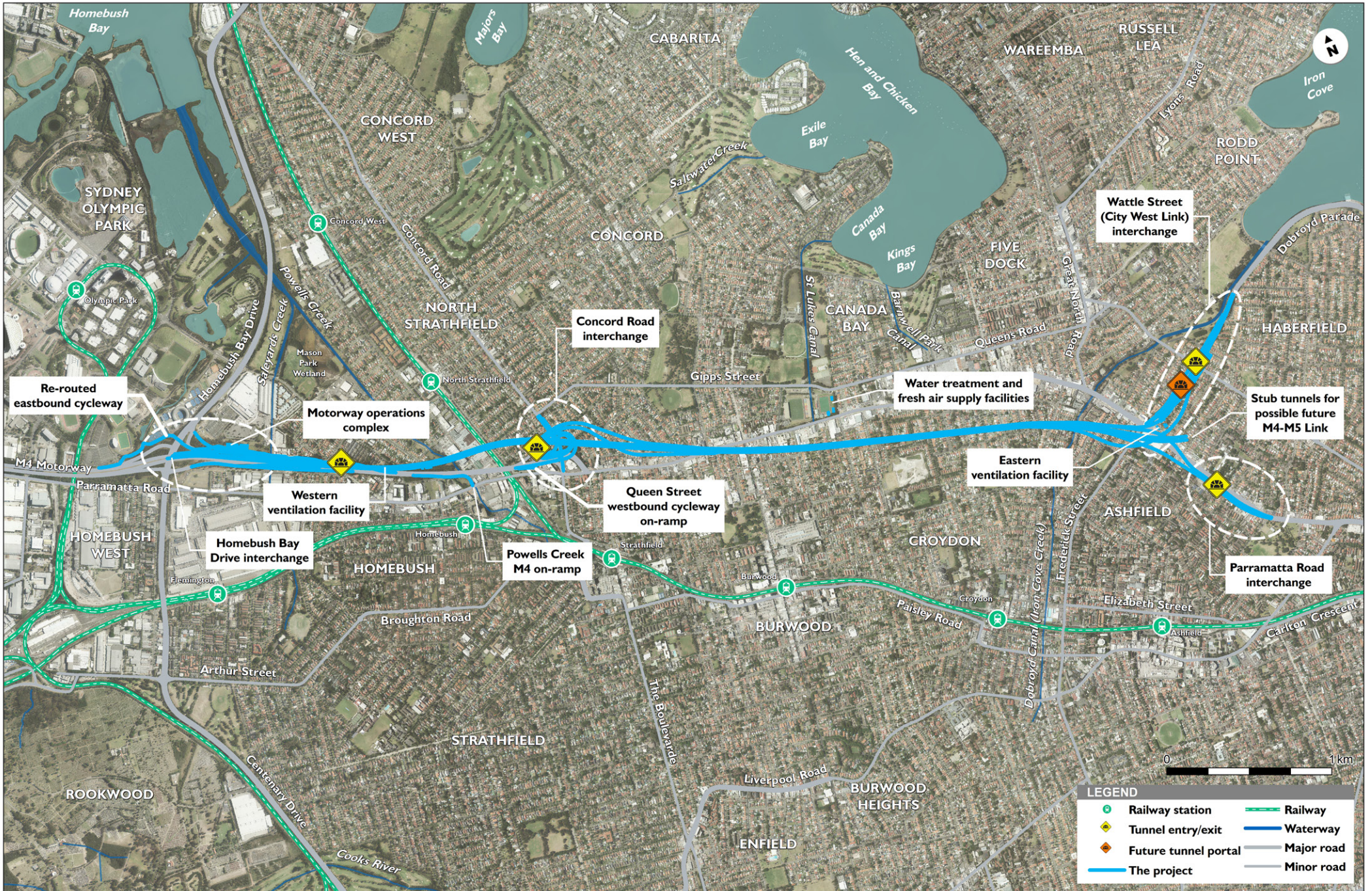


Figure 2.1 Overview of the project

Construction ancillary facilities currently proposed would be required at the following 10 locations:

- Homebush Bay Drive civil site (C1)
- Pomeroy Street civil site (C2)
- Underwood Road civil and tunnel site (C3)
- Powells Creek civil site (C4)
- Concord Road civil and tunnel site (C5)
- Cintra Park tunnel site (C6)
- Northcote Street tunnel site (C7)
- Eastern ventilation facility site (C8)
- Wattle Street and Walker Avenue civil site (C9)
- Parramatta Road civil site (C10).

An overview of the construction footprint is shown in .

The final size and configuration of construction ancillary facilities would be further developed during detailed design.

### 2.2.3 Construction program

Subject to planning approval, construction of the project is planned to start in the second quarter of 2016, with completion planned for the first quarter of 2019. The total period of construction works is expected to be around three years, including nine months of commissioning occurring concurrently with the final stages of construction. The indicative construction program is shown in **Figure 2.2**.

**Table 2.1 Indicative construction program overview**

Construction activity	Indicative construction timeframe											
	2016			2017			2018			2019		
Construction access excavation (all sites)												
Tunnelling (excavation)												
Tunnel drainage and pavement works												
Tunnel mechanical and electrical fitout works												
Tunnel completion works												
Homebush Bay Drive interchange												
M4 surface works												
Western ventilation facility												
Powells Creek on-ramp												
Concord Road interchange												
Wattle Street interchange												
Parramatta Road interchange												
Eastern ventilation facility												
Cintra Park fresh air supply facility												
Cintra Park water treatment facility												
Motorway operations complex												
Mechanical and electrical fitout works												
Site rehabilitation and landscaping												

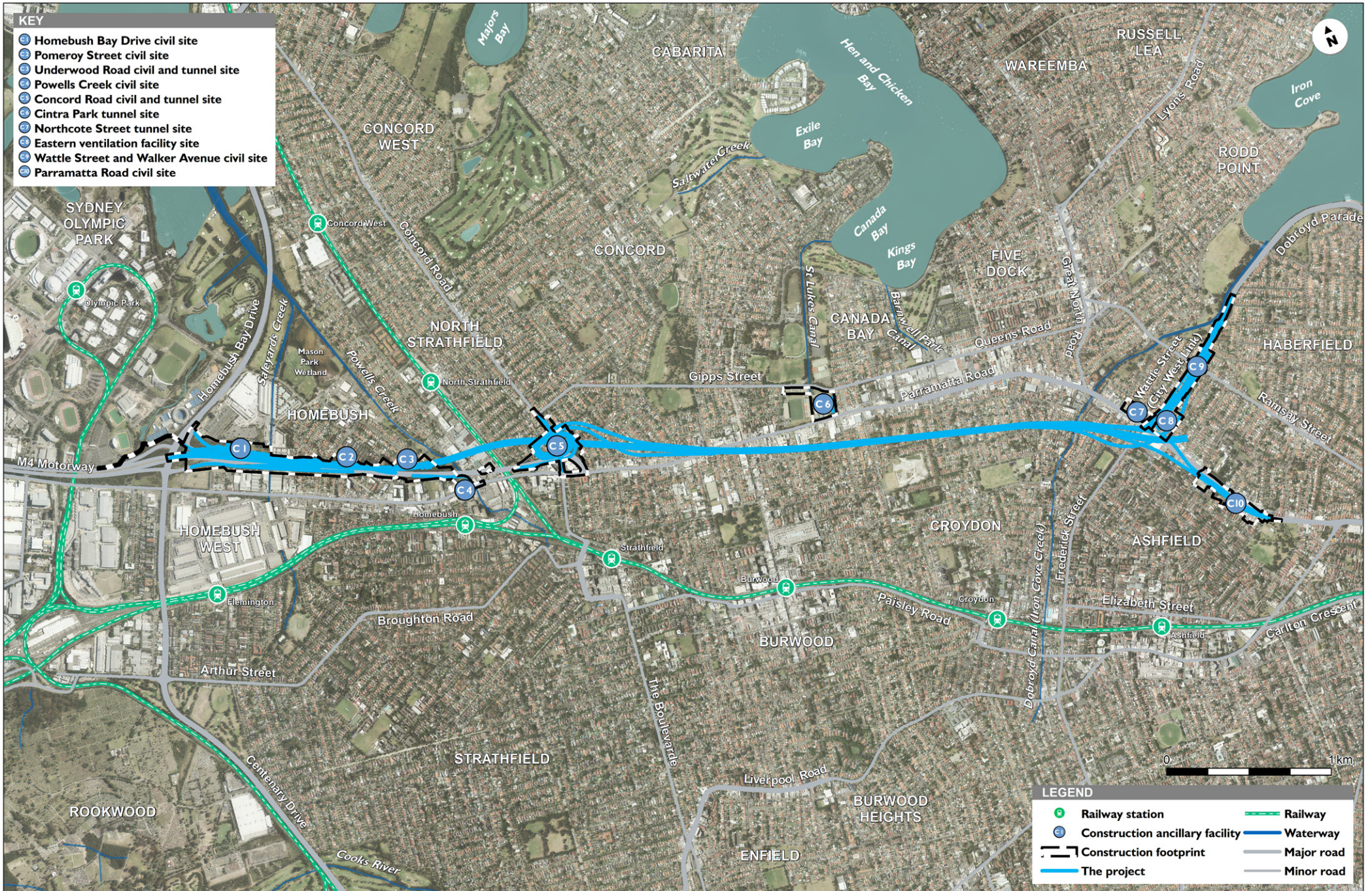


Figure 2.2 Overview of construction footprint and construction ancillary facilities

## 3 Assessment methodology

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### 3.1 Key guidelines and policies

The methodology for this assessment was developed with consideration of the SEARs and the Roads and Maritime Environmental Impact Assessment Practice Note - Socio-economic Assessment (EIA-N05 (Roads and Maritime, 2013)).

The Socio-economic Practice Note provides a framework for assessing social and economic impacts of projects to ensure impact assessments are carried out consistently, to a high standard, and are properly integrated with other environmental assessments, design development and management processes.

Based on the size and nature of the project, a moderate level assessment has been prepared in accordance with the practice note. A moderate level assessment applies to projects with several impacts, medium duration impacts or impacts on groups of people.

### 3.2 Methodology

#### 3.2.1 Overview

The methodology for this assessment was developed with consideration of the SEARs and the Socio-economic Practice Note and was based on the following steps:

- Definition of a study area for the EIA, considering the components of the project and potential impacts during construction and operation. This is discussed further in **Section 3.2.2**.
- Development of a baseline profile for current businesses and the economy within the defined study area using published data sources including the Australian Bureau of Statistics (ABS) (2012 and 2015) and NSW Bureau of Transport Statistics (BTS) (2014)
- Assessment of key stakeholder issues arising from the community consultation conducted by the WDA consultation team for the project to date
- Review of businesses currently located within the study area that may be directly impacted due to acquisition or indirectly impacted by the project (for example, due to losses in passing trade) through a desk-top assessment
- Quantification of positive and/or negative impacts on the businesses as a result of the project, where possible, measured through:
  - Employment: The projected net change in the number of people employed in local businesses. The change in employment is measured by total employment and full time equivalent (FTE) employment. The latter measure converts the number of full time, part time and casual employees into a unit equivalent to the number of full time employees
  - Turnover: The projected net change in turnover (\$) generated by local businesses
  - Other: Additional components of business operations that may be impacted by the project, which are unable to be quantified
- Identification of potential positive and/or negative impacts on businesses within the study area as a result of the project, including impacts related to access, land use and amenity related changes
- Identification of potential positive and/or negative impacts on commercial road users and freight vehicles as a result of the project
- Identification of measures to mitigate or manage the potential impacts on businesses

For the purpose of the EIA, an affected business has been defined as a business that would be impacted by property acquisition, changes in amenity, changes to accessibility or changes in the volume of passing trade due to the construction and operation of the project.

The preparation of the EIA has not included direct consultation with businesses, individuals or industry groups. The use of information obtained from primary research was limited to that undertaken by the WDA community consultation team.

While the Parramatta Road Urban Transformation Program is not included in the scope of this project, a qualitative assessment has been included to consider the potential of the project to facilitate the revitalisation program and/or where cumulative impacts of the combined projects may occur.

An assessment of the impact of the project on residential and commercial property prices has not been included in the preparation of the EIA. There are a large number of factors that influence the value of a property and as such a reliable assessment of the interaction between the project and the property market cannot be made with any certainty.

### 3.2.2 Study area

The study area for the EIA has been identified as including the 5 LGAs of Auburn, Strathfield, Burwood, Canada Bay and Ashfield. Within the study area the geographical statistical areas (as defined by the ABS (Australian Bureau of Statistics, 2011)) that encompass the project, as well as a wider catchment focussed on the M4/ Parramatta Road corridor.

The following Statistical Areas (SA2s) have been identified as the areas that are most likely to experience business impacts due to the project:

- Homebush SA2, located within Strathfield LGA
- Strathfield SA2, located within Strathfield and Burwood LGAs
- Concord West – North Strathfield SA2, located within Canada Bay LGA
- Concord - Mortlake – Cabarita SA2, located within Canada Bay LGA
- Burwood – Croydon SA2, located within Burwood and Ashfield LGAs
- Five Dock – Abbotsford SA2, located within Canada Bay LGA
- Ashfield SA2, located within Ashfield LGA
- Haberfield – Summer Hill SA2, located within Ashfield LGA.

A map of the study area for the EIA, comprising the above SA2s is presented in **Figure 3.1**. Sydney Olympic Park has been included in the study area because of its proximity to the Homebush Bay Drive Interchange.

The wider catchment area for the project is defined as the Greater Sydney Greater Capital City Statistical Area (Greater Sydney GCCSA) and is the statistical representation of the Greater Sydney area. The SA2s identified within the study area are located within the Greater Sydney GCCSA.

Construction and operation of the project is expected to have beneficial and adverse impacts on a number of businesses, customers and commercial road users including freight transport operators within, and in the vicinity of, the project corridor. The EIA will consider the direct, indirect and cumulative economic impacts (where relevant).

The study area for the EIA differs from the Social Impact Assessment study area. While social impacts generally occur on a community level, business impacts such as changes to turnover or employment generally occur at the location of the business activity. This is due to the fact that businesses generally rely on the attractiveness and accessibility of their location to induce business activity. As such, businesses that reside far beyond the boundaries of the project are unlikely to be significantly impacted by the project, unless they are road transport companies that rely on the project corridor for freight or delivery purposes.

As the majority of the project is located underground within the main alignment tunnels, direct impacts associated with property acquisition will be limited to areas close to interchanges and tunnel portals. This includes the Homebush Bay Drive, Concord Road, Parramatta Road and Wattle Street interchanges. It also includes the motorway operations complex, ventilation facility buildings, tunnel support facilities and other ancillary operations buildings and facilities as well as the 10 locations proposed for construction ancillary facilities.

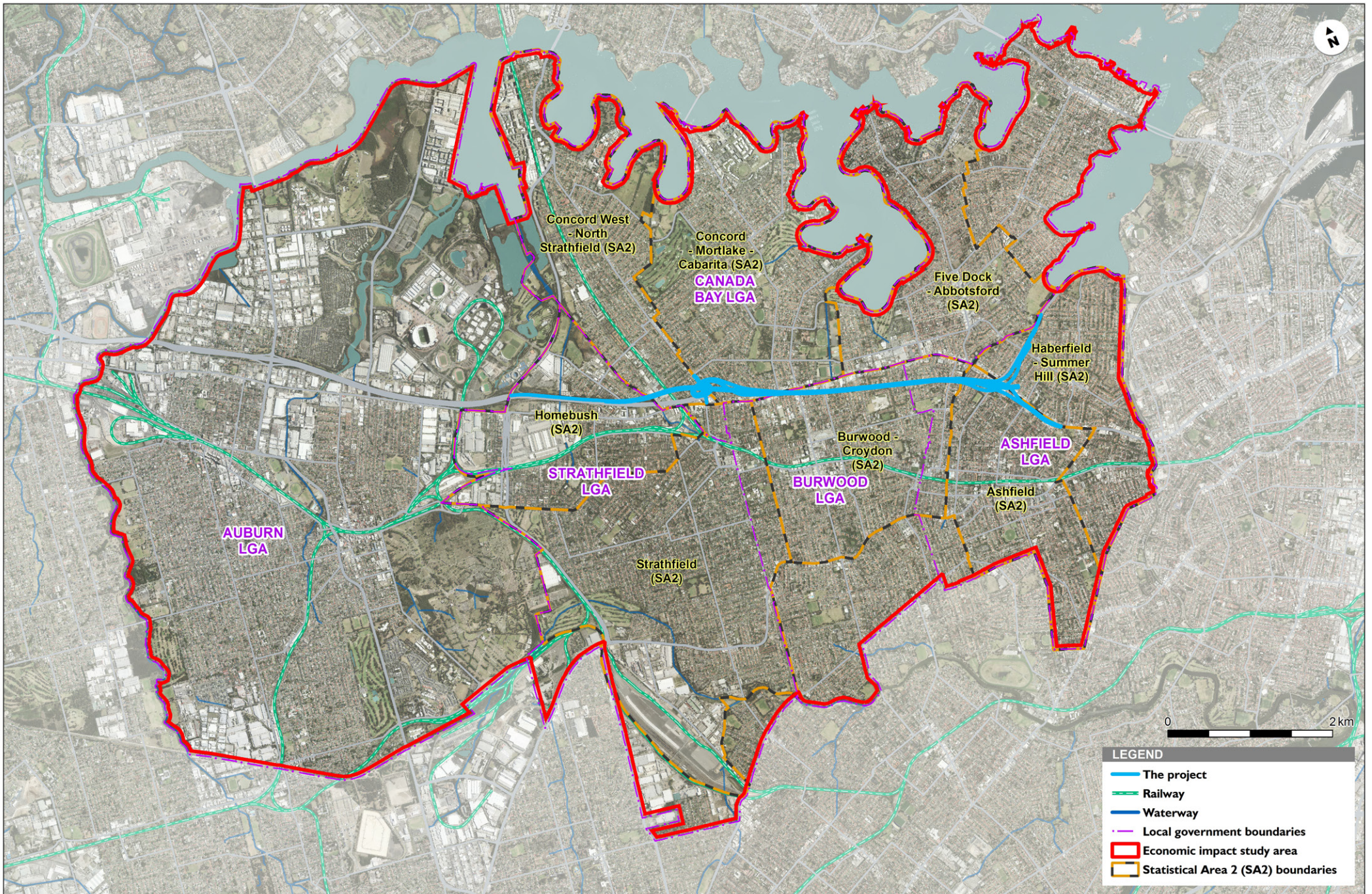


Figure 3.1 Economic impact assessment study area

The study area is used as a thoroughfare for freight and commercial activity linking western Sydney to Sydney CBD and the wider road network. Therefore, some impacts related to freight and commercial movement would occur beyond the geography of the study area, at a regional, state-wide or national level.

This assessment has included a qualitative assessment of the impacts (both positive and negative) that are likely to occur beyond the defined study area, such as impacts on businesses that rely on the M4 / Parramatta Road corridor for commercial and freight movements, and in terms of regional economic impacts, such as income and employment arising from construction and operation expenditure.

### 3.2.3 Economic Multipliers

Economic multipliers are used to quantify economic impacts or changes in economic activity resulting from a stimulus such as construction of the project. These multipliers can be calculated from input-output tables. The ABS prepares a national input-output table, the most recent being for 2012/13 (ABS, Australian National Accounts: Input-Output Tables 2012/13, 5209.0.55.001, 25 June 2015). The table describes inter-industry transactions among 114 industries, showing the fixed amounts of inputs that are required to produce a given output at the national level. The table is compiled in accordance with the Australian national accounting system, and international Government accounting standards.

State-level input-output tables can be derived by adjusting the national table to reflect each state's inter-industry transactions and final demand flows, based on information and data at the state level within the Australian national accounting system and on the latest Census data.

Four multipliers are usually used to measure economic impact:

- Output (value of production or turnover)
- Value added (which can be directly compared to gross domestic product (GDP) and gross state product (GSP))
- Household income
- Employment.

Two types of multipliers can be calculated:

- Type 1 multipliers, which measure the direct and production-induced impacts of a stimulus or activity – the latter impacts refer to the subsequent rounds of purchases of inputs by businesses supplying the direct suppliers of the stimulus or activity (industrial flow-on effects)
- Type 2 multipliers, which capture the Type 1 effects and also measure the consumption-induced effects that flow from the expenditure of income that is earned from the production of additional output.

Input-output multipliers are based on a number of assumptions that provide a relative measure (to be compared with other industries) of the interdependence between one industry and the rest of the economy. This interdependence arises solely from the sales and purchase links between industries and is based on estimates of transactions occurring over a recent historical period. The limitations of input-output analysis include:

- Lack of supply-side constraints – it is assumed that extra output can be produced in one area without taking resources away from other activities, thus potentially overstating economic impacts. The actual impact is likely to be dependent on the extent to which the economy is operating at or near capacity
- Fixed prices – it is assumed that any change in the demand for productive factors would not induce any change in their cost
- Fixed ratios for intermediate inputs and production – it is assumed that there is a fixed input structure in each industry and fixed ratios for production (as described by fixed technological coefficients)

- No allowance for purchasers' marginal responses to change – it is assumed that households consume goods and services in exact proportion to their initial budget shares and that this applies equally to industrial consumption of intermediate inputs and factors of production
- Absence of budget constraints – it is assumed for consumption-induced effects (Type 2 multipliers) that household and government consumption is not subject to budget constraints.

It is preferable to apply Type 1 multipliers, because an input-output model is based on the above simplifying assumptions which have the effect of imposing few constraints to economic expansion. As a result, Type 2 multipliers could overstate potential impacts, particularly where assessing the expansion of an existing activity rather than the contribution of an existing activity.

Type 1 multipliers have been used for the quantification of economic impacts and changes in economic activity in this EIA.

## 4 Existing environment

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### 4.1 Workforce characteristics

The following profile of the existing economic environment of the study area has been informed by the most recent release of the Australian Census of Housing and Population, Working Population Profiles or Journey to Work Statistics (Australian Bureau of Statistics, 2012), unless otherwise stated. As this census was undertaken in 2011, there may be some minor discrepancies in the representation of the current characteristics of the local and regional economies.

The study area adopted for this assessment is presented in **Section 3.2.2** of this report. The geographical area of comparison is Greater Sydney GCCSA, as defined by the ABS (Australian Bureau of Statistics, 2011).

A detailed set of economic data tables is provided at **Appendix A**.

The following indicators provide the key characteristics of people that are employed in businesses within the study area and how they compare against the workforce of Greater Sydney GCCSA:

- Businesses in the study area employed around 64,000 people in 2011 (Australian Bureau of Statistics, 2012). The highest employing industry was health care/social assistance (14.6 per cent), followed by retail trade (11.6 per cent), education/training (8.9 per cent) and wholesale trade (8.3 per cent). The study area had a higher proportion of employment in these industries than the Greater Sydney average.
- The BTS estimates that employment in the study area could increase to around 100,000 employees by 2031 (Bureau of Transport Statistics, 2014). This is equivalent to a 25 per cent increase in employment between 2011 and 2031. Between 2011 and 2031, Strathfield SA2 is expected to experience the fastest growth (28 per cent), while Concord West - North Strathfield SA2 is estimated to experience the slowest growth (22 per cent) (Bureau of Transport Statistics, 2014). These estimates do not include the potential growth in jobs that may arise from the renewal of Parramatta Road
- Employment in the study area was predominately (67 per cent) on a full-time basis and this figure is the same as the Greater Sydney average (Australian Bureau of Statistics, 2012). Part-time employment in the study area (29 per cent) was slightly higher than the Greater Sydney average of 28 per cent. Concord West – North Strathfield SA2 and Homebush SA2 had higher proportions of full-time workers (75 per cent and 74 per cent, respectively), while Five Dock – Abbotsford SA2 and Haberfield – Summer Hill SA2 had lower proportions (both 57 per cent) of full-time workers than the study area average
- Workers in the study area were predominately employed in professional occupations (26 per cent), followed by community and administrative occupations (20 per cent) and managerial occupations (14 per cent) (Australian Bureau of Statistics, 2012). This distribution closely reflected the Greater Sydney distribution of employment of 27 per cent of employees in professional occupations, 17 per cent of employees in community and administrative occupations and 14 per cent of employees in managerial occupations
- The total weekly personal income for employees in the study area closely reflected the Greater Sydney distribution of income. The majority of employees earned a total weekly personal income of more than \$799 per week (61.3 per cent) (Australian Bureau of Statistics, 2012). Around five per cent of employees in the study area earned under \$200 per week and an additional 13 per cent earned over \$2,000 per week
- Local councils that make up the study area (Auburn, Strathfield, Burwood, Canada Bay and Ashfield Local Government Areas (LGAs)) and those surrounding the study area (Canterbury and Parramatta LGAs) had the greatest concentration of employees residing within them. However, residents from across the Greater Sydney region travel to the study area to work (Australian Bureau of Statistics, 2012).

- The most common mode of transport used by employees (for one-method of travel only) in the study area was private car, with 74 per cent of employees driving to work and five per cent of employees travelling as a passenger. Around 11 per cent of employees in the study area travelled by train to work (Australian Bureau of Statistics, 2012).

## 4.2 Business and industry

### 4.2.1 Gross regional product

The study area is located within Auburn, Strathfield, Canada Bay, Burwood and Ashfield LGAs. A gross regional product (GRP) model used by AECOM estimated that these LGAs had an estimated GRP of \$21.4 billion in 2012-13.

- Auburn LGA had an estimated GRP of \$8.5 billion and a relatively diverse economy, with the largest contributing industries being financial/insurance services, manufacturing and wholesale trade
- Strathfield LGA had an estimated GRP of \$3.4 billion and a relatively diverse economy, with the largest contributing industries being transport/postal/warehousing and wholesale trade
- Canada Bay had an estimated GRP of \$5.3 billion, with financial/insurance services making up 20 per cent of total industry value add and being the largest contributing industry to the economy
- Burwood LGA had an estimated GRP of \$2.4 billion and a relatively diversified economy, with the largest contributing industries being transport/postal/warehousing and health care/social assistance
- Ashfield LGA had an estimated GRP of \$1.7 billion and a relatively diverse economy, with the largest contributing industries being health care/social assistance and rental/hiring/real estate services.

### 4.2.2 Businesses and commercial areas

There were 18,200 businesses in the study area in 2014 (Australian Bureau of Statistics, 2015). The largest numbers of businesses were in the rental/hiring/real estate services (16 per cent), professional/scientific/technical services (14 per cent) and construction (13 per cent) industries. Most of the businesses in the study area were small businesses with 63 per cent of businesses having a turnover of less than \$200,000 and 91 per cent of businesses employing less than 20 employees<sup>1</sup> (Australian Bureau of Statistics, 2015).

The project footprint does not contain any major retail and commercial centres. Retail, commercial and light industrial development along the Parramatta Road corridor is 'strip' or 'ribbon' development, where development is concentrated on Parramatta Road but typically does not extend further north or south.

A number of commercial properties on Parramatta Road, between Homebush Bay Drive, Homebush and Liverpool Road, Ashfield, have been closed and the premises untenanted for long periods. Accessibility to these commercial premises is difficult due to the high level of congestion on Parramatta Road and limited availability of on-street parking spaces. The amenity of Parramatta Road does not provide an attractive environment for businesses or customers and as such foot traffic is low. As a result, some types of businesses have difficulty in remaining viable due to the environment of Parramatta Road.

There are a number of businesses located along Parramatta Road that rely on passing trade, from motorists travelling to and from destinations that are beyond Parramatta Road. These include service stations, car washes, fast food restaurants, cafes and liquor stores, located in east bound and west bound directions on Parramatta Road, between Concord Road and Wattle Street.

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<sup>1</sup> The ABS defines a small business as having less than 20 employees.

A Plan for Growing Sydney (NSW Government 2014) identifies a number of strategic centres. These are locations that currently or are planned to have at least 10,000 jobs and are priority locations for employment, retail, housing, services and mixed-uses. The following strategic centres have been identified in the M4 and Parramatta Road corridor, within the study area:

- Sydney Olympic Park – located immediately to the north-west of the M4 and Homebush Bay Drive intersection. This is currently primarily a sporting precinct, but also contains a number of commercial and residential buildings. Sydney Olympic Park has been identified as a future employment area, particularly for future commercial/office space, due to its transport connections and location within the Global Economic Corridor, an area identified by DP&E as an arc of extensive economic activity from Port Botany and Sydney Airport to Parramatta and north west Sydney growth areas, including Sydney CBD and North Sydney.
- Rhodes – located about three kilometres to the north of the Concord Road interchange. It is centred around Rhodes Station and extends south along Concord Road, Rider Boulevard and Homebush Bay Drive. It contains a large shopping centre, and commercial and residential buildings. Rhodes has been identified as a future employment area, particularly in health-related services, due to its close proximity and connections with Concord Hospital
- Burwood – located about 600 metres to the south of Cintra Park. It is centred around Burwood Station and also extends north and south along Burwood Road, and east and west along Railway Parade. It includes a large shopping centre, and commercial and residential buildings. Burwood has been identified as a future employment area, particularly for mixed-use development including offices, retail, services and housing, due to its transport connections with the Sydney and Parramatta CBDs.

A number of priority revitalisation precincts were identified within the Parramatta to Olympic Peninsula Priority Growth Area. The following priority precincts have been identified in the M4 and Parramatta Road corridor, in proximity to the project:

- Wentworth Point - located at the northern end of Wentworth Point in Sydney's inner west, adjacent to Sydney Olympic Park. Wentworth Point is expected to deliver 2,300 additional homes, local jobs and required social infrastructure. It is close to ferry services, Sydney Olympic Park and marina facilities. Rezoning for this precinct was finalised in June 2014 and UrbanGrowth NSW is now in the process of obtaining planning approvals, undertaking enabling infrastructure works and coordinating the sale to the private sector to facilitate housing supply. .
- Carter Street - located adjacent to Sydney Olympic Park and within 800 metres of Olympic Park Station. The renewal project is expected to deliver a mix of housing, office-based employment and retail services. It is expected to deliver 5,500 additional homes, local jobs and required social infrastructure. The precinct has strong connections to Sydney Olympic Park's sporting, recreational and entertainment facilities. The draft proposal for this precinct has been on exhibition and is now under consideration.

Clusters of businesses located in proximity to the project include:

- Lidcombe Business Park and Campus Homebush Business Park are a cluster of bulk goods, automotive services, transport/courier services and personal services businesses, plus a number of cafes/restaurants catering to workers and customers, located on Parramatta Road, adjacent to the M4 in Lidcombe/Homebush
- Sydney Markets are located on Parramatta Road in Flemington. The markets are open seven days a week offering fresh produce, flowers, food services and retail trade
- Direct Factory Outlets (DFO) Homebush is a large regional retail shopping centre located on Homebush Bay Drive, adjacent to the M4
- The Bakehouse Quarter is a cluster of retail trade, cafes and restaurants, personal services and a supermarket, located on George Street in North Strathfield, adjacent to the M4
- Parramatta Road between Homebush Bay Drive and the City West Link is lined with businesses including:

- Automotive services such as car dealerships, petrol stations, car washes, mechanics and tyre/audio/electronic car services. Parramatta Road is the central hub of Sydney's motor vehicle dealership industry
- Cafes and restaurants, fast food restaurants and hotels/pubs
- Retail businesses such as liquor stores, including Dan Murphy's and Choice Liquor, homewares, electrical goods and hardware stores, including Bunnings and Mitre 10 stores
- Storage, shipping and transport services.
- A number of town centres and shopping/business precincts are located in the suburbs surrounding the M4 and Parramatta Road corridor in the study area, including:
  - A cluster of businesses located adjacent to Strathfield Station in Strathfield. The businesses are located approximately 600 metres from Parramatta Road and include cafes and restaurants, retail stores, personal services, real estate services, food services and a supermarket located in and around Strathfield Plaza Shopping Centre
  - Majors Bay Road, Concord is a strip shopping centre lined with businesses including supermarket, cafes and restaurants, retail services, real estate services and personal services
  - Great North Road, Five Dock is lined with businesses, including cafes and restaurants, personal services, supermarkets, retail, homewares and real estate services
  - Burwood Road, Burwood is lined with businesses, including personal services, automotive services, retail, health services, cafes and restaurants, commercial office space and Burwood Westfield Shopping Centre
  - Liverpool Road, Ashfield has a number of businesses located in and around Ashfield Mall, including supermarkets, cafes and restaurants, retail services, real estate services and personal services.

A map of business activity in proximity to the M4/Parramatta Road corridor is presented in **Figure 4.1**.

### 4.2.3 Parramatta Road Urban Transformation Program

The New Parramatta Road Draft Urban Renewal Strategy identifies areas along the corridor where there will be a focus on encouraging growth and changes in the long term (about 20 years). The aim of the strategy is to create an environment with good design, land use mix, housing choice and infrastructure, as well as improved access to community facilities and services and access to public and active transport. It is envisaged that up to 40,000 new dwellings and 50,000 new jobs would be generated in the urban renewal precincts (UrbanGrowth NSW 2014).

To improve the corridor, the Parramatta Road Strategy has identified eight urban renewal precincts at Granville, Auburn, Homebush, Burwood, Kings Bay (Five Dock), Taverners Hill, Leichhardt and Camperdown. Three of these precincts are located in the vicinity of the M4 East project:

- The Homebush precinct is generally located between Homebush Bay Drive, Parramatta Road and the Main North Rail Line. It has been identified for significant future growth given its central location and very good access to transport and employment opportunities in Sydney Olympic Park, Burwood, Parramatta CBD, Rhodes, Macquarie Park and the Sydney CBD, to complement the adjoining Sydney Olympic Park. A housing target in the range of 10,350 to 16,200 new dwellings is proposed in this precinct
- The Burwood precinct is centred around the intersection of Burwood Road and Parramatta Road, extending south towards commercial and medium density residential development in Burwood, and north towards Crane Street in Concord. The Burwood precinct has been identified for future growth given its good access to transport, as well as employment opportunities accessible by rail and bus, including Sydney Olympic Park and the Parramatta and Sydney CBDs. A housing target in the range of 4,300 to 6,400 new dwellings is proposed in this precinct. The northern part of the precinct has also been identified for future growth, given the amenity offered by Kings Bay and its associated network of foreshore open spaces. The precinct could evolve to support the existing Burwood town centre with business uses fronting Burwood Road to Parramatta Road, surrounded by mixed use/residential development

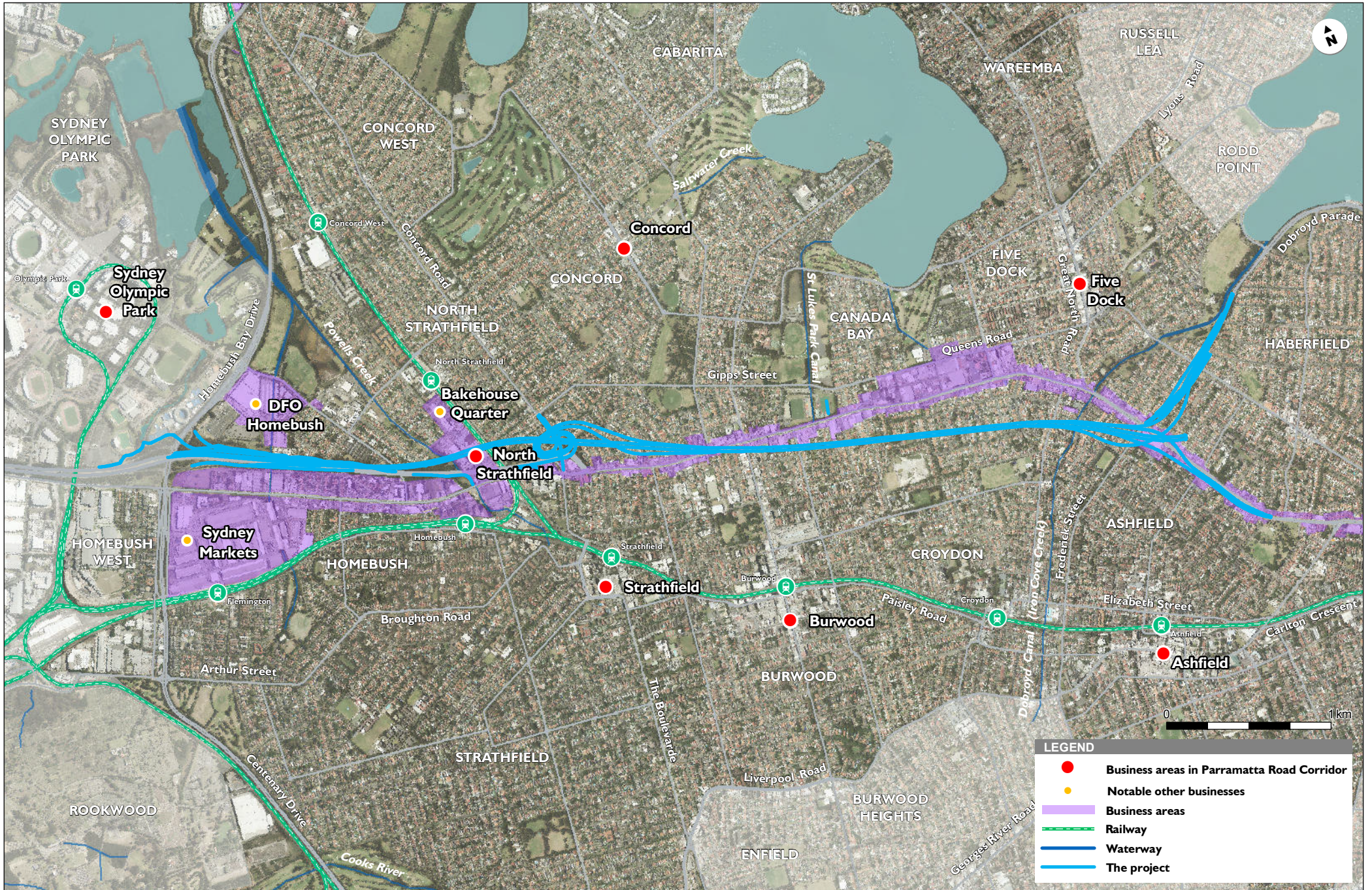


Figure 4.1 Businesses located in the vicinity of the project

The Kings Bay (Five Dock) precinct is located along Parramatta Road and Queens Road, generally between Regatta Road and Courland Street. The Kings Bay precinct has been identified for future growth given its very good access to bus services traveling to Sydney CBD and Burwood. The precinct could evolve to have a residential/mixed use focus, while maintaining the employment lands south of Parramatta Road. A housing target in the range of 3,200 to 4,200 new dwellings is proposed in this precinct.

A key element of this program is improved public transport services along Parramatta Road. WestConnex will enable traffic reductions on Parramatta Road between Concord Road, Concord and Wattle Street, Ashfield. This frees up road space for better public transport choice for existing and new residents along the Parramatta Road corridor. The Parramatta Road Urban Transformation Program is also planning for the construction and delivery of walking and cycling infrastructure in key locations along the corridor.

## 4.3 Travel patterns

### 4.3.1 Passenger vehicles and public transport

The M4 and Parramatta Road corridor is Sydney's main east-west route for freight, commercial and passenger vehicles between the Sydney CBD, Parramatta, Greater Western Sydney and beyond to the Blue Mountains.

Sections of Parramatta Road carry more than 90,000 vehicles each day, with up to 5,300 of these being heavy vehicles. This is a similar traffic volume to two of Sydney's busiest motorways, the M4 and M5 motorways. On an average weekday, 2.8 million trips start or finish within the Parramatta Road corridor, representing 14 per cent of all daily trips made within Sydney (Bureau of Transport Statistics, 2014).

Parramatta Road is the sixth most congested transport corridor in NSW, with average travel speeds during the morning peak of about 30 kilometres an hour (Transport for NSW, 2012). Congestion reduces the safety of road networks causing more frequent vehicle crashes and traffic incidents, impacting personal safety, property and road network performance.

Private vehicles are the predominant mode of transport in the study area. However, the number of private vehicle users is lower in the study area than the Greater Sydney average. The SA2s that make up the study area have averages of 1.3 to 1.6 vehicles per household, equal to, or less than the Greater Sydney average of 1.6 vehicles per household. Homebush SA2 had the greatest private vehicle use in the study area, with 77 per cent of weekday trips undertaken by car, and Burwood had the lowest private vehicle use in the study area with 59 per cent of weekday trips undertaken by car. The Greater Sydney average was 68 per cent of weekday trips undertaken by car. Overall, the study area was lower than the Greater Sydney average with 65 per cent of weekday trips undertaken by private vehicle.

There is limited parking available along Parramatta Road. Clearways are in operation on Parramatta Road in both directions between the M4, North Strathfield and Wattle Street in Ashfield between Monday to Friday 6.00am to 7.00pm and on weekends between 8.00am and 8.00pm. On-street parking is available west of Concord Road but is sporadic and generally limited to off-peak hours. A small amount of local parking is available on side streets or on business premises.

Rail passengers represent 14 per cent of average weekday travel mode share in the study area. The Inner West and Western rail lines operate in the area, running parallel to, and south of, Parramatta Road. The Inner West line operates between Macarthur and the Sydney CBD, operating through Flemington, Homebush, Strathfield, Burwood, Croydon, Ashfield and Summer Hill in the study area. The Western line runs between Richmond or Emu Plains and the Sydney CBD. The Northern line operates between Epping, through Strathfield and the Sydney CBD.

Bus passengers in the EIA study area represent two per cent of average weekday travel mode (see **Table A.7** in **Appendix A**). Parramatta Road is an important corridor, with a number of bus services operating both east-west and north-south connections in the study area. The section of Parramatta Road between Burwood and the Sydney CBD is identified in the NSW Long Term Transport Master Plan as the most important Sydney transport corridor, due largely to it having the highest public transport movements of any corridor in Sydney. The majority of this demand occurs outside the study area and therefore is not reflected in the bus mode share in the study area. Bus services in the study area provide connections between a number of key centres, including Burwood, Strathfield, Ryde, Sydney Olympic Park and Sydney CBD.

### 4.3.2 Pedestrians and cyclists

Pedestrian footpaths are provided along the length of Parramatta Road, with regular crossings via signalised intersections as well as a pedestrian overpass near the intersection with Broughton Street in Concord and at Bland Street in Ashfield. The Parramatta Road environment is not particularly conducive to walking due to the large volumes of light and heavy vehicle traffic, peak period congestion along the corridor and associated noise and air quality issues.

There is a lack of segregated cycling facilities along the Parramatta Road corridor. Cycling is generally restricted to the surrounding local roads. Dedicated cycleways or cycle lanes that are provided are geared towards leisure trips rather than commuter trips with off-road cycle paths predominantly restricted to recreational foreshore or park areas.

### 4.3.3 Freight and commercial travel patterns

The M4 forms part of the National Land Transport Network. The National Land Transport Network is based on national and inter-regional transport corridors including connections through urban areas, links to ports and airports and rail, road and intermodal connections that together are of critical importance to national and regional economic growth, development and connectivity.

The M4 plays an important role as part of the National Land Transport Network in providing western Sydney with links to the Sydney CBD, moving freight and commercial vehicles across Sydney to key markets. The M4 and Parramatta Road acts as a main thoroughfare for commercial vehicles as they make deliveries and support services to or from major centres such as Parramatta, Sydney Olympic Park and the Sydney CBD. Freight movements along Parramatta Road and the M4 support businesses located around Parramatta and Western Sydney by providing access to key markets such as Port Botany and Sydney Airport. Currently around 30 per cent of vehicles using the M4 in the morning peak are for work related purposes, increasing to 40 per cent during business hours (Infrastructure NSW, 2012).

In 2011, the NSW Freight and Ports Strategy (Transport for NSW, 2013) reported that approximately 63 per cent of the total freight task in NSW was carried by road. As the population grows, non-containerised freight and commercial trips are also forecast to grow as demand for goods increases. By 2031, the freight task in NSW is projected to nearly double to 794 million tonnes (Transport for NSW, 2013) and maintaining an efficient and effective road network is vital to support this growth. The Parramatta Road and M4 corridor currently present a major challenge in that additional capacity is limited during peak periods.

Congestion on the M4 is no longer restricted to peak travel times only, with an estimated 13 hours of congestion per day (Infrastructure NSW (citing Ernst and Young), 2012). The M4 and Parramatta Road have average morning peak speeds as low as 38 kilometres per hour and 17 kilometres per hour, respectively.

Sustained congestion increases the time and cost of travel for freight and commercial movements, reduces the efficiency of freight movements and business travel and hinders economic growth. The cost of congestion to the NSW economy in 2011 was estimated at \$5.1 billion and is expected to rise to \$8.8 billion by 2020 if there are no major improvements to existing road infrastructure, as Sydney's population grows (Transport for NSW, 2012). Efficient freight movements can reduce the cost of congestion, thus reducing the cost of goods and services, which in turn can strengthen NSW export opportunities and generate jobs.

## 4.4 Summary of key findings

Parramatta Road and the M4 act as a major thoroughfare for commuters, freight and commercial vehicles between western Sydney and the Sydney CBD. The road network is generally congested, with traffic volumes on Parramatta Road currently at a similar level to motorway levels and congestion on the M4 no longer restricted to peak travel times only. Sustained congestion increases the time and cost of travel for freight and commercial movements, reduces efficiency of freight movements and business travel and hinders economic growth.

Businesses in the study area are generally clustered around Parramatta Road or other main transport hubs such as train stations or major bus routes. Parramatta Road currently acts as the central hub of Sydney's motor dealership industry, with other businesses generally catering to passing traffic or storage, wholesaling or bulk good retail optimising the proximity to the National Land Transport Network. A number of commercial properties on Parramatta Road, between Homebush Bay Drive, Homebush and Liverpool Road, Ashfield, have been closed and the premises untenanted for long periods as these locations tend to experience issues with accessibility, availability of on-street parking and reduced amenity along Parramatta Road.

The New Parramatta Road Draft Urban Renewal Strategy aims to create an environment with good design, land use mix, housing choice and infrastructure, as well as improved access to community facilities and services and access to public and active transport. It is envisaged that up to 40,000 new dwellings and 50,000 new jobs would be generated in the urban renewal precincts along Parramatta Road.

## 5 Consultation and key stakeholder issues

Consultation with key stakeholders has been conducted prior to, and during, the preparation of the EIS for the project. A number of communication and consultation activities were undertaken to inform the concept design development for the project, the environmental assessment activities and ongoing communications during the preparation of the EIS.

Consultation with government agencies, local councils and the community has been recorded and considered during the preparation of the EIS. **Table 5.1** presents the feedback provided by government agencies, local councils, businesses, industry groups, residents and the community with regard to business and economic issues.

More detail on consultation undertaken to date and planned consultation activities can be found in **Chapter 7** of the EIS.

Consultation with local businesses and business stakeholder groups will continue throughout the EIS process and construction stages of the project.

**Table 5.1 Issues raised during consultation in relation to business impacts**

<b>Issue</b>	<b>Detail</b>	<b>Report Section</b>
<b>Construction</b>		
Business and economic issues	<ul style="list-style-type: none"> <li>• Potential impact to local businesses due to acquisition.</li> <li>• Potential disruptions to local business during construction.</li> <li>• Potential impacts of the project on business viability.</li> </ul>	<b>Sections 6.1, 6.2, 6.3, 6.4 and 6.5</b>
Amenity	<ul style="list-style-type: none"> <li>• Potential impact of noise, vibration, dust, and air quality and construction traffic on businesses.</li> </ul>	<b>Section 6.3</b>
Traffic and access arrangements	<ul style="list-style-type: none"> <li>• Potential impacts on access arrangements for commercial operations including deliveries and customer access by foot, bicycle and private vehicle.</li> <li>• Potential impact on access for customers and deliveries due to construction traffic.</li> </ul>	<b>Sections 6.4</b>
<b>Operation</b>		
Business and economic issues	<ul style="list-style-type: none"> <li>• Potential impact of toll costs on local residents.</li> <li>• Potential loss of trade due to reduction in passing traffic.</li> <li>• Potential impact to advertising and attracting passing trade.</li> <li>• Potential impact on employment due to reduction in passing trade.</li> <li>• Potential impact to local businesses due to acquisition.</li> </ul>	<b>Sections 7.1, 7.2, 7.3, 7.4 7.5, 7.6 and 6.2</b>
Amenity	<ul style="list-style-type: none"> <li>• Potential loss of amenity from proximity of tunnel entry / exit points, road widening and ventilation outlets to businesses.</li> </ul>	<b>Section 7.4</b>
Traffic and access arrangements	<ul style="list-style-type: none"> <li>• Potential business impacts arising from new access arrangements.</li> </ul>	<b>Sections 7.5</b>

## 6 Assessment of construction impacts

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During the construction of the project, there is the potential for positive and negative impacts on businesses and the economy. An assessment of the potential impacts has been undertaken to determine the type, direction and magnitude of the potential impacts.

The following potential impacts during project construction have been identified:

- Economic stimulus from construction expenditure and employment
- Acquisition of properties where businesses are located
- Amenity impacts due to construction activities in proximity to individual businesses, or commercial / retail centres
- Changes in accessibility due to changes in access arrangements for pedestrians, cyclists or vehicles.
- Increased congestion due to construction traffic and reductions in car parking availability
- Cumulative impacts due to concurrent construction activities associated with other major infrastructure projects in the region.

Further details of construction impacts are presented in the following sections.

### 6.1 Construction expenditure and employment

The construction expenditure of the project would be of significant benefit to the economy over the three year construction period. This expenditure would inject economic stimulus benefits into the local, regional and state economies. Local businesses would benefit from this expenditure through purchases made by construction contractors and associated workers to build and support the development of the project. This assessment assumes that 10 per cent of labour, plant and equipment, materials and other inputs being sourced from interstate or overseas, based on similar projects within NSW.

Two types of impacts occur from construction expenditure:

- Direct impacts (including employment), consisting of:
  - 'initial' effects - referring to the impacts arising from the direct employment or expenditure used in the construction of the project
  - 'first-round' effects - referring to the impacts on businesses supplying directly to the construction of the project.
- Indirect impacts referring to 'flow-on' effects to the wider state economy, such as increased expenditure and employment within industries that supply to businesses that directly supply the project with goods or services.

Businesses that may directly benefit from construction of the project may include local construction contractors and those businesses who service or supply goods to the construction industry such as food and beverage retailers, accommodation providers, and other retail outlets that would cater to the day-to-day needs of the construction workforce. The increase in turnover may subsequently lead to increased employment opportunities and incomes for those businesses (and employees) providing goods and services.

Around 1,400 jobs are expected to be created during the peak construction period of the project (classified as 'initial' employment in this assessment). There may be employment opportunities for local residents as part of the construction workforce. As a result, the overall wealth and/or disposable income of the community are expected to grow. Wages may also have the potential to increase due to the increase in demand for construction workers associated with this and other major transport infrastructure projects proposed in Sydney such as the M4 Widening, New M5, NorthConnex, North West Rail Link, Sydney Metro and Western Sydney Airport.

**Table 6-1** presents the direct, indirect and total impacts of construction expenditure to the New South Wales economy per year of construction.

The expenditure would also have indirect effects to other businesses in the area. Indirect effects refer to flow-on effects to the wider state economy, such as increased expenditure and employment within industries that supply to businesses that directly supply the project with goods or services.

The assessment of direct, indirect and total impacts of construction expenditure has been conducted using the economic multiplier methodology presented in **Section 3.2.3**. **Table 6.1** presents the direct, indirect and total impacts of construction expenditure to the New South Wales economy per year of construction.

**Table 6.1** shows that for NSW:

- Direct construction expenditure, in terms of output, contributes an estimated \$1.3 billion directly, on average, per year of construction, with indirect (flow-on) effects of \$0.5 billion per year, giving an estimated total impact of \$1.8 billion per average year of construction
- Direct household income generated by the construction of the project is estimated to be \$290 million, on average per year of construction, with indirect (flow-on) effects of \$130 million, giving an estimated total household income contribution of \$420 million per average year of construction
- Direct employment (initial and ‘first-round’) supported by the construction of the project is estimated to average 2,540 FTE positions per year, giving a total of 8,240 annual FTE positions over the 39 month construction period
- Indirect (flow-on) employment is estimated to average 1,580 FTE positions per year, giving a total of around 5,150 annual FTE positions over the 39 months construction period
- Total employment supported by the construction of the project is estimated to average 4,120 FTE positions per year, giving a total of 13,390 annual FTE positions over the 39 month construction period
- Direct value added attributable to the construction of the project is estimated to be around \$470 million directly per average year of construction, with indirect (flow-on) effects of around \$220 million, giving an estimated total value added contribution of \$690 million per year of construction. This is the estimated contribution to Gross State Product (GSP).

**Table 6.1** Direct, indirect and total impacts of average annual construction expenditure on the NSW economy (rounded)

Impact	Increase in industry output	Increase in household income	Increase in employment	Increase in value added
	\$ million (2015 prices)	\$ million (2015 prices)	Full-time equivalent positions	\$ million (2015 prices)
<b>Direct</b>	1,310	290	2,540	470
<b>Indirect</b>	500	130	1,580	220
<b>Total</b>	1,810	420	4,120	690

Source: AECOM (2015)

Notes:

- 1) Average number of FTE positions supported for the 39 month construction period
- 2) Totals may not sum due to rounding

## 6.2 Land acquisition

A total of 26 properties that are either currently used for or zoned for business activity would be acquired for the project prior to commencement of construction. This includes 23 properties that would be fully acquired and three properties that would be partly acquired. The properties that are to be fully acquired currently contain a total of 20 buildings used for commercial purposes. This has the potential to impact on economic productivity and the viability of those businesses.

The acquisition of the properties would occur under the terms of Land Acquisition (Just Terms Compensation) Act 1991 (NSW) and under the Roads and Maritime Land Acquisition Information Guide (Roads and Maritime, 2012), whereby a number of matters are considered when assessing compensation, including:

- The market value of the property
- Any special value, meaning the financial value of any advantage, in addition to market value
- Severance or the amount of any reduction in the market value of any other land of the person entitled to compensation
- Disturbance, including legal costs, valuation fees, relocation costs, stamp duty costs, mortgage discharge and execution fees or other financial costs reasonably incurred
- Solatium, meaning financial compensation to a person for non-financial disadvantage resulting from the necessity of the person to relocate his/her principal place of residence as a result of acquisition
- Any increase or decrease in the value of adjoining or severed land (as affected by the road proposals).

Three commercial properties will require partial acquisition. This includes one vacant property adjacent to the M4 in Homebush which is currently owned by Ausgrid, one vacant commercial property and one property used for automotive sales in North Strathfield. The partial acquisition of these properties would occur under the same legislation and guidelines.

A number of the commercially zoned properties are either currently vacant land or untenanted. A number of businesses also sit across several commercially zoned properties.

The 20 businesses that are located on land to be fully acquired for the project comprise:

- One motel with 50 guest rooms and a restaurant
- Four commercial offices
- Nine automotive sales and services businesses
- One funeral services business
- Three homeware sales and services business
- Two retail businesses.

WDA commenced a process of voluntary acquisition of properties in November 2013. Subsequently in June 2015 WDA and RMS notified individual property owners that their property was required by the preferred design, with information on the land acquisition process also provided. Valuations by RMS and property owners were subsequently sought and negotiations commenced.

All businesses located on land to be fully acquired are located adjacent to Parramatta Road, toward the eastern end of the project in the suburbs of Ashfield and Haberfield. See **Appendix B** for a list of fully and partially acquired properties that are either currently used for, or zoned for, business activity.

Many of the affected businesses serve a wider catchment area so their relocation will not significantly disadvantage the local community. Due to the nature of current business activity in the areas surrounding the commercial properties to be acquired, it is not anticipated that the viability of adjacent or surrounding businesses will be impacted due to land acquisition. Businesses in these locations do not generally provide complementary or supplementary goods or services that will be affected by the

loss of other business activity in the vicinity of their operations. Any indirect amenity impacts on these businesses are addressed in **section 6.3**.

The impact of property acquisition on land owners and residents is assessed in the WestConnex M4 East Technical Report: Social Impact Assessment.

The impact of acquisition would have both short term impacts (during construction of the project) and medium to long term impacts (during operation of the project). The economic impacts would be associated with the potential loss of employment and turnover.

As detailed consultation with the owners of the acquired businesses was not conducted during the EIS phase of the project, an assessment of the magnitude of turnover and employment impacts was not conducted.

During initial consultation conducted by WDA in June 2015 with businesses subject to acquisition as a result of the project, it appears that the majority of these businesses intend to relocate to another site within the region and continue trading. Due to the existing vacancy of commercial and retail space along Parramatta Road, this relocation option may be feasible for a number of commercial and retail businesses impacted by land acquisition.

At the completion of construction, a number of commercially zoned properties temporarily acquired for the construction period only would potentially be available for sale and redevelopment following construction. Residual land at the Northcote Street tunnel site (C7) and the Parramatta Road civil cite (C10) are currently zoned for business use and could provide an opportunity for future commercial development. The future use of this residual land would be subject to separate assessment and planning approval in accordance with the existing land use zoning. At this stage, Roads and Maritime Services do not intend to rezone acquired land or to subdivide/consolidate properties.

### 6.3 Changes in amenity

Amenity has an impact on a customer's decision on where to shop. The impact of amenity on a business could potentially result in loss of trade as customers shop elsewhere to avoid adverse conditions. Amenity impacts include any factors that affect the ability of customers, employees or business owners to enjoy their workplace and daily activities such as noise, vibration, changes to views or changes to air quality from construction activities or increases in traffic due to construction vehicles.

Amenity impacts during the construction of the project have been discussed in detail in **Chapter 11** (Noise and vibration), **Chapter 9** (Air quality) and **Chapter 13** (Urban design, landscape character and visual amenity) of the EIS.

With reference to those assessments, the potential impact to businesses during construction within the study area as a result of changes in amenity would occur as a result of:

- Increases in noise and vibration from plant and equipment or increases in road traffic noise
- Potential changes in local air quality due to increased dust emissions associated with surface disturbance and/or the handling, transport and disposal of spoil. Emissions from plant, equipment and heavy vehicle traffic were identified as being below impact assessment criteria and would not adversely impact businesses or customers during construction
- Changes in visual amenity due to construction compounds or activities close to businesses.

The majority of construction activity would occur underground, which would limit the extent of amenity impacts to businesses along the corridor. Impacts will mainly arise at the location of surface works on the M4 between Homebush Bay Drive and Underwood Road, at construction ancillary facilities, where shallow sub-surface works are being conducted, at tunnel portals, interchanges and ancillary facilities such as ventilation facilities. The transport of spoil and other construction materials would also increase road traffic noise along key routes or in proximity to construction sites and compounds.

Amenity impacts to businesses and customers are likely to occur at the following locations:

- DFO located on Homebush Bay Drive, Homebush - DFO car park users are likely to be impacted by changes in dust levels, noise and visual amenity due to construction works at the Homebush Bay Drive civil site (C1), located adjacent to the DFO overflow car park lot. As amenity impacts would only occur for the short period in which customers are parking and walking to the shopping complex, this impact is unlikely to impact a customer's decision where to shop or impact business viability
- Ashfield Bowling Club located on the corner of Parramatta Road and Orpington Street, Ashfield - Ashfield Bowling Club is likely to be impacted by changes in dust levels, noise and visual amenity from the Parramatta Road civil site (C10) as the majority of activity at the bowling club occurs outside on the greens. As the greens are separated from the construction compound by the club house, the impact is expected to be limited and is not expected to impact patronage of the bowling club or use of the greens
- A variety of businesses located along Parramatta Road, such as commercial buildings and used car yards, adjacent to the Parramatta Road civil site (C10) in Ashfield would be impacted by changes in amenity during construction works. As the types of businesses impacted are not reliant on amenity to attract customers, it is not expected that changes in amenity will impact the viability of these businesses
- A variety of businesses located along Powell Street, adjacent to the Powells Creek civil site (C4), including a number of commercial properties, would be impacted by amenity during construction works. As the majority of businesses impacted are located in multiple storey commercial buildings and are therefore businesses that are not reliant on amenity to attract customers, it is not expected that changes in visual amenity will impact the viability of these businesses
- The Bakehouse Quarter, located in North Strathfield, has a number of cafes and restaurants with outdoor seating that may rely on amenity to attract customers. During construction, these businesses may experience minor changes in dust levels, noise, vibration and visual amenity but not to the extent that the viability of these businesses are affected considering that construction works will generally occur on the south side of the current M4 deck.

During construction, businesses such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities would stand to be the most affected by changes in amenity. It should be noted that those businesses currently located along Parramatta Road or in proximity to the M4 would already experience reduced amenity (such as reduced air quality and increase noise) from traffic volumes along these roads. Due to the existing level of road traffic noise in the vicinity of the project, it is not anticipated that construction traffic on major roads will noticeably impact amenity for businesses located in the study area.

Businesses located on local roads used for haulage, such as Powell Street, may experience some changes in amenity due to heavy vehicles entering and exiting the compound sites. These impacts are limited to day-time activities as businesses in these locations operate within normal business hours.

The magnitude of the impact of amenity would be largely influenced by the construction hours, length of the construction period, the construction activity, proximity to the project and the nature of the business.

## 6.4 Changes to accessibility

Changes in accessibility to businesses have the potential to impact the viability of a business, depending on the type of business and the ability of that business to respond to any changes.

Reduced accessibility would occur if access arrangements for individual businesses or retail centres change as a direct result of the project. Impacts on accessibility may also arise from increased congestion on the road network hindering business deliveries.

Changes in accessibility due to the construction of the project have the potential to impact businesses and the local economy through:

- Increased congestion impacting delivery times and the efficiency of freight and commercial vehicle movements
- Increased congestion impacting on customer's travel time and decision where to shop
- Changes in access or egress arrangements impacting deliveries to and from businesses or a customer's decision where to shop
- Changes in availability of on-street parking impacting accessibility by customers and staff
- Changes in pedestrian or cycling arrangements impacting accessibility by customers and staff.

The construction impacts of the project have been separated into those arising from increased congestion and those occurring as a result in changes in access to properties or parking. These impacts are detailed further in the following sections.

### 6.4.1 Congestion

Construction traffic is estimated to reach a maximum of 1,260 heavy vehicles and 920 light vehicles per day during the peak construction period. Increased construction traffic will affect network performance by increasing travel times and increasing intersection delays as detailed in WestConnex M4 East Technical Working Paper: Traffic and Transport.

Increased congestion and increased travel times for traffic using the M4 and Parramatta Road have the potential to impact businesses that are reliant on deliveries as they may experience longer transit times. Increased transit times are likely to result in increased delivery costs, particularly fuel and labour costs and such an increase in the cost base may increase prices and thus decrease demand for these businesses. Freight and commercial vehicles that use Parramatta Road and/or the M4 are expected to also experience longer transit times due to congestion and decreased efficiencies over the construction period.

Increased congestion and longer travel times along Parramatta Road and the M4 also have the potential to influence a customer's decision where to shop. Customers may be deterred from accessing businesses along Parramatta Road or in the surrounding areas due to increased delays in transit.

Access to businesses such as Flemington Markets, Homebush DFO and businesses/sporting facilities in the Sydney Olympic Park precinct may be impacted by traffic congestion and delays during the construction period, particularly at the western end of the project around the intersection of the M4 and Homebush Bay Drive where there may be some overlap of the M4 Widening and M4 East construction works. This may result in travel delays for customers and staff during the construction period. These impacts could be mitigated to some degree by careful scheduling of construction activities to minimise impacts during peak traffic periods and by the implementation of a Construction Traffic Management Plan.

Changes to service availability, increases in public transport travel times or diversions for public transport services can also result in customers choosing to shop at another location that is perceived to be more accessible. Increased congestion on Parramatta Road and increased delays at intersections along the project corridor are expected to increase bus service travel times due to slower travel speeds and increased dwell time at intersections. The project may also result in the temporary closure or relocation of some bus stops on Underwood Road, Concord Road and Parramatta Road. See Chapter 8 (Traffic and transport) for details relating to bus stop relocations.

Customers that access businesses along Parramatta Road by bicycle may also experience increased delays due to increased traffic volumes due to the project. While pedestrian and cyclist access to businesses is expected to be maintained during the project, pedestrian and cyclists may experience increases in journey times due to closed shoulders and detours. The combination of these delays and reduced amenity on their journey may influence their decision to visit these businesses.

As Parramatta Road is already highly congested, customers currently accessing businesses in the study area by private vehicle, bus or bicycle already experience long delays and travel times. Therefore the impact of additional congestion and delays during construction is expected to have limited impact on customers' decisions. As a result, the number of customers who choose to shop elsewhere during the construction period is expected to be limited.

## 6.4.2 Property access and parking

During the construction phase of the project, there is the potential for direct impacts on access to businesses or impacts on an access route to businesses due to road network changes. Table 6-2 summarises the potential access impacts to businesses due to the construction of the project. ...

The maintenance of access to businesses is vital to the viability of businesses. Surface works during construction, including the construction ancillary facilities, have the potential to impact property access.

At all locations where road closures are required, access would be maintained to retained properties throughout the construction period. Business owners and road users would be notified of traffic changes, and ongoing consultation would be undertaken to provide information on planned construction activities and changes to any access arrangements.

Impacts on property access due to changes in the road network during construction are discussed in Chapter 8 (Traffic and transport) and in **Table 6.2** below.

The majority of the construction ancillary facilities nominated for the project would have parking for staff based at those sites. There are two main locations for dedicated construction car parking: north of Concord Oval (around 250 spaces) and at the North Strathfield Underpass Alliance carpark in Railway Lane (around 50 spaces). A construction car parking strategy would be prepared as part of the Traffic Management and Safety Plan which focuses on encouraging public transport use, promoting carpooling and investigating provision of additional off-street parking in appropriate locations.

The majority of businesses in the vicinity of construction ancillary facilities have a dedicated on-site customer and staff parking. However, a number of smaller businesses rely on on-street parking on local side streets, particularly those businesses located along Parramatta Road. Businesses located at the eastern end of project works, particularly those located in proximity to the Wattle Street and Walker Avenue civil site (C9) and the Parramatta Road civil site (C10) are generally reliant on local residential streets for staff and customer parking. It should be noted that those businesses reliant on on-street parking are already subject to limited availability of parking due to clearways on Parramatta Road and the competing demand for parking spaces with local residents. See Section 6.6 of the EIS for further details on construction parking impacts.

**Table 6.2 Commercial properties impacted by changes in access**

Location	Estimated duration	Staging of any closure or modification	Road access reinstatement	Commercial properties potentially impacted
Pomeroy Street/ Wentworth Road South intersection	6 months	Closure of both lanes for about two months, then reduction to one lane to facilitate road works and associated modification of retaining wall. Temporary traffic signals would be provided either side of the corner to manage traffic during single lane operation. Existing street parking within the area would be maintained except within the work zone.	Once works are completed, road would be reopened.	- Australian Training Company (access off Pomeroy Street)

<b>Location</b>	<b>Estimated duration</b>	<b>Staging of any closure or modification</b>	<b>Road access reinstatement</b>	<b>Commercial properties potentially impacted</b>
Underwood Road	2 years	Temporary diversions at various stages. One lane in each direction would be maintained at all times. A new signalised intersection would be provided to facilitate safe site and pedestrian access. No parking would be allowed in front of the worksite along Underwood Road.	Once works are completed, road would be reopened.	- Australian Training Company (access off Pomeroy Street) - A number of commercial businesses located on Underwood Road and Powell Street
Sydney Street (M4 off-ramp) and Queen Lane	2 years	Temporary diversions at various stages. There would be no reduction in the number of traffic lanes or impact on movements.	Road would rebuilt on existing alignment at completion of works.	- No foreseeable access impacts to businesses
Existing M4 east of Sydney Street off-ramp	2 years	Temporary diversions at various stages. There would be no reduction in the number of traffic lanes (except during night works) or impact on movements.	Road would be rebuilt on new alignment at completion of works.	- No foreseeable access impacts to businesses
Northcote Street at Parramatta Road	Duration of construction works	Closure at Parramatta Road to facilitate demolition of buildings and site compound access.	Once works are completed, road would be reopened.	- Due to closure of existing businesses in this location, there are no foreseeable access impacts to businesses
Ramsay Street (east of Wattle Street)	18 months	Temporary diversions at various stages.	Road would rebuilt on existing alignment at completion of works.	- No foreseeable access impacts to businesses
Martin Street (east of Wattle Street) at Wattle Street	2 years	Closure to facilitate road construction.	Once works are completed, road would be reopened in line with permanent design.	- No foreseeable access impacts to businesses
Walker Avenue at Parramatta Road	Duration of construction works	Closure of eastbound lane and left-in from Parramatta Road permitted only for construction traffic. The westbound lane would remain open and would permit left turn onto Parramatta Road.	Once works are completed, road would be reopened.	- Bootcamps Australia

Location	Estimated duration	Staging of any closure or modification	Road access reinstatement	Commercial properties potentially impacted
Chandos Street (south of Parramatta Road) at Parramatta Road	18 months	Closure to facilitate demolition of buildings and dive construction.	Once works are completed, road would be reopened.	- Due to the closure of existing businesses in this location, there are no foreseeable access impacts to businesses
Parramatta Road between Orpington Street and Bland Street	Duration of construction works	Closure of one of the three westbound lanes, resulting in only two westbound lanes from Dalhousie Street to west of Chandos Street. Provision of a new signalised intersection on Parramatta Road, near Rogers Avenue, to provide a dedicated right turn bay for eastbound construction vehicles entering the Parramatta Road civil site.	Once works are completed, temporary traffic signals would be removed and the road would be reopened in line with permanent design.	- Due to the closure of existing businesses in this location, there are no foreseeable access impacts to businesses
Orpington Street	Duration of construction works	Reconfiguration of the Parramatta Road / Orpington Street intersection to facilitate new site entry intersection including traffic signals.	Once works are completed, traffic signals would be removed.	- The Willows Private Nursing Home - Ashfield Bowling Club

Due to the small number of businesses located in proximity to construction ancillary facilities that are reliant on on-street car parking, the implementation of an appropriate construction car parking strategy, in consultation with businesses, should mitigate any impact the construction of the project would have on customer and staff parking.

Changes in access and parking due to the construction of the project are not anticipated to affect deliveries to and from businesses in proximity to the project.

## 6.5 Cumulative impacts

Cumulative impacts to the local businesses and the economy are most likely to result from the concurrent construction activity associated with the WestConnex project, such as the construction of the New M5 (scheduled for completion in 2019, subject to separate assessment and planning approval) and the M4 Widening (scheduled for completion in 2017).

Cumulative impacts are likely to intensify employment and stimulus impacts. The demand for labour for major projects such as this project, the New M5, the M4 Widening and other similar projects in the area would increase employment opportunities for local residents. There is potential for wages to increase due to high demand for construction workers.

The opportunity for local businesses to supply goods or services to the construction of these projects and their construction workforces has the potential to increase business turnover due to demand from the multiple projects.

Construction fatigue is likely to arise for motorists and users of the M4 and Parramatta Road due to the construction timeframe associated with the M4 Widening and M4 East projects. The M4 Widening project is currently under construction and is scheduled for completion in 2017 and the M4 East is expected to begin construction in early 2016 and be completed in 2019. As such, the combined construction period of both projects spans up to five years.

Businesses and key centres located in the areas of overlap with the M4 Widening and the M4 East projects (particularly around the M4 and Homebush Bay Drive) are likely to experience traffic delays for customers and staff, extended periods of amenity impacts due to increases in noise, increases in dust levels and changes in visual amenity due to the construction of these projects. This is also likely to affect key centres such as Flemington Markets and the Sydney Olympic Park precinct.

The M4-M5 link is scheduled for construction from 2019 to 2023; this project may also result in construction fatigue for businesses and road users in areas of overlap.

There is the potential for construction vehicles for other projects to contribute further to congestion on the road network and further increase travel times along the M4 and Parramatta Road, intensifying the impact on freight movements during the construction of the project. These impacts are likely to be experienced by motorists using Parramatta Road and the M4 and businesses in areas of overlap, particularly along Parramatta Road and around the intersection of Parramatta Road and Wattle Street.

## 6.6 Summary of key findings

During the construction of the project, there is the potential for a boost in the economy due to construction expenditure in the region. Local business would benefit from this expenditure through purchases made by construction businesses and associated workers to build and support the development of the project.

Employment opportunities would grow in the region through the potential increase in business customers and through the increase in demand for construction workers. The increase in demand for labour may increase wages in the region, particularly for construction workers, who would be in high demand.

It is estimated that construction expenditure would directly and indirectly contribute an estimated \$1.8 billion of output, \$410 million of household income, around 4,120 FTE jobs and \$690 million value added to the NSW economy per average year of construction.

A total of 23 properties that are either currently used, or zoned for, business activity would be fully acquired for the project prior to commencement of construction. These properties currently contain a total of 20 private businesses. The acquisition of this land would result in impacts to the local economy through loss of business turnover and employment.

All businesses located on land to be fully acquired are located adjacent to Parramatta Road, toward the eastern end of the project in the suburbs of Ashfield and Haberfield. Many of the affected businesses serve a wider catchment area so their relocation will not significantly disadvantage the local community. It is not anticipated that the viability of adjacent or surrounding businesses will be impacted as they do not generally provide complementary or supplementary goods or services.

At the completion of the construction period, a number of these properties would potentially be available for sale and redevelopment as they will not be required during operation. Some of these properties fronting Parramatta Road in Haberfield and Ashfield are currently zoned for business use and would provide an opportunity for commercial development in the future. The future use of this residual land would be subject to separate assessment and planning approval.

There is the potential for businesses to experience amenity impacts from the project in the form of increases in noise and vibration, potential decreases in air quality and changes to visual amenity. The majority of construction activity would occur underground, which would limit the extent of amenity impacts to businesses along the corridor. Businesses such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities would stand to be the most affected by noise and air quality impacts.

It is anticipated that the construction phase of the project has the potential to impact on the performance of the road network. As a result, businesses that are reliant on deliveries may experience longer transit times. Freight and commercial vehicles that use Parramatta Road and the M4 may also experience longer transit times and decreased efficiencies over the construction period.

Access to property not acquired or leased for the project would be maintained at all times during construction. Where impacts on property access are unavoidable as a result of construction activities, consultation would be undertaken with the property owner and/or tenant to develop appropriate alternative access arrangements. This may involve provision of a temporary alternate access.

The majority of the construction ancillary facilities nominated for the project would have parking for staff based at those sites. It is anticipated that potential impacts on parking for customers and staff of businesses located near construction ancillary facilities will be mitigated with the implementation of a construction car parking management strategy.

Cumulative impacts are most likely to result from the concurrent construction activity associated with the WestConnex project, such as the construction of the New M5 and the M4 Widening. Construction fatigue is likely to arise for motorists and users of the M4 due to the extended construction timeframe associated with the M4 Widening and M4 East projects. Cumulative benefits are likely to intensify employment and economic stimulus impacts in the region. The M4-M5 link is scheduled for construction from 2019 to 2023; this project may also result in construction fatigue for businesses and road users in areas of overlap.

## 7 Assessment of operational impacts

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During the operation of the project, there is the potential for both positive and negative impacts on businesses and the economy. An assessment has been undertaken to determine the type, direction and magnitude of the potential impacts.

The following potential impacts during project operation have been identified:

- Economic stimulus from operational expenditure and employment
- Improvements in amenity and accessibility for businesses due to reduced congestion and reduced traffic volumes along Parramatta Road east of Concord Road
- Improvements to freight transport efficiencies
- Loss of business turnover and employment due to the acquisition of commercially zoned land
- Changes in trade and employment due to changes in volumes of passing traffic
- Changes in accessibility due to changes in access arrangements for pedestrians, cyclists or vehicles
- Cumulative impacts associated with other major infrastructure projects in the region, specifically the M4 Widening Project and the Parramatta Road Urban Transformation Program.

Further details of operational impacts are presented in the following sections.

### 7.1 Changes to business turnover and employment

The assessment of direct, indirect and total impacts of operational expenditure has been conducted using the economic multiplier methodology presented in **Section 3.2.3**.

**Table 7.1** presents the direct, indirect and total impacts of operational expenditure on the NSW economy per year of operation:

- Operation of the project, in terms of output, is estimated to contribute around \$31 million per year directly, with indirect (flow-on) effects of around \$8 million, giving an estimated total impact of around \$39 million per operational year
- Direct Household income generated by operation of the project is estimated to be around \$7 million per year, with indirect (flow-on) effects of around \$2 million, giving an estimated total household income contribution of around \$9 million per operational year.
- Direct employment supported by the operation of the project is estimated to average 80 FTE positions per year of operation. Indirect (flow-on) employment is estimated to average 30 FTE positions per year of operation, giving a total of 110 FTE positions per year of operation.
- Direct value added attributable to the operation of the project is estimated to be \$14 million per year directly, with indirect (flow-on) effects of \$4 million, giving an estimated total value added contribution of \$18 million per operational year. This is the estimated contribution to Gross State Product (GSP).

**Table 7.1 Direct, indirect and total impacts of operational expenditure on the NSW economy per year of operation (rounded)**

Impact	Increase in industry output	Increase in household income	Increase in employment	Increase in value added
	\$ million (2015 prices)	\$ million (2015 prices)	Full-time equivalent positions	\$ million (2015 prices)
<b>Direct</b>	31	7	80	14
<b>Indirect</b>	8	2	30	4
<b>Total</b>	39	9	110	18

Notes:

- 1) Average number of FTE positions supported each year of operation
- 2) Totals may not sum due to rounding

## 7.2 Efficiency impacts on freight and commercial vehicles

The total freight task in NSW is projected to increase significantly over the next 20 years. As discussed in **Section 4.3**, the M4 and Parramatta Road present a significant challenge to this growth as congestion on these roads is already impacting on their operability. Without the project, congestion along these roads would increase further, impacting on travel speeds. Reduced travel speeds (and the resulting increase in travel time) impact on road freight and commuter vehicle productivity and commuter vehicle occupants, representing an economic cost to the state.

Upon completion of the project (2019), it is estimated that freight and commercial vehicles travelling along the M4 and Parramatta Road between Homebush Bay Drive and Wattle Street will experience a generous decrease in travel time for those vehicles that use the new tunnel. AM and PM peak analysis suggests that travel time savings of between six and eight minutes are provided by the project in 2021.

The reduced travel times for freight and commercial vehicles would reduce operational costs associated with fuel and wages and improve safety by reducing stop-start traffic conditions caused by congestion. In 2013, travel time for freight movement has been valued by Transport for NSW at \$57.84 per vehicle hour, demonstrating significant benefits associated with reduced travel times.

Reduced travel times would also improve the efficiency of freight and commercial vehicle movements, given the improvements in capacity on the M4 and the bypass of Parramatta Road. This would also lead to improvements in the efficiency and reliability of Sydney's freight network, facilitating more efficient movement of goods through the supply chain and ultimately enhancing productivity.

Commercial vehicle movements are generally more focused around commercial centres as workers travel between major centres for business, such as professionals (or white-collar workers), tradesmen and salesmen. The M4 and Parramatta Road acts as a main thoroughfare for commercial vehicles as they make deliveries and support services to or from major centres such as Parramatta, Sydney Olympic Park and the Sydney CBD. Improvements in efficiency and reliability of the road network leads to the more efficient commercial vehicle movements and therefore has the potential to reduce costs and enhance the productivity of this workforce.

The implementation of tolls on the M4 and M4 East to recover the capital costs of construction and the operating and maintenance costs of the projects will result in a number of motorists that are unwilling to pay the toll to divert onto Parramatta Road or other alternate routes. Commercial vehicles and freight operators using these roads can either pay the tolls and benefit from decreased travel time, increased efficiency and reductions in vehicle operating costs, or choose not to pay the toll and experience longer travel times.

In summary, the project would improve network efficiency, delivering travel time savings and provide more efficient movement of freight and commercial vehicles, thereby reducing operational costs. The project would also provide increased road capacity along the M4 / Parramatta Road corridor, which is a key corridor for the movement of freight between Sydney Airport/ Port Botany and the western suburbs, particularly for those businesses located in the vicinity of M4, and commercial vehicle movements between major centres. This benefit would be fully realised upon the completion of the future M4-M5 Link (subject to separate planning approval), whereby a direct connection would be available between Sydney Airport/ Port Botany, Sydney CBD and western Sydney.

### 7.3 Changes in passing trade

Changes in traffic volumes and changes to visibility have the potential to impact businesses on Parramatta Road that are reliant on passing trade. The M4 East tunnels enable the bypass of Parramatta Road and businesses along that road that were previously visible to passing trade. Studies of bypass impacts in NSW, resulting from reductions in passing traffic and changes in visibility, have shown that the most affected businesses are those directly serving the needs of the motorist such as motor services, food and beverage outlets and, to a lesser extent, accommodation establishments.

Businesses that currently advertise on Parramatta Road between the M4 and Ashfield Park may experience decreased visibility from the reduction in traffic volumes. Visibility is important for businesses that rely on passing trade. Customers of these types of businesses are generally impulse or convenience purchasers. The likely change in through traffic may necessitate potential changes to advertising operations to continue to draw customers to some businesses.

The potential change in the value of passing trade has been estimated based on industry data and changes in volumes of traffic. This provides an estimate of the direct loss of employment and turnover after the opening of the project. It represents the worst case scenario in so far as it does not take account of any increases in turnover due to the revitalisation of Parramatta Road and business adaptation.

The changes in volumes of traffic along Parramatta Road due to the project have been adopted from the WestConnex M4 East Technical Assessment: Traffic and transport and adjusted to account for light vehicle traffic only, using outputs from the traffic model. For further detail on changes in traffic volumes due to the project see WestConnex M4 East Technical Assessment: Traffic and transport (**Section 8.4**). Predicted traffic volumes for 2021 have been used for this assessment.

The linkages with other businesses supplying goods and services to those businesses impacted through a reduction of passing trade were not quantified. These would be indirect or flow-on impacts on employment and turnover resulting from the diversion of through traffic and are likely to be minor.

Passing trade can be defined as those motorists travelling to and from destinations that are beyond Parramatta Road, that choose to patronise businesses due to the convenience of the business location. A total of 18 businesses were identified as potentially being impacted by a reduction in passing trade. These include service stations, car washes, fast food restaurants, cafes and liquor stores, located in east bound and west bound directions on Parramatta Road, between Concord Road and Wattle Street.

In the absence of data from these businesses, the value of the reduction in passing trade has been based on a 'typical' or 'average' business in each of the above industries. Output (or business turnover) was estimated using employment to output ratios published by the ABS (1991-92) and inflated to 2015 prices. This does not take into account efficiencies or inefficiencies within the businesses that could result in higher or lower turnover estimates.

Based on the above methodology, it has been estimated that there could be an annual reduction of around \$7.3 million in output and around 33 full-time equivalent jobs due to loss in passing trade. This equates to a loss of 19 per cent of total output and full-time equivalent employment of the businesses reliant on passing trade.

This is a worst case scenario analysis of the impact of the reduction of passing trade based on industry averages and the results presented in **Table 7.2** should be regarded as indicative only.

**Table 7.2 Potential impacts of passing trade**

Type of business	Number of businesses	Annual potential loss of output (\$ million)	Annual potential loss of employment (FTE positions)
Fast food restaurant	8	2.3	18
Service station	5	4.6	12
Car wash	3	0.1	1
Other	2	0.3	2
<b>Total</b>	<b>18</b>	<b>7.3</b>	<b>33</b>

Source: AECOM Analysis based on ABS (1992) and ABS (2015)

Forecast traffic volumes indicate that sections of Parramatta Road between Concord Road, Concord and Homebush Bay Drive/Centenary Drive, Homebush will experience increases in traffic after opening of the project due to some drivers diverting to Parramatta Road.

In addition, increases in traffic volumes are anticipated along Parramatta Road, east of the Parramatta Road interchange at Ashfield where traffic from the tunnel will merge with surface road traffic. This increase in traffic will occur until 2023 when the M4-M5 Link is anticipated to open. After opening of the M4-M5 Link traffic volumes on this section of Parramatta Road are then forecast to reduce.

This assessment has not taken into account the potential increase in trade that may result from businesses located on these sections of Parramatta Road. A total of five businesses were identified as potentially benefitting from an increase in passing trade along Parramatta Road between Concord Road, Concord and Homebush Bay Drive/Centenary Drive, Homebush. These comprise of service stations, a car wash and cafes/restaurants.

The potential increases in turnover and employment from increased passing traffic is difficult to estimate and to attribute to the operation of this project alone.

This assessment has also not taken into account the potential for businesses located on Parramatta Road to relocate to areas where traffic volumes are expected to increase.

The assessment of the impacts associated with loss of passing trade should also be considered in the context of, and balanced against, a range of benefits such as travel time improvements, efficiencies for the freight industry and the employment opportunities generated by the project.

Impacts on businesses from changes in passing trade may also be offset by the potential increase in customers frequenting local businesses along some sections of Parramatta Road due to improved amenity and accessibility. There is the potential for new businesses to move into the area as a result of increased amenity and accessibility which would offset to some extent the potential loss of output and employment due to reductions in passing trade.

## 7.4 Changes in amenity

Amenity impacts during the operation of the project could arise from changes visual amenity due to the presence of new infrastructure or removal of heavy vehicles from the road network, increased noise levels which could impact the ambience of a business or changes air quality. The majority of these impacts will be localised around portal and interchange areas.

There is the potential for amenity impacts on businesses to occur at portals and interchanges and at the location of permanent operational facilities, such as ventilation outlets. Changes in amenity during the operation of the project are anticipated to occur at the following locations:

- Some businesses located along Parramatta Road, adjacent to, or within the southern end of Bakehouse Quarter, such as cafes and restaurants with outdoor seating may be impacted by the introduction of the Powells Creek on-ramp that will sit below the level of the existing M4 deck and closer to some existing businesses, and increases in traffic on Parramatta Road. These changes are likely to result in reductions in visual amenity and increased noise due to the project. As businesses in this location are already subject to reduced amenity due to the overhead motorway and traffic volumes on Parramatta Road and the resulting noise, air quality and visual impacts, the potential for impacts resulting from the project to affect the viability of these businesses is limited. The magnitude of this impact will be dependent on the proximity of each business, the ability of the business to adapt to the changes in amenity and the provision of any changes to landscape character on a localised basis, such as improved street scaping
- A number of businesses located along the project corridor will receive a positive change to visual amenity due to the removal of a significant proportion of heavy vehicles from Parramatta Road. The reduction of heavy vehicles from Parramatta Road creates an opportunity to improve public transport services along the corridor and may facilitate urban renewal and streetscape improvements along the corridor, thus improving amenity for businesses located along Parramatta Road and some local roads
- It is anticipated that the project will result in decreased noise levels across large parts of the study area, due to the expected reduction in traffic along sections of Parramatta Road and the M4. It is expected that the majority of businesses will experience either a reduction in noise levels, or only a relatively a minor increase in noise at a level considered to be unnoticeable. Increases in noise are identified near the Concord Road and Wattle Street interchanges where the project adds new lanes/ramps closer to properties in combination with removing existing building screening due to property acquisitions. A number of businesses have been identified for consideration of additional noise mitigation.
- It is anticipated that the project will result in general improvements in air quality along sections of Parramatta Road where traffic is reduced. . In addition, contributions from the ventilation outlets to local air quality were demonstrated to be negligible. Businesses located along sections of Parramatta Road, such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities are likely to benefit the most from the improvement in air quality.
- Businesses located on Parramatta Road between Concord Road, Concord and Homebush Bay Drive/Centenary Drive, Homebush may experience decreased amenity associated with increased traffic as a result of toll diversion. In addition, businesses located on Parramatta Road east of Wattle Street will also experience a temporary decrease in amenity due to increased traffic volumes between 2019 (when the M4 East is completed) and 2023 (when the M4-M5 Link is completed and traffic on this section of Parramatta Road is forecast to decline. As businesses in these locations would already experience reduced amenity (such as reduced air quality and increase noise) from traffic volumes along Parramatta Road, this impact is likely to be limited.

Overall, it is anticipated that businesses located in the vicinity of interchanges may experience adverse amenity impacts due to the introduction of new infrastructure and changes in noise levels. However, some businesses located along Parramatta Road between Concord Road, Concord and Wattle Street, Ashfield, and away from the interchange sites will experience improvements in amenity due to the removal of a significant proportion of heavy vehicles along this section of Parramatta Road resulting in improved air quality, visual amenity and noise levels.

Improved amenity and increased accessibility along Parramatta Road between Concord Road, Concord and Wattle Street, Ashfield may also lead to increased economic activity by enticing different types of businesses to locate in the area. There is potential for businesses that cater to local residents that move into the area due to increased accessibility for local customers through reductions in traffic. As there are a number of vacant properties located on Parramatta Road, there is capacity for businesses to move or adapt to the changing demands for local customers.

## 7.5 Changes to accessibility

Changes in accessibility have the potential to impact the viability of a business, depending on the type of business and the ability of that business to respond to any changes. Reduced accessibility would occur if access arrangements for individual businesses or retail centres change as a direct result of the project.

It is not anticipated that businesses will be impacted by permanent changes in access as a result of the project. In addition, there are no anticipated impacts on parking for businesses due to the operation of the project.

It is anticipated that the project will result in reduced traffic volumes on Parramatta Road in 2021 and 2031. This will facilitate the introduction of bus lanes along the Parramatta Road corridor, providing greater accessibility to businesses in the area by public transport.

Cyclists and pedestrians can also expect to benefit from reduced traffic volumes through the study area, enabling reduced travel times, greater north/south connectivity across Parramatta Road and greater accessibility to businesses located along Parramatta Road.

Increases in traffic volumes are expected on Parramatta Road, between Concord Road and Homebush Bay Drive and on Parramatta Road east of Ashfield until 2023 when the M4-M5 Link is anticipated to open. This increase in traffic has the potential to impact on access to businesses along these sections of road due to increased congestion. The additional traffic and the resultant increase in congestion are not considered likely to have a significant impact on businesses along these sections of Parramatta Road.

The project, in combination with the approved M4 Widening, will improve regional east-west accessibility along the Parramatta Road / M4 corridor to key business centres such as Flemington Markets and the Sydney Olympic Park precinct. By reducing traffic on Parramatta Road the project should also improve north/south connectivity across the corridor which will also be beneficial to businesses. .

## 7.6 Cumulative impacts

Cumulative impacts to the economy and businesses are most likely to result from the concurrent operation of the wider WestConnex project and the Parramatta Road Urban Transformation Program.

It is estimated that in 2023 upon completion of all stages of WestConnex, there will be a significant reduction in traffic on Parramatta Road and a corresponding reduction in travel times. This, in combination with initiatives proposed as part of the Parramatta Road Urban Transformation Program, will result in improved amenity and increased accessibility to businesses along Parramatta Road between Concord and Ashfield. It will also facilitate job growth and enable freight to efficiently move through and across Sydney.

The freight industry will benefit greatly by enabling the efficient movement of traffic between western and south-western Sydney and interstate and international markets through connections with the wider National Land Transport Network, Sydney Airport and Port Botany. WestConnex provides one of the missing links in the Sydney Motorway network by providing a connection between the M4 and M5 Motorways, resulting in benefits for freight including the opportunity to streamline interstate movements around and through Sydney. This provides businesses with connections to service more diverse and dispersed markets across Sydney.

The Parramatta Road Urban Transformation Program is facilitated by removing significant volumes of traffic from Parramatta Road as a result of the project and other WestConnex stages. This reduction in traffic has the potential to provide a more amenable environment for living and working within the Parramatta Road corridor and as a result has the potential to stimulate housing and employment growth and generate economic activity.

The project would also help to facilitate the provision of faster and more reliable public transport services along Parramatta Road that may attract more people living and working along the corridor to utilise public transport. It also helps to facilitate potential improvements in active transport options along the corridor, in particular, by improving north/ south connectivity and creating the opportunity to undertake urban design and streetscape improvements.

Improvements in public and active transport and improvements in public amenity has the potential to drive residential and mixed use development which in turn is likely to attract new and different types of businesses to the area. The Parramatta Road Urban Transformation Program is proposing an overall employment target of 50,000 new jobs along the corridor and the introduction of 10,350 to 16,200 new dwellings in the Homebush Precinct, between 4,300 and 6,400 dwellings in Burwood and between 3,200 to 4,200 new dwellings in the Kings Bay Precinct. This residential and employment growth will drive additional demand that will support existing businesses and the establishment of new businesses in the area.

## 7.7 Summary of operational impacts

The project has the potential to have positive and negative impacts on amenity. Businesses located along Parramatta Road between Concord Road and Ashfield will experience decreased traffic volumes and associated improvements in noise, air quality and visual amenity. Businesses located adjacent to the tunnel portals, interchanges and along sections of Parramatta Road (e.g. west of Concord Road and east of Ashfield) are likely to experience increased traffic volumes and associated increases in noise, reduced air quality and visual amenity.

Operational expenditure was estimated to contribute a total of \$39 million in output, around \$9 million in household income, 110 FTE jobs and \$18 million in value added per year of operation of the project.

As a significant volume of traffic currently using Parramatta Road would be diverted into the tunnel, businesses that are reliant on passing trade will be affected by the project. It has been estimated that there could be an annual reduction of around \$7.3 million in output and around 33 full-time equivalent jobs due to loss in passing trade. This equates to a loss of 19 per cent of total output and full-time equivalent employment of the businesses reliant on passing trade. Reductions in passing trade would potentially be offset to some degree by improved amenity and accessibility for the businesses affected.

This assessment does not take into account the potential increase in passing trade for businesses located along Parramatta Road, west of Concord Road, from an increase in traffic volumes associated with drivers choosing to avoid the motorway tolls. A total of five businesses were identified as potentially benefitting from an increase in passing trade, comprising of services stations, a car wash and cafes/restaurants.

It is not anticipated that businesses will be impacted by changes in access as a result of the project. It is anticipated that the project will result in reduced traffic volumes on Parramatta Road in 2031 and thus will facilitate the introduction of bus lanes along the Parramatta Road corridor, providing greater accessibility to businesses in the area by public transport.

The project would improve network efficiency, delivering travel time savings and provide more efficient movement of freight and commercial vehicles, thereby reducing operational costs. The project would also provide increased road capacity along the M4/ Parramatta Road corridor, which is a key corridor for the movement of freight between Sydney Airport/ Port Botany and the western suburbs, particularly for those businesses located in the vicinity of the M4, and commercial vehicle movements between major centres.

Cumulative impacts to the economy and businesses are most likely to result from the concurrent operation of WestConnex and the Parramatta Road Urban Transformation Program. The completion of WestConnex will facilitate job growth and enable freight to efficiently move through and across Sydney. The freight industry and commercial commuters will benefit greatly by enabling the efficient movement of traffic between western and south-western Sydney and interstate and international markets through connections with the wider National Land Transport Network, Sydney Airport and Port Botany.

The project will facilitate the removal of a significant amount of traffic from Parramatta Road and act as an enabler for the Parramatta Road Urban Transformation Program. This program will result in improved amenity and increased accessibility to businesses along Parramatta Road as well as improvements in public and active transport and to the public domain. In turn this has the potential to facilitate significant residential and mixed use development which will support existing businesses and attract new and different types of businesses into the area.

## 8 Management of impacts

### 8.1 Construction

The recommended measures to mitigate or manage impacts generated during the construction of the project are summarised in **Table 8.1**.

**Table 8.1 Construction mitigation measures**

Impact	Detail
Amenity	
Noise and vibration	<ul style="list-style-type: none"> <li>Mitigation measures specific to construction noise and vibration can be found in <b>Chapter 11</b> of the EIS.</li> </ul>
Visual amenity	<ul style="list-style-type: none"> <li>Mitigation measures specific to construction visual amenity impacts <b>Chapter 13</b> of the EIS.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Mitigation measures specific to construction air quality impacts <b>Chapter 9</b> of the EIS.</li> </ul>
Business and economic issues	
Acquisition	<ul style="list-style-type: none"> <li>Carry out the acquisition under the terms of the Land Acquisition (Just Terms Compensation) Act 1991 (NSW) and in accordance with the Roads and Maritime Land Acquisition Information Guide (Roads and Maritime, 2012).</li> </ul>
Other business impacts	<ul style="list-style-type: none"> <li>Develop a Business Management Plan to effectively communicate with impacted businesses during the construction of the project. The plan should address the key issues raised by businesses, including access arrangements, traffic conditions, parking and local supplier opportunities.</li> <li>Maintain a 24 hour project information line and website to enable business owners and/or operators to receive prompt responses to their concerns, access information and view assistance measures in place during construction related work.</li> </ul>
Traffic and access arrangements	
Accessibility	<ul style="list-style-type: none"> <li>Implement a Community Communication Strategy to provide timely, regular and transparent information about changes to access and traffic conditions, details of future work programs and general construction progress throughout the construction phase of the project. Information to be provided in a variety of ways including letter box drops, media releases, internet site, signage and 24 hour project information line.</li> <li>Provision of appropriate signage to ensure motorists' understanding of access to local businesses adjacent to construction works.</li> <li>Mitigation measures specific to Traffic and transport can be found in <b>Chapter 8</b> of the EIS.</li> </ul>

## 8.2 Operation

The recommended measures to mitigate or manage impacts generated during the operation of the project are summarised in **Table 8.2**.

**Table 8.2 Operational mitigation measures**

<b>Impact</b>	<b>Detail</b>
<b>Amenity</b>	
Noise and vibration	<ul style="list-style-type: none"> <li>Mitigation measures specific to operational noise and vibration can be found in <b>Chapter 11</b> of the EIS.</li> </ul>
Visual amenity	<ul style="list-style-type: none"> <li>Mitigation measures specific to operational visual amenity impacts <b>Chapter 13</b> of the EIS.</li> </ul>
<b>Business and economic issues</b>	
Acquisition	<ul style="list-style-type: none"> <li>Carry out the acquisition under the terms of the Land Acquisition (Just Terms Compensation) Act 1991 (NSW) and in accordance with the Roads and Maritime Land Acquisition Information Guide (Roads and Maritime, 2012).</li> </ul>
<b>Traffic and access arrangements</b>	
Accessibility	<ul style="list-style-type: none"> <li>Mitigation measures specific to operational traffic and transport can be found in <b>Chapter 8</b> of the EIS.</li> </ul>

## 9 Conclusion

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This report has identified and assessed the potential impacts to businesses and the economy associated with the construction and operation of the project. This assessment has been conducted with regard to the existing business and economic environment and includes an assessment of potential positive and negative impacts and management and mitigation measures.

Overall, the assessment has concluded that the positive impacts on businesses and the economic benefits of the project are expected to outweigh any negative impacts that cannot be satisfactorily mitigated.

The construction expenditure of the project would be of significant benefit to the economy over the three year construction period. This expenditure would inject economic stimulus benefits into the local, regional and state economies. Local and regional businesses would benefit from this expenditure through purchases made by construction businesses and associated workers to build and support the development of the project.

Through economic multipliers it was determined that construction expenditure would contribute a total of \$1.8 billion of output, \$420 million of household income, around 4,120 full-time equivalent (FTE) jobs and \$690 million value added to the NSW economy per average year of construction.

There is the potential for local businesses to be impacted by changes in amenity, such as increased noise and vibration, increased dust levels and changes in visual amenity due to the construction of the project and the associated increase in traffic volumes. Businesses that are sensitive to changes in amenity, such as outdoor restaurants and cafes, hotels/pubs, childcare centres and aged care facilities would stand to be the most affected during project construction. As businesses currently located along Parramatta Road or in proximity to the M4 already experience reduced amenity from traffic volumes along these roads, it is not anticipated that increased construction traffic on major roads will noticeably impact on the amenity of businesses located in the study area.

A total of 23 properties that are either currently used for, or zoned for, business activity would be fully acquired for the project prior to commencement of construction. These properties currently contain a total of 20 buildings used for commercial purposes. A number of commercially zoned properties are currently vacant or untenanted and a number of businesses sit across several commercially zoned properties. Three commercially zoned properties would be partially acquired as a result of the project.

Acquisition of land used for business activity has the potential to impact on economic productivity and the viability of those businesses. Initial consultation with businesses impacted by property acquisition determined that the majority of these businesses intend to relocate their business activities to another site within the region and continue trading. Due to the high vacancy of commercial and retail space along Parramatta Road, this may be feasible for a number of commercial and retail businesses impacted by land acquisition.

All businesses located on land to be fully acquired are located adjacent to Parramatta Road, toward the eastern end of the project in the suburbs of Ashfield and Haberfield. Many of the affected businesses serve a wider catchment area so their relocation will not significantly disadvantage the local community. It is not anticipated that the viability of adjacent or surrounding businesses will be impacted as they do not generally provide complementary or supplementary goods or services.

The acquisition of property would occur under the terms of Land Acquisition (Just Terms Compensation) Act 1991 and under the Roads and Maritime Land Acquisition Information Guide (Roads and Maritime, 2012).

At the completion of the construction period, a number of properties would potentially be available for sale and redevelopment as they will not be required during operation. Some of these properties fronting Parramatta Road in Haberfield and Ashfield are currently zoned for business use and would provide an opportunity for commercial development in the future. The future use of this residual land would be subject to separate assessment and planning approval.

Operational expenditure was estimated to contribute a total of \$39 million in output, around \$9 million in household income, 110 FTE jobs and \$18 million in value added per average year of operation of the project.

It has been identified that businesses trading as service stations, car washes and fast food restaurants along Parramatta Road between Concord Road and Ashfield, have the potential to be impacted by a reduction of passing trade. Under the worst case scenario, it has been estimated that the annual reduction in turnover and employment would be in the magnitude of \$7.3 million and around 33 full-time equivalent jobs. Reductions in passing trade would potentially be offset to some degree by improved amenity and accessibility for the businesses affected.

The project would improve network efficiency, delivering travel time savings and provide more efficient movement of freight and commercial vehicles, thereby reducing freight and commercial vehicle operational costs and occupants' time costs. The project would also provide increased road capacity along the M4/ Parramatta Road corridor, which is a key corridor for the movement of freight between Sydney Airport/ Port Botany and the western suburbs, particularly for those businesses located in the vicinity of the M4, and commercial vehicle movements between major centres. This benefit would be fully realised upon the completion of the M4-M5 Link, whereby a direct connection would be available between Sydney Airport/ Port Botany, Sydney CBD and western Sydney.

Cumulative impacts are likely to arise at the western end of the project near the Homebush Bay Drive and M4 intersection due to the concurrent construction of the M4 Widening project. Impacts are likely to include construction fatigue, increased demand for labour for major projects, prolonged traffic congestion and prolonged amenity impacts for businesses such as the Flemington Markets, Homebush DFO and those located in the Sydney Olympic Park precinct. Traffic related impacts could be mitigated to some degree by careful scheduling of construction activities to minimise impacts during peak traffic periods and by the implementation of a Construction Traffic Management Plan.

Cumulative impacts are likely to arise from the concurrent operation of WestConnex and the Parramatta Road Urban Transformation Program. The completion of WestConnex will facilitate jobs growth and enable freight to move efficiently through and across Sydney. The freight industry and commercial travellers will benefit greatly by enabling the efficient movement of traffic between western and south-western Sydney and interstate and international markets through improved connections with the wider National Land Transport Network, Sydney Airport and Port Botany.

The project will facilitate the removal of a significant amount of traffic from Parramatta Road and facilitate the Parramatta Road Urban Transformation Program, which will result in improved amenity and increased accessibility to businesses along Parramatta Road. Improvements in public and active transport and improvements in public amenity have the potential to drive residential and mixed use development and employment growth which in turn will support existing businesses and potentially attract new and different types of businesses into the area.

A number of mitigation measures have been proposed to minimise any impacts that would be associated with construction or operation of the project.

## 10 References

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# Appendix A

## Economic Tables

**Table A.1 Labour force status (place of work)**

Statistical Area 2	Worked full-time	Worked part-time	Away from work	Hours worked not stated	Total employed persons
Homebush	73.8%	22.1%	2.8%	1.3%	10,551
Strathfield	65.3%	29.9%	3.4%	1.4%	9,033
Concord West - North Strathfield	74.8%	20.9%	3.6%	0.7%	15,301
Concord - Mortlake - Cabarita	60.4%	34.7%	3.2%	1.7%	4,267
Burwood - Croydon	32.2%	32.8%	3.6%	1.3%	11,626
Five Dock - Abbotsford	57.4%	38.5%	2.9%	1.2%	4,248
Ashfield	62.7%	32.2%	3.6%	1.5%	6,370
Haberfield - Summer Hill	57.0%	37.7%	3.6%	1.7%	2,792
Total Study Area	66.9%	28.5%	3.4%	1.2%	64,188
Greater Sydney	67.3%	28.1%	3.5%	1.2%	1,874,113

Source: Australian Bureau of Statistics (2012), Census of Population and Housing, Working Population Profile (based on Place of Work), Catalogue Number 2006.0, Statistical Area 2

**Table A.2 Employment projections in the study area**

Statistical Area 2	Estimated employment 2011	Estimated employment 2021	Estimated employment 2031
Homebush	12,949	14,359	16,430
Strathfield	11,269	12,701	14,504
Concord West - North Strathfield	18,782	19,978	22,922
Concord - Mortlake - Cabarita	5,137	5,683	6,475
Burwood - Croydon	14,432	16,097	18,165
Five Dock - Abbotsford	5,255	5,735	6,563
Ashfield	7,856	8,837	9,923
Haberfield - Summer Hill	3,469	3,892	4,359
Total Study Area	79,149	87,282	99,341

Source: Bureau of Transport Statistics (2012), Summary Employment Forecasts 2011-2041, September 2014 Release, Statistical Area 2 Note: Data not available for Greater Sydney GCCSA

**Table A.3 Industry of employment (place of work)**

Industry of employment	Homebush SA2	Strathfield SA2	Concord West - North Strathfield SA2	Concord - Mortlake - Cabarita SA2	Burwood - Croydon SA2	Five Dock - Abbotsford SA2	Ashfield SA2	Haberfield - Summer Hill SA2	Total Study Area	Greater Sydney
Agriculture, forestry and fishing	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.4%
Mining	0.1%	0.1%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.2%
Manufacturing	5.4%	5.6%	11.2%	6.8%	1.3%	3.5%	1.1%	4.7%	5.6%	8.8%
Electricity, gas, water and waste services	5.2%	0.2%	1.0%	0.3%	0.1%	1.0%	0.1%	0.6%	1.3%	0.9%
Construction	5.1%	6.7%	4.6%	10.3%	2.4%	6.7%	4.1%	5.2%	5.1%	5.4%
Wholesale trade	21.7%	4.9%	9.6%	3.2%	5.5%	4.8%	1.3%	2.8%	8.3%	5.5%
Retail trade	16.7%	4.7%	7.5%	7.5%	16.9%	12.0%	13.3%	18.3%	11.6%	10.1%
Accommodation and food services	3.9%	4.0%	3.6%	7.1%	6.1%	11.0%	7.9%	7.1%	5.5%	6.3%
Transport, postal and warehousing	10.8%	21.2%	1.5%	1.4%	10.8%	3.5%	1.6%	2.4%	7.6%	5.2%
Information media and telecommunications	1.8%	0.7%	4.9%	0.9%	3.7%	1.4%	0.7%	0.9%	2.5%	3.2%
Financial and insurance services	6.2%	1.9%	18.4%	4.3%	3.3%	3.1%	1.4%	2.4%	7.0%	7.0%
Rental, hiring and real estate services	1.4%	2.1%	1.5%	2.4%	2.3%	2.4%	8.8%	2.0%	2.6%	1.9%
Professional, scientific and technical services	4.7%	5.2%	7.8%	7.0%	7.1%	10.2%	5.3%	9.1%	6.7%	10.2%
Administrative and support services	1.9%	2.1%	1.8%	2.4%	3.3%	2.5%	2.2%	2.3%	2.3%	3.2%
Public administration and safety	1.6%	2.3%	0.7%	2.0%	6.7%	3.0%	15.9%	1.2%	3.9%	6.0%

Industry of employment	Homebush SA2	Strathfield SA2	Concord West - North Strathfield SA2	Concord - Mortlake - Cabarita SA2	Burwood - Croydon SA2	Five Dock - Abbotsford SA2	Ashfield SA2	Haberfield - Summer Hill SA2	Total Study Area	Greater Sydney
Education and training	3.3%	22.4%	2.9%	7.2%	10.3%	10.1%	11.1%	8.8%	8.9%	8.0%
Health care and social assistance	2.9%	10.5%	17.2%	28.7%	15.6%	11.9%	20.7%	23.5%	14.6%	11.3%
Arts and recreation services	2.1%	0.6%	0.8%	2.9%	0.6%	2.8%	0.9%	1.7%	1.3%	1.6%
Other services	3.4%	3.7%	4.2%	4.0%	3.2%	9.1%	2.7%	5.8%	4.1%	3.7%
Inadequately described/Not stated	1.4%	1.0%	0.8%	1.3%	0.7%	1.2%	0.8%	1.2%	1.0%	1.2%
Total	10,553	9,033	15,301	4,266	11,627	4,249	6,370	2,790	64,189	1,874,117

Source: Australian Bureau of Statistics (2012), Census of Population and Housing, Working Population Profile (based on Place of Work), Catalogue Number 2006.0, Statistical Area 2

**Table A.4 Occupation of employment (place of work)**

<b>Occupation of employment</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>	<b>Greater Sydney</b>
Managers	17%	11%	16%	11%	12%	13%	13%	11%	14%	14%
Professionals	15%	27%	33%	29%	27%	22%	28%	25%	26%	27%
Technicians and trades workers	12%	11%	8%	13%	9%	15%	7%	13%	10%	11%
Community and personal service workers	5%	6%	5%	12%	12%	12%	15%	17%	9%	9%
Community and administrative workers	19%	25%	24%	16%	18%	15%	17%	12%	20%	17%
Sales workers	12%	6%	8%	7%	15%	12%	11%	10%	10%	9%
Machinery operators and drivers	12%	6%	1%	3%	3%	4%	2%	5%	5%	5%
Labourers	7%	6%	3%	7%	4%	6%	6%	7%	5%	6%
Inadequately described/Not stated	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%
<b>Total</b>	<b>10,553</b>	<b>9,035</b>	<b>15,303</b>	<b>4,266</b>	<b>11,625</b>	<b>4,248</b>	<b>6,372</b>	<b>2,790</b>	<b>64,192</b>	<b>1,874,115</b>

Source: Australian Bureau of Statistics (2012), Census of Population and Housing, Working Population Profile (based on Place of Work), Catalogue Number 2006.0, Statistical Area 2

**Table A.5 Total personal income per week (place of work)**

<b>Personal income (\$/week)</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>	<b>Greater Sydney</b>
Negative/Nil income	0.8%	1.0%	0.5%	1.4%	0.9%	1.4%	0.9%	1.1%	0.9%	0.8%
\$1-\$199	3.0%	3.5%	2.7%	5.1%	6.6%	7.2%	5.1%	5.4%	4.4%	4.4%
\$200-\$299	3.1%	3.4%	2.3%	4.0%	4.8%	5.5%	3.8%	5.6%	3.7%	3.5%
\$300-\$399	4.4%	4.9%	2.7%	5.3%	6.3%	6.6%	5.8%	6.8%	4.9%	4.7%
\$400-\$599	10.2%	10.3%	6.7%	12.7%	11.6%	13.9%	12.4%	14.4%	10.5%	10.3%
\$600-\$799	15.7%	16.1%	12.1%	14.7%	13.5%	16.6%	14.0%	18.9%	14.5%	13.7%
\$800-\$999	14.5%	15.4%	14.0%	12.7%	10.3%	12.3%	10.2%	12.6%	13.0%	12.5%
\$1,000-\$1,249	14.1%	14.3%	13.1%	13.2%	11.3%	10.6%	11.5%	10.4%	12.7%	12.8%
\$1,250-\$1,499	9.6%	9.8%	10.4%	9.6%	9.0%	7.9%	8.3%	7.6%	9.4%	9.6%
\$1,500-\$1,999	10.6%	12.5%	13.8%	11.2%	12.9%	9.1%	15.3%	8.9%	12.4%	12.4%
\$2,000 or more	12.7%	7.6%	20.9%	8.8%	11.7%	7.6%	11.6%	6.8%	12.8%	14.2%
Personal income not stated	1.3%	1.2%	0.7%	1.2%	1.0%	1.3%	1.0%	1.3%	1.1%	1.0%
Total	10,552	9,036	15,302	4,267	11,626	4,249	6,371	2,789	64,192	1,874,119

Source: Australian Bureau of Statistics (2012), Census of Population and Housing, Working Population Profile (based on Place of Work), Catalogue Number 2006.0, Statistical Area 2

**Table A.6 LGA of residence for individuals employed in businesses located in each SA2**

<b>Residential location of workers</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>
Ashfield LGA	1%	2%	1%	2%	4%	4%	18%	31%	5%
Auburn LGA	5%	4%	4%	3%	3%	2%	2%	2%	4%
Burwood LGA	2%	4%	2%	3%	15%	6%	6%	5%	5%
Canada Bay LGA	4%	5%	11%	37%	7%	39%	6%	8%	11%
Canterbury LGA	4%	6%	3%	4%	7%	4%	8%	6%	5%
Parramatta LGA	7%	5%	6%	3%	4%	3%	3%	3%	5%
Strathfield LGA	7%	16%	3%	4%	6%	3%	3%	2%	6%
Other (all Australia)	70%	58%	70%	45%	55%	37%	53%	43%	59%
Total Employed persons	11,522	10,025	16,561	4,546	12,770	4,653	6,949	3,024	70,050

Source: Bureau of Transport Statistics (2012), 2011 Journey to Work, Table 19

Note: This table presents the residential location (LGA of residence) of individuals employed in each SA2 within the study area. GGSA data is not relevant for this statistic.

**Table A.7 Journey to work (place of work)**

<b>Mode (One method only)</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>
Train	9.0%	11.9%	17.6%	5.9%	21.9%	3.8%	16.0%	9.3%	14.0%
Bus	0.7%	1.5%	1.3%	2.4%	3.6%	4.5%	2.3%	2.0%	2.1%
Ferry/Tram	0.0%	0.0%	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%
Car, as driver	72.7%	64.5%	62.2%	64.0%	50.7%	62.6%	54.6%	55.5%	61.3%
Car, as passenger	4.5%	3.9%	3.8%	4.3%	4.5%	5.0%	4.7%	3.6%	4.2%
Other	0.9%	1.2%	1.1%	0.9%	0.8%	1.4%	1.1%	1.7%	1.1%
Walked only	1.9%	3.6%	2.4%	3.2%	4.6%	3.9%	7.1%	6.8%	3.7%
Mode not stated	1.8%	1.6%	1.2%	1.3%	1.8%	1.8%	1.7%	2.4%	1.6%
Worked at home or did not go to work	8.5%	11.8%	10.3%	17.8%	12.1%	17.0%	12.5%	18.8%	12.1%
Total one method	11,522	10,025	16,561	4,546	12,770	4,653	6,949	3,024	70,050

Source: Bureau of Transport Statistics (2012), 2011 Journey to Work, Table 19

Note: Data not available for Greater Sydney GCCSA

**Table A.8 Businesses by turnover, 2014**

<b>Business turnover</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>
Zero to \$50,000	26%	25%	28%	25%	26%	26%	33%	26%	27%
\$50,000 to less than \$100,000	17%	18%	20%	18%	19%	19%	21%	20%	19%
\$100,000 to less than \$200,000	16%	18%	17%	20%	18%	18%	17%	18%	18%
\$200,000 to less than \$500,000	17%	20%	19%	20%	19%	19%	16%	18%	19%
\$500,000 to less than \$2,000,000	14%	13%	12%	11%	13%	14%	10%	14%	12%
\$2,000,000 or more	10%	5%	5%	5%	5%	4%	3%	5%	5%
Total businesses	1,592	3,738	2,090	2,310	3,053	2,302	1,784	1,328	18,197

Source: Australian Bureau of Statistics (2015), Catalogue Number 8165.0, Counts of Australia Businesses, including entries and exits, June 2010-June 2014 by SA2.

Note: Data not available for Greater Sydney GCCSA

**Table A.9 Businesses by employment sizes, 2014**

<b>Employing businesses</b>	<b>Homebush SA2</b>	<b>Strathfield SA2</b>	<b>Concord West - North Strathfield SA2</b>	<b>Concord - Mortlake - Cabarita SA2</b>	<b>Burwood - Croydon SA2</b>	<b>Five Dock - Abbotsford SA2</b>	<b>Ashfield SA2</b>	<b>Haberfield - Summer Hill SA2</b>	<b>Total Study Area</b>
Non employing	61%	60%	60%	60%	59%	60%	64%	61%	61%
1-4 employees	28%	30%	30%	32%	32%	31%	28%	28%	30%
5-19 employees	8%	8%	8%	7%	8%	7%	7%	9%	8%
20-199 employees	3%	2%	2%	1%	1%	2%	1%	2%	2%
Over 200 employees	0%	0%	0%	0%	0%	0%	0%	0%	0%
<b>Total</b>	<b>1,602</b>	<b>3,742</b>	<b>2,103</b>	<b>2,308</b>	<b>3,041</b>	<b>2,297</b>	<b>1,782</b>	<b>1,329</b>	<b>18,204</b>

Source: Australian Bureau of Statistics (2015), Catalogue Number 8165.0, Counts of Australia Businesses, including entries and exits, June 2010-June 2014 by SA2.

Note: Data not available for Greater Sydney GCCSA

**Table A.10 Businesses by Industry, 2014**

Industry of employment	Homebush SA2	Strathfield SA2	Concord West - North Strathfield SA2	Concord - Mortlake - Cabarita SA2	Burwood - Croydon SA2	Five Dock - Abbotsford SA2	Ashfield SA2	Haberfield - Summer Hill SA2	Total Study Area
Agriculture, forestry and fishing	1%	1%	1%	1%	0%	1%	1%	1%	1%
Mining	0%	0%	0%	0%	0%	0%	0%	0%	0%
Manufacturing	4%	3%	3%	3%	2%	3%	2%	3%	3%
Electricity, gas, water and waste services	0%	0%	0%	0%	0%	0%	0%	0%	0%
Construction	14%	13%	12%	14%	12%	13%	12%	11%	13%
Wholesale trade	8%	4%	5%	4%	5%	4%	4%	3%	5%
Retail trade	9%	6%	8%	6%	8%	7%	8%	7%	7%
Accommodation and food services	4%	4%	7%	5%	5%	4%	7%	4%	5%
Transport, postal and warehousing	9%	4%	5%	4%	5%	3%	11%	4%	5%
Information media and telecommunications	1%	1%	1%	1%	1%	1%	1%	2%	1%
Financial and insurance services	6%	10%	8%	10%	8%	8%	5%	9%	8%
Rental, hiring and real estate services	14%	18%	15%	16%	17%	17%	12%	14%	16%
Professional, scientific and technical services	9%	11%	14%	15%	13%	17%	14%	19%	14%

Industry of employment	Homebush SA2	Strathfield SA2	Concord West - North Strathfield SA2	Concord - Mortlake - Cabarita SA2	Burwood - Croydon SA2	Five Dock - Abbotsford SA2	Ashfield SA2	Haberfield - Summer Hill SA2	Total Study Area
Administrative and support services	7%	6%	7%	4%	5%	4%	5%	4%	5%
Public administration and safety	1%	0%	0%	1%	0%	0%	1%	0%	0%
Education and training	1%	1%	1%	2%	1%	2%	2%	2%	1%
Health care and social assistance	5%	13%	7%	8%	9%	7%	7%	8%	9%
Arts and recreation services	0%	0%	1%	1%	1%	2%	2%	2%	1%
Other services	3%	3%	2%	3%	3%	5%	3%	3%	3%
Inadequately described/Not stated	4%	3%	3%	2%	3%	3%	3%	2%	3%
Total	1,602	3,742	2,103	2,308	3,041	2,297	1,782	1,329	18,204

Source: Australian Bureau of Statistics (2015), Catalogue Number 8165.0, Counts of Australia Businesses, including entries and exits, June 2010-June 2014 by SA2.

Note: Data not available for Greater Sydney GCCSA

**Table A.11 Businesses by Industry, 2014 (\$m)**

<b>Industry of employment</b>	<b>Strathfield LGA</b>	<b>Ashfield LGA</b>	<b>Burwood LGA</b>	<b>Canada Bay LGA</b>	<b>Total Study Area</b>
Agriculture, forestry and fishing	\$0.2	\$0.0	\$0.1	\$0.0	\$0.3
Mining	\$3.3	\$0.0	\$2.4	\$1.4	\$7.1
Manufacturing	\$238.4	\$36.5	\$31.3	\$328.2	\$634.3
Electricity, gas, water and waste services	\$211.2	\$8.3	\$7.2	\$74.3	\$301.0
Construction	\$186.4	\$72.4	\$67.8	\$261.2	\$587.9
Wholesale trade	\$463.2	\$30.7	\$113.9	\$307.3	\$915.2
Retail trade	\$174.5	\$101.0	\$145.4	\$183.4	\$604.2
Accommodation and food services	\$45.6	\$49.4	\$51.7	\$103.7	\$250.5
Transport, postal and warehousing	\$548.7	\$32.4	\$244.4	\$82.7	\$908.2
Information media and telecommunications	\$66.8	\$19.7	\$117.3	\$241.0	\$444.8
Financial and insurance services	\$233.4	\$49.4	\$148.0	\$998.5	\$1,429.4
Rental, hiring and real estate services	\$71.5	\$153.9	\$87.0	\$146.5	\$459.0
Professional, scientific and technical services	\$128.0	\$97.3	\$148.6	\$358.4	\$732.2
Administrative and support services	\$68.4	\$41.5	\$80.7	\$106.8	\$297.5
Public administration and safety	\$50.1	\$136.4	\$113.2	\$64.8	\$364.6
Education and training	\$152.4	\$92.5	\$191.5	\$135.6	\$572.0
Health care and social assistance	\$72.2	\$192.6	\$232.5	\$426.8	\$924.1
Arts and recreation services	\$27.6	\$12.3	\$9.3	\$45.8	\$95.0
Other services	\$51.9	\$31.7	\$36.7	\$113.2	\$233.4
Ownership of dwellings	\$282.3	\$405.0	\$273.4	\$766.5	\$1,727.1
Gross Sector Value Add	\$3,076.3	\$1,562.9	\$2,102.4	\$4,746.1	\$11,487.8
Taxes Less Subsidies	\$364.6	\$185.3	\$249.2	\$562.5	\$1,361.6

<b>Industry of employment</b>	<b>Strathfield LGA</b>	<b>Ashfield LGA</b>	<b>Burwood LGA</b>	<b>Canada Bay LGA</b>	<b>Total Study Area</b>
Gross Regional Product	\$3,441.0	\$1,748.2	\$2,351.6	\$5,308.6	\$12,849.4

Source: AECOM Australia (2015)

Note: Data not available for Greater Sydney GCCSA

# Appendix B

## List of Commercial Properties Directly Impacted

Table B.1 Commercial properties directly impacted due to the project

Property No.	Lot/DP or SP	Location	Existing land use	Ownership	Full or partial	Construction	Operation	Total size of property (m2)	Area of property to be acquired (m2)	No. of buildings
PA1	1/DP883387	Homebush	Vacant/transmission line easement (Ausgrid property)	Ausgrid	Partial		✓	71,715	10,600 (14.8% of property)	-
PA2	1/DP1002876	North Strathfield	Vacant/commercial	Private	Partial (air)		✓	23,829	245 (1% of property)	-
PA3	50/DP785451	Parramatta Road, Concord	Commercial	Private	Partial		✓	6,105	230 (<0.1% of lot)	No impacts on buildings on this property
FA1	64/DP4612	Parramatta Road, Haberfield	Commercial	Private	Full	✓		693	693	1
	63/DP4612	Parramatta Road, Haberfield	Commercial	Private	Full	✓		682	682	
FA2	50/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		455	455	1
	51/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		444	444	
	52/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		415	415	
FA3	53/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		642	642	1
	54/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		631	631	

PA – partial acquisition

FA – full acquisition

Property No.	Lot/DP or SP	Location	Existing land use	Ownership	Full or partial	Construction	Operation	Total size of property (m2)	Area of property to be acquired (m2)	No. of buildings
FA4	55/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		586	586	1
	56/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		603	603	
	57/DP719977	Parramatta Road, Haberfield	Commercial	Private	Full	✓		591	591	
	58/DP719977	Parramatta Road, Haberfield	Vacant/Commercial	Private	Full	✓		246	246	
FA5	1/DP239458	Wattle Street, Haberfield	Commercial	Private	Full	✓		238	238	1
	2/DP239458	Wattle Street, Haberfield	Commercial	Private	Full	✓		312	312	
FA6	1/DP655550	Parramatta Road, Haberfield	Commercial	Private	Full		✓	362	362	1
	B/DP306471	Parramatta Road, Haberfield	Commercial	Private	Full		✓	346	346	
	C/DP306471	Parramatta Road, Haberfield	Commercial	Private	Full		✓	348	348	
FA7	Y/DP384779	Parramatta Road, Haberfield	Residential with commercial business	Private	Full		✓	326	326	1
FA8	B/DP433998	Parramatta Road, Haberfield	Commercial	Private	Full		✓	1,066	1,066	1
FA9	1/DP342078	Parramatta Road, Haberfield	Commercial	Private	Full		✓	560	560	1
FA10	10/DP1150608	Parramatta Road, Haberfield	Commercial	Private	Full		✓	543	543	1

PA – partial acquisition

FA – full acquisition

Property No.	Lot/DP or SP	Location	Existing land use	Ownership	Full or partial	Construction	Operation	Total size of property (m2)	Area of property to be acquired (m2)	No. of buildings
FA11	50/DP1122039	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	635	635	-
	51/DP1122039	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	591	591	
	3/DP5010	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		449	449	
	1/DP973337	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		387	387	
	6/DP965245	Bland Street, Ashfield	Vacant/Commercial	Private	Full	✓		484	484	
	1/DP965245	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	3,341	3,341	
	2/DP965245	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	676	676	
	3/DP965245	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full	✓	✓	702	702	
FA12	2/DP1023083	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,905	1,905	1
FA13	1/DP963236	Parramatta Road, Ashfield	Vacant/Commercial	Private	Full		✓	804	804	-
	2/DP668831	Chandos Street, Ashfield	Vacant/Commercial	Private	Full		✓	203	203	
FA14	4/DP18382	Parramatta Road, Ashfield	Commercial	Private	Full		✓	436	436	1
FA15	A/DP433769	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,042	1,042	1
FA16	11/DP439	Parramatta Road, Ashfield	Commercial	Private	Full		✓	929	929	1
FA17	10/DP439	Parramatta Road, Ashfield	Commercial	Private	Full		✓	944	944	1

PA – partial acquisition

FA – full acquisition

Property No.	Lot/DP or SP	Location	Existing land use	Ownership	Full or partial	Construction	Operation	Total size of property (m2)	Area of property to be acquired (m2)	No. of buildings
FA18	A/DP504990	Parramatta Road, Ashfield	Commercial	Private	Full		✓	1,138	1,138	1
FA19	B/DP504990	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	1,162	1,162	1
FA20	11/DP610044	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	3,228	3,228	1
FA21	1/DP130606	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓	✓	253	253	1
	2/DP130606	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓		30	30	
	3/DP130606	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓		93	93	
	4/DP439	Parramatta Road, Ashfield	Commercial/place of worship	Private	Full	✓	✓	967	967	
FA22	3/DP439	Parramatta Road, Ashfield	Commercial	Private	Full	✓	✓	922	922	1
FA23	5/DP33945	Parramatta Road, Ashfield	Commercial	Private	Full		✓	553	553	1

PA – partial acquisition

FA – full acquisition

# Appendix



Soil and water quality assessment

# WestConnex Delivery Authority

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WestConnex M4 East EIS

Soil and Water Quality

September 2015

**Prepared for**

WestConnex Delivery Authority

**Prepared by**


*GHD Pty Ltd*

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# Document controls

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# Glossary of terms and abbreviations

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<b>Term/Abbreviation</b>	<b>Definition</b>
AHD	Australian Height Datum
ASS	Acid Sulfate Soil
ANZECC	Australian and New Zealand Environment and Conservation Council
ARMCANZ	Agriculture and Resources Management Council of Australia and New Zealand
CBD	Central Business District
CCTV	Closed circuit television
CEMP	Construction Environmental Management Plan
DCP	Development Control Plan
DDT	Dichlorodiphenyltrichloroethane
DPI	NSW Department of Primary Industries
DS	Downstream
EIS	Environmental impact statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPA	New South Wales Environment Protection Agency
EPL	Environment Protection Licensing
GPT	Gross pollutant trap
ITS	Intelligent transport systems
LGA	Local Government Area
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
OEH	New South Wales Office of Environment and Heritage
PAHs	Polycyclic Aromatic Hydrocarbons
PASS	Potential Acid Sulfate Soil
Roads and Maritime	Roads and Maritime Services
RTA	Roads and Transport Authority (now Roads and Maritime)
SEARs	Secretary's Environmental Assessment Requirements
SWMP	Soil and Water Quality Management Plan
TSC Act	<i>Threatened Species Conservation Act 1995</i>
The Blue Book	<i>Managing Urban Stormwater – Soils and Construction Volumes 1 and 2, Landcom 2004 and 2006</i>
US	Upstream
VMS	Variable message sign
WDA	WestConnex Delivery Authority
WSUD	Water sensitive urban design
WTP	Water treatment plant

# Executive summary

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The NSW Roads and Maritime Services (Roads and Maritime), is seeking approval to upgrade and extend the M4 Motorway from Homebush Bay Drive at Homebush to Parramatta Road and City West Link (Wattle Street) at Haberfield. This proposed section of road is known as the M4 East project (the project).

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) to support the environmental impact statement (EIS) for the project.

The scope of this report is focussed on the assessment of surface water and the potential impacts that the project will have on the existing stormwater runoff in the related catchments. This report focusses specifically on the surface water quality impacts of the project during both construction and operation phases. Comment is also included in the report on the impacts associated with the erosion of soils and resultant sedimentation issues. Discussion on the groundwater aspects of the tunnel sections of the project can be found in *Groundwater Impact Assessment* (GHD 2015b).

The M4 Motorway and Parramatta Road are located within the Parramatta River Estuary catchment.

The project crosses four main waterways and their associated sub-catchments with a fifth waterway close to the project footprint. The total catchment area relevant to the proposed alignment is about 1,553 hectares. The sub-catchments are well established urban catchments with predominantly residential and commercial land use. The five waterways from west to east are:

- Saleyards Creek
- Powells Creek
- St Lukes Park Canal (unnamed channel)
- Barnwell Park Canal (unnamed channel)
- Dobroyd Canal (Iron Cove Creek).

During construction, the highest risk of impacts on water quality would be associated with:

- Exposure of soils during earthworks which may result in soil erosion and off-site movement of eroded sediments by wind and/or stormwater to receiving waterways, resulting in increased levels of sediment, nutrients, metals and other pollutants
- Disturbance of contaminated land causing contamination of downstream waterways and groundwater, impacting on aquatic and riparian habitats
- Accidental leaks or spills of chemicals, fuels, oils and/or greases from construction plant and machinery, which may result in pollution of receiving waterways and groundwater sources
- Direct disturbance of waterway beds and banks during the widening of Saleyards Creek bridge, which may lead to sediment entering and polluting the waterways
- Infiltration of surface water to groundwater sources, including sediments and particles and soluble pollutants (such as acids, salts, nitrates and soluble hydrocarbons).

During operation, the main potential impacts on water quality would be associated with discharge of treated groundwater, stormwater runoff during rainfall events and direct deposition of airborne particles, causing acute or chronic contamination of water quality in downstream waterways.

The minor increase in the area of impervious surfaces associated with the surface works of the project would have the potential for a small additional adverse impact on the hydrological regime due to increased runoff volumes and peak flows and associated potential increases in erosion and sedimentation of downstream watercourses. The areas of the project where the greatest increase in impervious surfaces is expected, i.e at the Homebush Bay Drive interchange, are located adjacent and up gradient of the permanent stormwater quality management measures proposed by the preferred design.

Pollutants in stormwater runoff include sediments, hydrocarbons, metals and microbials. These deposits build up on road surfaces and pavement areas during dry weather and get washed off and transported to downstream waterways when it rains. The project is likely to have a minor increase in these pollutants associated with the small increase of hardstand area associated with the motorway.

Typical mitigation measures that would be implemented to address the potential construction impacts include:

- Disturbed areas would be minimised and would be progressively revegetated or stabilised as soon as practical throughout construction
- Appropriate erosion and sediment control measures would be installed such as silt fencing, straw bales, check dams, temporary ground stabilisation, diversion berms or site regrading
- Clean water runoff would be diverted away from disturbed areas where practical
- Appropriate surface and groundwater treatment prior to offsite discharge, for example through the use of treatment systems and water quality basins (where practicable)
- Appropriately bunded areas would be provided for storage of hazardous materials such as oils, chemicals and fuels
- Work platforms or access tracks required in the vicinity of waterways would be constructed to mitigate against the movement of erodible soils and provide a means of stabilisation e.g. utilisation of large clean rock material wrapped or underlain with geofabric
- A qualified soil conservationist would be employed to develop the initial project erosion and sediment control plans and advise on appropriate controls, implementation and monitoring and management processes
- Site staff would be engaged through tool box talks or similar with appropriate induction on soil and water management practices
- Work method statements would be prepared for waterway works with particular emphasis on the early implementation of erosion and scour protection requirements.

Erosion and sediment loads would gradually diminish after construction as the disturbed areas are stabilised.

To address the potential operational surface water quality impacts, a combination of measures would be employed as appropriate, including:

- Gross Pollutant Traps
- Water treatment plant
- Spill containment and water treatment basins.

# 1 Introduction

---

## 1.1 Overview of the project

NSW Roads and Maritime Services (Roads and Maritime) is seeking approval to upgrade and extend the M4 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. These proposed works are described as the M4 East project (the project). The location of the project is shown in **Figure 1.1**.

Approval is being sought under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). The project was declared by the Minister for Planning to be State significant infrastructure and critical State significant infrastructure and an environmental impact statement (EIS) is therefore required.

The project is a component of WestConnex, which is a proposal to provide a 33 kilometre motorway linking Sydney's west and south-west with Sydney Airport and the Port Botany precinct. The location of WestConnex is shown in **Figure 1.2**. The individual components of WestConnex are:

- M4 Widening – Pitt Street at Parramatta to Homebush Bay Drive at Homebush (planning approval granted and under construction)
- M4 East (the subject of this report)
- New M5 – King Georges Road at Beverly Hills to St Peters (planning application lodged and subject to planning approval)
- King Georges Road Interchange Upgrade (planning approval granted and work has commenced)
- M4–M5 Link – Haberfield to St Peters, including the Southern Gateway and Southern Extension (undergoing concept development and subject to planning approval).

Separate planning applications will be lodged for each individual component project. Each project will be assessed separately, but the impacts of each project will also be considered in the context of the wider WestConnex.

The NSW Government has established the WestConnex Delivery Authority (WDA) to deliver WestConnex. WDA has been established as an independent public subsidiary corporation of Roads and Maritime. Its role and functions are set out in Part 4A of the *Transport Administration (General) Regulation 2013* (NSW). WDA is project managing the planning approval process for the project on behalf of Roads and Maritime. However, for the purpose of the planning application for the project, Roads and Maritime is the proponent.

## 1.2 Project location

The project is generally located in the inner west region of Sydney within the Auburn, Strathfield, Canada Bay, Burwood and Ashfield local government areas (LGAs). The project travels through 10 suburbs: Sydney Olympic Park, Homebush West, Homebush, North Strathfield, Strathfield, Concord, Burwood, Croydon, Ashfield and Haberfield.

The project is generally located within the M4 and Parramatta Road corridor, which links Broadway at the southern end of the Sydney central business district (CBD) and Parramatta in Sydney's west, about 20 kilometres to the west of the Sydney CBD. This corridor also provides the key link between the Sydney CBD and areas further west of Parramatta (such as Penrith and western NSW).

The western end of the project is located at the interchange between Homebush Bay Drive and the M4, about 13 kilometres west of the Sydney CBD. The project at this location would tie in with the M4 Widening project in the vicinity of Homebush Bay Drive.

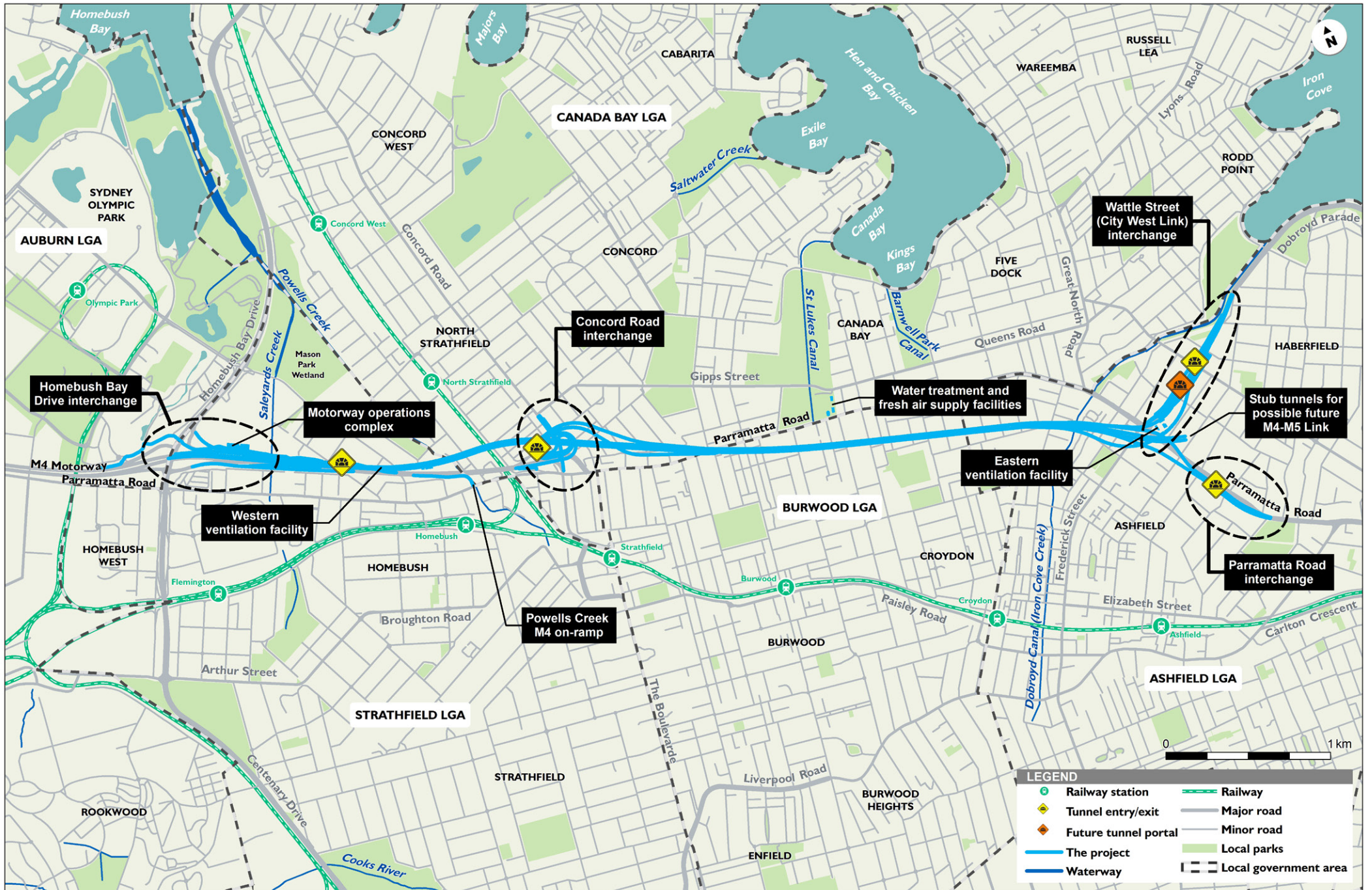


Figure 1.1 Local context of the project



Figure 1.2 WestConnex

The tunnel dive structures would start at the centre of the M4, west of the existing pedestrian footbridge over the M4 at Pomeroy Street, and would continue underground to the north of the existing M4 and Parramatta Road, before crossing beneath Parramatta Road at Broughton Street at Burwood. The tunnels would continue underground to the south of Parramatta Road until the intersection of Parramatta Road and Wattle Street at Haberfield. Ramps would connect the tunnels to Parramatta Road and Wattle Street (City West Link) at the eastern end of the project. The tunnels would end in a stub connection to the possible future M4–M5 Link (M4–M5 Link), near Alt Street at Haberfield.

The project would include interchanges between the tunnels and the above ground road network, along with other surface road works, at the following locations:

- M4 and Homebush Bay Drive interchange at Sydney Olympic Park and Homebush (Homebush Bay Drive interchange)
- Powells Creek, near George Street at North Strathfield (Powells Creek M4 on-ramp)
- Queen Street, near Parramatta Road at North Strathfield (Queen Street cycleway westbound on-ramp)
- M4 and Sydney Street, Concord Road and Parramatta Road interchange at North Strathfield (Concord Road interchange)
- Wattle Street (City West Link), between Parramatta Road and Waratah Street at Haberfield (Wattle Street (City West Link) interchange)
- Parramatta Road, between Bland Street and Orpington Street at Ashfield and Haberfield (Parramatta Road interchange).

### 1.3 Secretary's environmental assessment requirements

The NSW Department of Planning and Environment has issued a list of Secretary's Environmental Assessment Requirements (SEARs) that inform the environmental impact assessment. **Table 1.1** displays the SEARS that are specific to surface water quality; and also provides a cross reference to the relevant section(s) of this report which address these requirements.

In addition, three agency letters, which accompany the SEARs and are applicable to surface water quality, were issued by NSW Department of Primary Industries (DPI), the then NSW Office of Water (NOW) and the NSW Environment Protection Authority (EPA). **Table 1.2** provides details of the surface water quality requirements outlined in the agency letters and a cross reference to the relevant section(s) of this report which address these conditions.

**Table 1.1 How SEARs have been addressed in this report**

<b>SEARs</b>	
<b>Soil and Water requirements</b>	
<b>Requirement</b>	<b>Section where addressed in EIS</b>
Assessment of construction and operational erosion and sediment and water quality impacts, taking into account impacts from both accidents and runoff (ie acute and chronic impacts), having consideration to impacts to surface water runoff, soil erosion and sediment transport, mass movement, and urban and regional salinity. The assessment of water quality is to have reference to relevant public health and environmental water quality criteria, including those specified in the Australian and New Zealand <i>Guidelines for Fresh and Marine Water Quality</i> (ANZECC/ARMCANZ 2000a), any applicable regional, local or site-specific guidelines and any licensing requirements	<b>Sections 5, 6 and 7</b>
Consideration of waterways likely to be affected by the project, including existing riparian vegetation and rehabilitation of riparian land	<b>Sections 4, 5 and 6</b>

**Table 1.2 How agency comments have been addressed in this report**

<b>Agency letters</b>	
<b>NSW Government – Department of Primary Industries (DPI), DPI Water</b>	
<b>Requirement</b>	<b>Section where addressed in EIS</b>
<ul style="list-style-type: none"> <li>Assessment of impacts on surface and ground water sources (both quality and quantity), watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts,</li> </ul>	<p><b>Section 5, 6 and 7</b></p> <p>Quantity, riparian land, groundwater dependent ecosystems and flooding addressed by others.</p>
<ul style="list-style-type: none"> <li>A description of the design features and measures to be incorporated to mitigate potential impacts.</li> </ul>	<b>Section 2 and 7</b>
<b>NSW Environment Protection Authority (EPA)</b>	
<b>Requirement</b>	<b>Section where addressed in EIS</b>
<ul style="list-style-type: none"> <li>Impacts related to the following environmental issues need to be assessed, quantified and reported on:               <ul style="list-style-type: none"> <li>Water and soilsAcid sulfate soils</li> <li>Contaminated sites</li> <li>Soil issues – general</li> <li>Water quality</li> </ul> </li> </ul>	<p><b>Section 5</b></p> <p>Contamination Assessment (GHD 2015a).</p> <p>Contamination Assessment (GHD 2015a)</p> <p>Contamination Assessment (GHD 2015a)</p> <p><b>Section 5</b></p>

<b>Agency letters</b>	
<ul style="list-style-type: none"> <li>• Background Conditions <ul style="list-style-type: none"> <li>– Describe existing surface and groundwater quality. An assessment needs to be undertaken for any water resource likely to be affected by the proposal.</li> <li>– State the Water Quality Objectives for the receiving waters relevant to the proposal.</li> <li>– State the indicators and associated trigger values or criteria for the identified environmental values.</li> </ul> </li> </ul>	<p><b>Section 4.8</b></p> <p><b>Section 3</b></p>
<ul style="list-style-type: none"> <li>• Impact Assessment <ul style="list-style-type: none"> <li>– Assess impacts against the relevant ambient water quality outcomes.</li> <li>– Describe how stormwater will be managed both during and after construction.</li> </ul> </li> </ul>	<p><b>Section 3 (Table 3.1)</b></p> <p><b>Section 5 and 6</b></p> <p><b>Section 5 and 6</b></p>
<ul style="list-style-type: none"> <li>• Monitoring <ul style="list-style-type: none"> <li>– Describe how predicted impacts will be monitored and assessed over time.</li> </ul> </li> </ul>	<p><b>Section 7.1.4</b></p>

## 1.4 Purpose of this report

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an EIS for the project.

The scope of this report is an assessment of surface water and the potential impacts of the project on the existing stormwater runoff in the related catchments and receiving waterways downstream. This report focuses specifically on the surface water quality aspects of the project, including the treatment of groundwater from the tunnel and discharge through the surface water system, during construction and operation. Comment is also included in the report on the impacts associated with the erosion of soils and resultant sedimentation issues.

The report presents the state of the existing environment as a baseline and then identifies the potential impacts that may arise from the project.

Potential impacts of and risks to the project in relation to flooding have been assessed separately in the *Surface Water: Flooding and Drainage* report (Lyll and Associates 2015). Potential contamination impacts have been assessed in the *Soil and Land Contamination Assessment* report (GHD 2015a), while groundwater aspects are addressed in the *Groundwater Impact Assessment* (GHD 2015b) prepared as part of the EIS for the project.

### 1.4.1 Structure of this report

The document has been divided into the following key sections:

- **Chapter 2** – Provides an overview of the proposed project
- **Chapter 3** – Outlines the assessment methodology undertaken
- **Chapter 4** – Describes the existing surface water environment that the project would interact with
- **Chapter 5** – Assesses the potential surface water quality impacts of the project during construction
- **Chapter 6** – Assesses the potential surface water quality impacts of the project during operation
- **Chapter 7** – Surface water quality management, which outlines the proposed management and monitoring measures required to mitigate impacts.

## 2 Proposed project

---

### 2.1 Project features

The project would comprise the construction and operation of the following key features:

- Widening, realignment and resurfacing of the M4 between Homebush Bay Drive and Underwood Road at Homebush
- Upgrade of the existing Homebush Bay Drive interchange to connect the western end of the new tunnels to the existing M4 and Homebush Bay Drive, while maintaining all current surface connections
- Two new three-lane tunnels (the mainline tunnels), one eastbound and one westbound, extending from west of Pomeroy Street at Homebush to near Alt Street at Haberfield, where they would terminate until the completion of the M4–M5 Link. Each tunnel would be about 5.5 kilometres long and would have a minimum internal clearance (height) to in-tunnel services of 5.3 metres
- A new westbound on-ramp from Parramatta Road to the M4 at Powells Creek, west of George Street at North Strathfield
- An interchange at Concord Road, North Strathfield/Concord with on-ramps to the eastbound tunnel and off-ramps from the westbound tunnel. Access from the existing M4 to Concord Road would be maintained via Sydney Street. A new on-ramp would be provided from Concord Road southbound to the existing M4 westbound, and the existing on-ramp from Concord Road northbound to the existing M4 westbound would be removed
- Modification of the intersection of the existing M4 and Parramatta Road, to remove the left turn movement from Parramatta Road eastbound to the existing M4 westbound
- An interchange at Wattle Street (City West Link) at Haberfield with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. The project also includes on- and off-ramps at this interchange that would provide access to the M4–M5 Link. In addition, the westbound lanes of Wattle Street would be realigned
- An interchange at Parramatta Road at Ashfield/Haberfield, with an on-ramp to the westbound tunnel and an off-ramp from the eastbound tunnel. In addition, the westbound lanes of Parramatta Road would be realigned
- Installation of tunnel ventilation systems, including ventilation facilities within the existing M4 road reserve near Underwood Road at Homebush (western ventilation facility) and at the corner of Parramatta Road and Wattle Street at Haberfield (eastern ventilation facility). The eastern ventilation facility would serve both the project and the M4–M5 Link project. Provision has also been made for a fresh air supply facility at Cintra Park at Concord
- Associated surface road work on the arterial and local road network, including reconfiguration of lanes, changes to traffic signalling and phasing, and permanent road closures at a small number of local roads
- Pedestrian and cycle facilities, including permanently re-routing a portion of the existing eastbound cycleway on the northern side of the M4 from west of Homebush Bay Drive to near Pomeroy Street, and a new westbound cycleway on-ramp connection from Queen Street at North Strathfield to the existing M4
- Tunnel support systems and services such as electricity substations, fire pump rooms and tanks, water treatment facilities, and fire and life safety systems including emergency evacuation infrastructure
- Motorway operations complex on the northern side of the existing M4, east of the Homebush Bay Drive interchange
- Provision of road infrastructure and services to support the future implementation of smart motorway operations (subject to separate planning approval)

- Installation of tolling gantries and traffic control systems along the length of the project
- Provision of new and modified noise walls
- Provision of low noise pavement for new and modified sections of the existing M4
- Temporary construction ancillary facilities and temporary works to facilitate the construction of the project.

An overview of the project at completion is shown in **Figure 2.1**.

The project does not include work required for reconfiguring Parramatta Road as part of the urban transformation program. The project does not include ongoing motorway maintenance activities during operation. These would be subject to separate assessment and approval as appropriate.

## 2.2 Construction activities

### 2.2.1 Overview

Construction activities associated with the project would generally include:

- Enabling and temporary works, including construction power, water supply, ancillary site establishment, demolition works, property adjustments and public 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 complex 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.

The project assessed in this report does not include surveys, sampling or investigation to inform the design or assessment, such as test drilling, test excavations, geotechnical investigations, or other tests. It also does not include adjustments to, or relocation of, existing utilities infrastructure undertaken prior to commencement of construction. These would be subject to separate assessment and approval as appropriate.

### 2.2.2 Construction footprint

The total area required for construction of the project, including construction ancillary facilities, is referred to as the 'construction footprint'. The construction footprint would be about 65 hectares in total, comprising about 48 hectares at the surface and about 17 hectares below ground.

In addition to below ground works, surface works would be required to support tunnelling activities and to construct surface infrastructure such as interchanges, tunnel portals, ventilation facilities, ancillary operations buildings and facilities, and new cycleway facilities near the Homebush Bay Drive interchange and Queen Street at North Strathfield.

The overall surface construction footprint generally aligns with the operational footprint, with the locations of future operational ancillary facilities being used to support construction work. Some additional areas adjacent to the operational footprint (around the portals and on- and off-ramps, and also at the tunnel mid-point) would also be required during the construction stage only to facilitate construction.

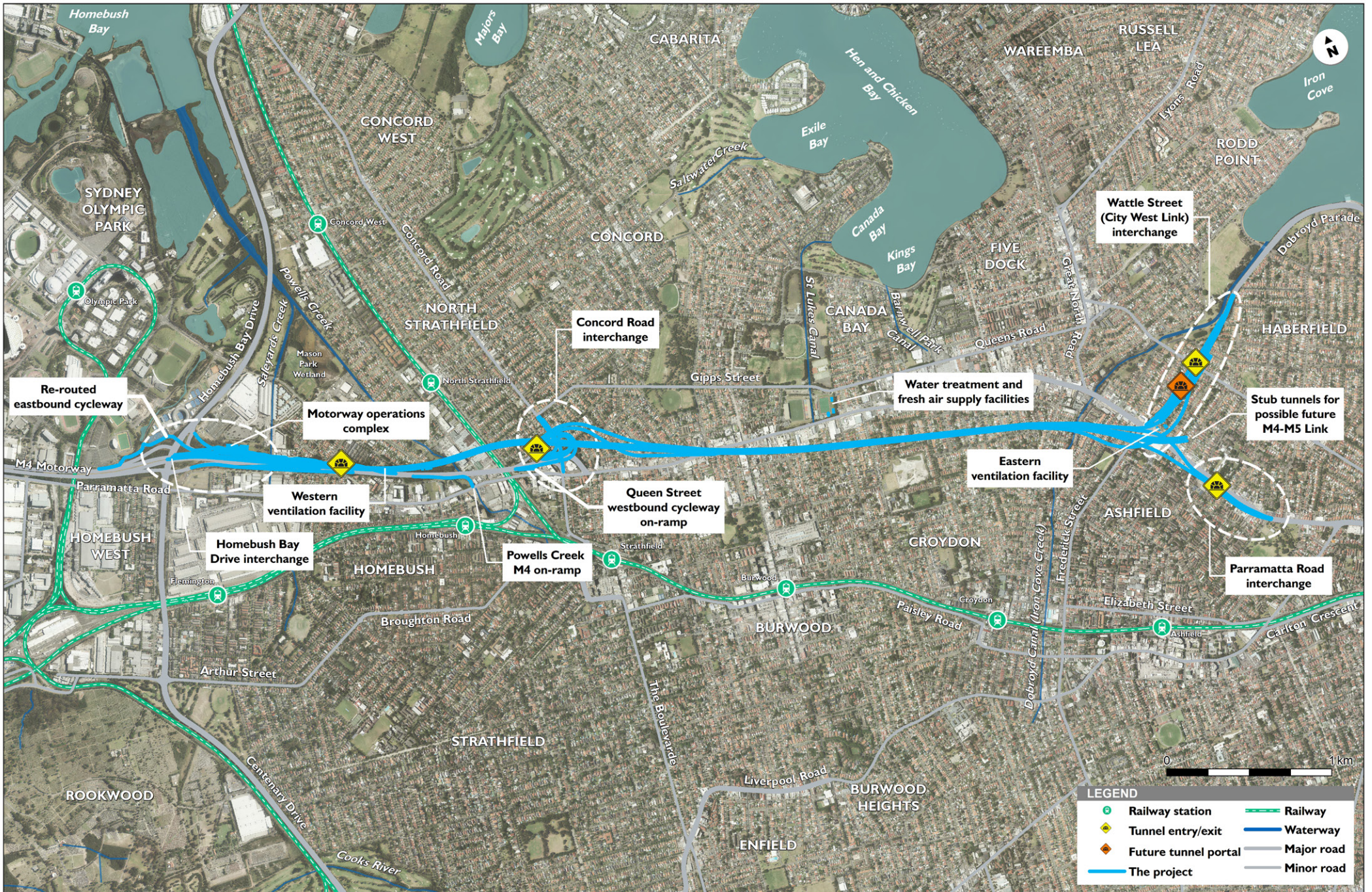


Figure 2.1 Overview of the project

Construction ancillary facilities currently proposed would be required at the following 10 locations:

- Homebush Bay Drive civil site (C1)
- Pomeroy Street civil site (C2)
- Underwood Road civil and tunnel site (C3)
- Powells Creek civil site (C4)
- Concord Road civil and tunnel site (C5)
- Cintra Park tunnel site (C6)
- Northcote Street tunnel site (C7)
- Eastern ventilation facility site (C8)
- Wattle Street and Walker Avenue civil site (C9)
- Parramatta Road civil site (C10).

An overview of the construction footprint is shown in **Figure 2.2**.

The final size and configuration of construction ancillary facilities would be further developed during detailed design.

### 2.2.3 Construction program

Subject to planning approval, construction of the project is planned to start in the second quarter of 2016, with completion planned for the first quarter of 2019. The total period of construction works is expected to be around three years, including nine months of commissioning occurring concurrently with the final stages of construction. The indicative construction program is shown in **Table 2.1**.

**Table 2.1 Indicative construction program overview**

Construction activity	Indicative construction timeframe												
	2016			2017			2018			2019			
Construction access excavation (all sites)													
Tunnelling (excavation)													
Tunnel drainage and pavement works													
Tunnel mechanical and electrical fitout works													
Tunnel completion works													
Homebush Bay Drive interchange													
M4 surface works													
Western ventilation facility													
Powells Creek on-ramp													
Concord Road interchange													
Wattle Street interchange													
Parramatta Road interchange													
Eastern ventilation facility													
Cintra Park fresh air supply facility													
Cintra Park water treatment facility													
Motorway operations complex													
Mechanical and electrical fitout works													
Site rehabilitation and landscaping													



## 2.3 Surface water quality specific aspects

This section describes the specific aspects of the project related to surface water quality that are proposed in the preferred design. The potential impacts that are to be mitigated are described in detail in **Chapters 5 and 6** of this report and additional mitigation measures and recommended water quality monitoring programme to be considered and further developed under the detailed design of the project are described in **Chapter 7**. Additional information on the project and the water management systems can be found in the project description in **Chapters 5 and 6** of the EIS.

### 2.3.1 Water quality objectives

The detailed design of the project would seek to minimise impacts on existing natural overland flows and watercourses, with general principles and objectives consistent with Roads and Maritime's *Code of Practice for Water Management – Road Development and Management* (Roads and Transport Authority (RTA) (now Roads and Maritime) 1999) (the RTA Code of Practice).

Based on the RTA Code of Practice, water quality objectives for the project construction phase would include:

- Appropriate techniques in the detailed design and construction phases to contain and treat road runoff to avoid or minimise potential impacts to aquatic and riparian environments (with particular reference to the *NSW Office of Water Guidelines for Controlled Activities on Waterfront Land (2012)*)
- Source control techniques, rather than relying on treatment prior to discharge, wherever practical
- Preference for vegetative methods (over engineering structures) to protect eroding stream banks, wherever practical.

Additional operational water quality objectives for the project are to:

- Minimise the potential for damage or loss as a result of the discharge of water outside the project footprint
- Contain all spillage within the system to prevent any environmental damage due to a spillage event on the motorway
- Ensure that additional runoff, stormwater or spillage is not directed onto other roadways outside of the project footprint
- Maintain effective containment and clean-up procedures to contain on-site spills and to dispose of spilt materials and any contaminated materials in an environmentally responsible manner
- Preparation of a Soil and Water Quality Management Plan (SWMP) that would include a monitoring plan for assessing the performance of the operational works in relation to the project specific performance indicators.

### Water quality pollutant reduction targets

The target criteria for Strathfield Municipal Council have been adopted for the operation of the main carriageway, as a large part of the project lies within this LGA and the criteria of other LGA's are either consistent with this or they do not have specific criteria. Part N of the Strathfield Consolidated Development Control Plan 2005 (DCP) (Strathfield DCP) provide clear targets for water quality.

The adopted water quality pollutant reduction targets for the main carriageway are:

- 90 per cent reduction in the post development mean annual load of total gross pollutant (greater than five millimetres)
- 85 per cent reduction in the post development mean annual load of Total Suspended Solids (TSS)
- 60 per cent reduction in the post development mean annual load of Total Phosphorus (TP)
- 45 per cent reduction in the post development mean annual load of Total Nitrogen (TN).

(Strathfield Municipal Council, 2005)

The above pollutant reduction targets are appropriate for consistent use across the main carriageway of the project during operation as they are intended for use in a highly urbanised and modified catchment. The catchments relevant to the project are highly modified and urbanised. The immediate receiving waters are the highly modified concrete-lined canals identified in **section 4.2**.

For all other areas, best practice water quality treatment has been adopted for the construction and operation of the project.

Spill containment is to be included at key locations where there is discharge of stormwater from the main carriageway to identified environmentally sensitive areas i.e Powells Creek and the Badu Mangroves.

### 2.3.2 Construction

#### **Surface works including construction sites**

##### *Preliminary basin sizing and location*

The project incorporates the construction of temporary water quality and spill containment basins at construction sites along the project alignment. The number, location and size of these basins will be confirmed during detailed design. The Homebush Bay Drive civil site basin will be retained for operational usage and will require reconstruction to meet the requirements of an operational basin. The temporary basin will be sited and sized in a similar location to the permanent basin as appropriate, such that post-construction they may be able to be augmented to be used as a stormwater runoff treatment measure during the operational life of the project.

#### **Tunnelling activities**

The project would include the installation and commission of construction water treatment plants to treat tunnel groundwater and dirty construction water at the following tunnelling sites (the final location and design of these plants will be confirmed during detailed design and construction planning):

- Underwood Road civil and tunnel site (C3) discharging to a concrete stormwater canal that forms a tributary of Powells Creek
- Concord Road civil and tunnel site (C5) discharging to a stormwater pipe under Concord Road that ultimately discharges to Canada Bay
- Cintra Park tunnel site (C6) discharging to St Lukes Park Canal located along the eastern side of Concord Oval
- Northcote Street tunnel site (C7) discharging to a stormwater pipe under Parramatta Road that connects to Dobroyd Canal
- Eastern ventilation facility site (C8) discharging to a stormwater pipe that connects into Dobroyd Canal
- Parramatta Road civil site (C10) discharging to a stormwater pipe that connects into Dobroyd Canal.

The water treatment plants (WTPs) would be designed to treat stormwater and groundwater to water quality guidelines within the project environment protection licence (EPL) and may consist of:

- Primary settling tanks/ponds to remove sand and silt sediment fractions and oil and grease
- pH balance/metals oxidation tank, with primary flocculation
- Secondary flocculation tank
- Clarifiers to remove sediment and residual oil
- Sediment dewatering processes
- Inline process and discharge turbidity and pH monitoring with diversion valves to divert out of specification water for retreatment.

### 2.3.3 Operational phase

#### Water quality treatment measures

The following discussion summarises the proposed surface water quality treatment measures proposed by the project. Additional measures proposed within the tunnels to manage water during construction and operation of the project are outlined in the *Groundwater Impact Assessment* (GHD 2015b).

#### *Operational water quality basins*

During the operation of the project, a bio-retention basin of around 500 square metres is proposed at the Homebush Bay Drive interchange (to be confirmed during detailed design). If appropriate, the basin identified in the construction water quality considerations in **section 2.3.2** would be augmented for this purpose.

Proposed locations for permanent sediment basins are as follows:

- Homebush Bay Drive interchange:
  - A water quality basin of an estimated 2,500 square metres (approximate operational sizing), consisting of an estimated 2,000 square metre sediment basin section, will be constructed on the western bank of Saleyards Creek
  - A sedimentation basin of an estimated 300 square metres (approximate operational sizing) will be constructed on the eastern side of Saleyards Creek

Each sediment basin would incorporate a high flow spillway, low flow outlet and spill containment, to be confirmed during detailed design, with the exception of the sedimentation basin treating tunnel drainage, which would not require spill containment as this would be provided within the tunnel stormwater sump.

#### *Grass channels*

Grass channels typically fulfil a stormwater runoff management measure but also provide initial treatment for those areas where the collection of stormwater runoff is discharged directly to an existing local stormwater network. For the project, grass channels are proposed for the diversion of external stormwater runoff away from the motorway. These channels would be designed to manage such stormwater flows during operation but also can provide a secondary function in managing spills which reach these areas prior to discharge into local stormwater reticulation and ultimately the identified waterways.

#### *Gross Pollutant Traps*

To complement the suite of surface water quality management measures proposed for the project as part of the concept design, gross pollutant traps (GPTs) or similar measures are proposed for the following locations.

- Concord Road interchange:
  - Queen Street – near the railway line as a retrofit to the existing stormwater system
  - Alexandra Street – north of the connection to the existing stormwater system
- City West Link/Haberfield interchange:
  - Waratah Street – two outfalls next to the Sydney Water main outlet adjacent to Waratah Street
- Parramatta Road/M4-M5 Link interchange:
  - Bland Street and Chandos Street – ancillary facilities building site just upstream of the connection points to the existing system
- Parramatta Road to existing surface M4 connection at Powells Creek:
  - On the north western side of the connection of the proposed on-ramp and Parramatta Road with an outlet into Powells Creek.

The number and locations will be confirmed during detailed design.

#### *Tunnel water treatment plant*

The management of groundwater water quality extracted from the tunnels during operation includes a water treatment facility located at the Cintra Park operational site. Groundwater seepage in the tunnels will be collected in the groundwater system, which discharges to a sump located near the tunnel low point, and is then pumped from the groundwater seepage chamber in the tunnel sump to the water treatment plant to be located at Cintra Park. The treatment plant will include a balance tank to regulate flows into the plant. The plant will discharge treated water into the stormwater system that leads into the St Luke's Park Canal located adjacent to Cintra Park. Further discussion regarding the operational groundwater treatment facility and the water management requirements for the tunnel sections is provided in the *Groundwater Impact Assessment* (GHD 2015b).

## 3 Assessment methodology

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### 3.1 Key guidelines and policies

#### 3.1.1 Water quality and environmental requirements

Relevant guidelines and environmental requirements specifically related to surface water quality have been considered in this assessment as follows:

- *Managing Urban Stormwater: Soils and Construction* (Landcom 2004), Volume 1 and Volume 2
- *Soil and Landscape Issues in Environmental Impact Assessment* (DLWC 2000)
- *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council (ANZECC), 2000a)
- *Australian and New Zealand Guidelines for Water Quality Monitoring and Reporting* (ANZECC, 2000b)
- *Australian Runoff Quality* (Institute of Engineers Australia 2005).

In addition, the following policies and legislation relevant to the management of surface water quality will need to be referenced during detailed design, construction and operation of the project:

- Water management:
  - *Water Management Act 2000*
  - *Water Act 1912*
- Stream ecology and riparian management:
  - *Controlled Activities – Guidelines for Riparian Corridors* (NOW 2011a)
  - *Controlled Activities – Guidelines for Laying Pipes and Cables in Watercourses* (NOW 2011b)
  - *Controlled Activities – Guidelines for Watercourse Crossings* (NOW 2010a)
  - *Controlled Activities – Guidelines for Instream Works* (NOW 2010b)
  - *Controlled Activities – Guidelines for Outlet Structures* (NOW 2010c)
  - *NSW Office of Water Guidelines for Controlled Activities on Waterfront Land* (2012)
  - *Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003a)
  - *Guidelines for Design of Fish and Fauna Friendly Waterway Crossings* (Fairfull and Witheridge 2003b)
  - *Fisheries Management Act 1994*
  - NSW State Rivers and Estuaries Policy (NSW Water Resources Council 1993).

#### **Water Management Act 2000**

The *Water Management Act 2000* (WM Act) controls the extraction of and use of water, the construction of works such as dams and weirs, and the carrying out of activities in or near water sources in NSW. It provides for the implementation of water sharing plans that establish rules for sharing a water resource while taking into account the environmental need of the resource. The project footprint is covered by the *Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2011* and the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011*.

Section 56 of the WM Act establishes access licences to take water from a water source. Roads authorities are exempt from the requirement to obtain a water access licence under clause 2, Schedule 5 of the *Water Management (General) Regulation 2011* (NSW).

Under section 89 of the WM Act a water use approval is required to use water taken from a water source that is covered by a water sharing plan. As discussed above, roads authorities are currently exempt from the need for a water access licence. In accordance with clause 31(1) of the *Water Management (General) Regulation 2011*, Roads and Maritime is also therefore exempt from requiring a water use approval.

Under section 90 of the WM Act, a water management work approval is required for a water supply work, a drainage work or a flood work. The project does not involve any of these and approval is therefore not required.

The project involves works within 40 metres of a number of watercourses. These works are therefore a 'controlled activity' in accordance with the WM Act and a controlled activity approval under section 91 of the WM Act would be required. Clause 38 of the *Water Management (General) Regulation 2011* (NSW) exempts public authorities from the need for a controlled activity approval.

### 3.1.2 Local council requirements

The project travels through five LGAs, as mentioned in **section 1.1**. The relevant council guidelines and policies that have been considered in this assessment are:

- Strathfield Municipal Council Stormwater Management Code (Strathfield Council 1994)
- Part N of Strathfield Consolidated Development Control Plan 2005 – Water Sensitive Urban Design (WSUD) (Strathfield Municipal Council 2005)
- City of Canada Bay Specification for the Management of Stormwater (City of Canada Bay Council 2009 revision)
- Burwood Development Control Plan (Burwood Council 2013)
- Burwood Council Stormwater Management Code (Burwood Council 1994)
- Ashfield Council Stormwater Management Policy (Ashfield Council 1998 amendment)
- Auburn City Council Development Control Plan (Auburn City Council 2010).

## 3.2 Water quality objectives

The NSW Water Quality Objectives (NSW Government 2014b) are the agreed environmental values and long-term goals for NSW's surface waters. They set out:

- The community's values and uses for rivers, creeks, estuaries and lakes (ie healthy aquatic life, water suitable for recreational activities like swimming and boating, and drinking water)
- A range of water quality indicators to help assess whether the current condition of waterways supports those values and uses

Water quality objectives have been agreed for fresh and estuarine surface waters and for marine waters.

The objectives are consistent with the agreed national framework for assessing water quality, set out in the Australian and New Zealand *Guidelines for Fresh and Marine Water Quality* (the Water Quality Guidelines, ANZECC/ARMCANZ 2000a). While the Water Quality Objectives provide environmental values for NSW waters, the Water Quality Guidelines provide the technical guidance to assess the water quality needed to protect those values.

The SEARs for the project require the assessment of water quality impacts to have reference to relevant public health and environmental water quality criteria, including those specified in the Water Quality Guidelines, applicable regional, local or site specific guidelines and any licensing requirements.

The Water Quality Guidelines include default trigger values and stressors for slightly disturbed ecosystems in south-east Australia. Trigger values are used to assess the risk of adverse effects due to nutrients, biodegradable organic matter and pH in various ecosystem types. Data is derived from trigger values supplied by Australian states and territories. **Table 3.1** presents these default trigger values applicable to NSW (note this table has been adapted from the original to present those relevant NSW figures only).

**Table 3.1 Default trigger values for physical and chemical stressors for south-east Australia for slightly disturbed ecosystems**

Ecosystem type	Chl a (µg L <sup>-1</sup> )	TP (µg P L <sup>-1</sup> )	FRP (µg P L <sup>-1</sup> )	TN (µg N L <sup>-1</sup> )	NOx (µg N L <sup>-1</sup> )	NH4+ (µg N L <sup>-1</sup> )	DO (saturation) (d)		pH	
							Lower limit	Upper limit	Lower limit	Upper limit
Upland River	na (a)	20	15	250	15	13	90	110	6.5	7.5 m
Lowland River (b)	5	50	20	500	40	20	85	110	6.5	8.0
Freshwater Lakes and Reservoirs	5	10	5	350	10	10	90	110	6.5	8.0 m
Wetlands	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
Estuaries	4	30	5	300	15	15	80	110	7.0	8.5
Marine	1	25	10	120	5 (c)	15 (c)	90	110	8.0	8.4

Note – The table has been modified to present the NSW figures only while still retaining sufficient information to provide context for the table and project. Not all information presented in the table is specifically relevant to the project.

na = not applicable

(a) = monitoring of periphyton and not phytoplankton biomass is recommended in upland rivers — values for periphyton biomass (mg Chl a m<sup>-2</sup>) to be developed

(b) = values are 3 µg L<sup>-1</sup> for Chl a, 25 µg L<sup>-1</sup> for TP and 350 µg L<sup>-1</sup> for TN for NSW & Vic. east flowing coastal rivers

(c) = values of 25 µg L<sup>-1</sup> for NOx and 20 µg L<sup>-1</sup> for NH4+ for NSW are elevated due to frequent upwelling events

(d) = dissolved oxygen values were derived from daytime measurements. Dissolved oxygen concentrations may vary diurnally and with depth. Monitoring programs should assess this potential variability

(m) = values for NSW upland rivers are 6.5–8.0, for NSW lowland rivers 6.5–8.5, for humic rich Tas. lakes and rivers 4.0-6.5

Chl a = chlorophyll a, TP = total phosphorus, FRP = filterable reactive phosphate, TN = total nitrogen, NOx = oxides of nitrogen, NH4+ = ammonium, DO = dissolved oxygen.

(Source: ANZECC/ARMCANZ 2000a)

It should be noted that these guidelines are intended for slightly disturbed ecosystems and the surrounding environment for the project is arguably highly disturbed. Therefore, these guidelines are conservative for this project. In consideration of this, and consistent with the SEARs requirement to give reference to applicable local guidelines, the Strathfield Municipal Council water quality pollutant reduction targets as specified in Part N of the Strathfield DCP are intended for consideration in an urbanised environment. Further information on the pollutant reduction targets is provided in **section 2.3.1**.

### 3.3 Methodology

Surface water quality assessments have been undertaken in relation to the existing environment and the potential impact of the proposed construction works and operation of the project. Potential impacts include:

- Impacts on surface stormwater quality from the construction activities of the project
- Impacts on existing watercourse and receiving environments in terms of potential changes in water quality during the operational phase of the project

To satisfy the requirements of the SEARs, the following tasks were undertaken:

- Collation and review of existing documentation relevant to the project, including:
  - Water quality requirements, constraints, targets, etc
  - Existing water quality data
  - Existing data on prior waterway assessments
  - GIS mapping (topography, cadastral, soil landscapes)
  - Rainfall and climate data
  - Concept design plans
  - Soil data
- Identification of the objectives, guiding principles and requirements for the assessment of surface water quality
- Review of existing environment:
  - Environmental setting
  - Sensitivities of receiving environment
  - Identification of high risk areas
  - Topography
  - Drainage network and existing water quality treatment measures
  - Catchments and connectivity (surface flow and piped connections)
  - Soil landscapes and geology
  - Acid sulfate soils
  - Soil salinity
  - Existing water quality.
- An identification and assessment of potential water quality impacts from the project. This is based on consideration of typical impacts for a project such as the M4 East and also potential impacts that are specific to the project during both construction and operation phases
- Review of construction impacts including:
  - Impact on existing drainage network and water quality treatment measures
  - Potential for erosion and sedimentation impacts from surface works
  - Potential impacts from spoil handling, transport and stockpiling
  - Potential impacts from works in riparian areas
  - Potential impacts from spills
  - Potential impacts from demolition works
- Construction phase mitigation measures including:

- Water quality objectives
- Identification of mitigation measures
- Implementation and monitoring (water quality monitoring framework)
- Erosion and sediment control
- Preliminary sediment basin sizing and location
- Stockpile sites management
- Haul roads management
- Management of works in riparian areas
- Management of spills
- Management of water from tunnel excavation
- Management of potential impacts from demolition works
- Review of operational phase impacts, including:
  - Impacts from surface infrastructure
  - Stormwater runoff quality
  - Potential impact from spills
  - Erosion and sedimentation impacts
  - Potential impact of infrastructure near riparian areas
  - Impact of permanent infrastructure on existing drainage network and water quality treatment measures
  - Impacts from increased impervious/paved areas
  - Impacts from tunnel infrastructure:
    - Stormwater runoff
    - Impacts from tunnel washing
    - Impacts from firefighting
    - Impacts from spills
    - Impacts from dangerous goods
- Operational phase mitigation measures:
  - Water quality objectives
  - Water quality treatment measures
  - Erosion and sediment control
  - Treatment and handling of tunnel generated water due to operations
  - Management of spills, wash-down water, road surface runoff, etc from tunnel and surface works
  - Management of surface water runoff from above ground infrastructure
  - Implementation and monitoring (water quality monitoring framework).

## 4 Existing environment

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### 4.1 Environmental setting

The project footprint is aligned parallel to the southern sections of the Parramatta River estuary. The land use of the surrounding area is predominantly residential and commercial with an undulating topography. The catchments relevant to the project generally drain in a north to north-easterly direction (see **Figure 4.1**), through the southern parts of the Parramatta River estuary catchment and ultimately discharge into Sydney Harbour.

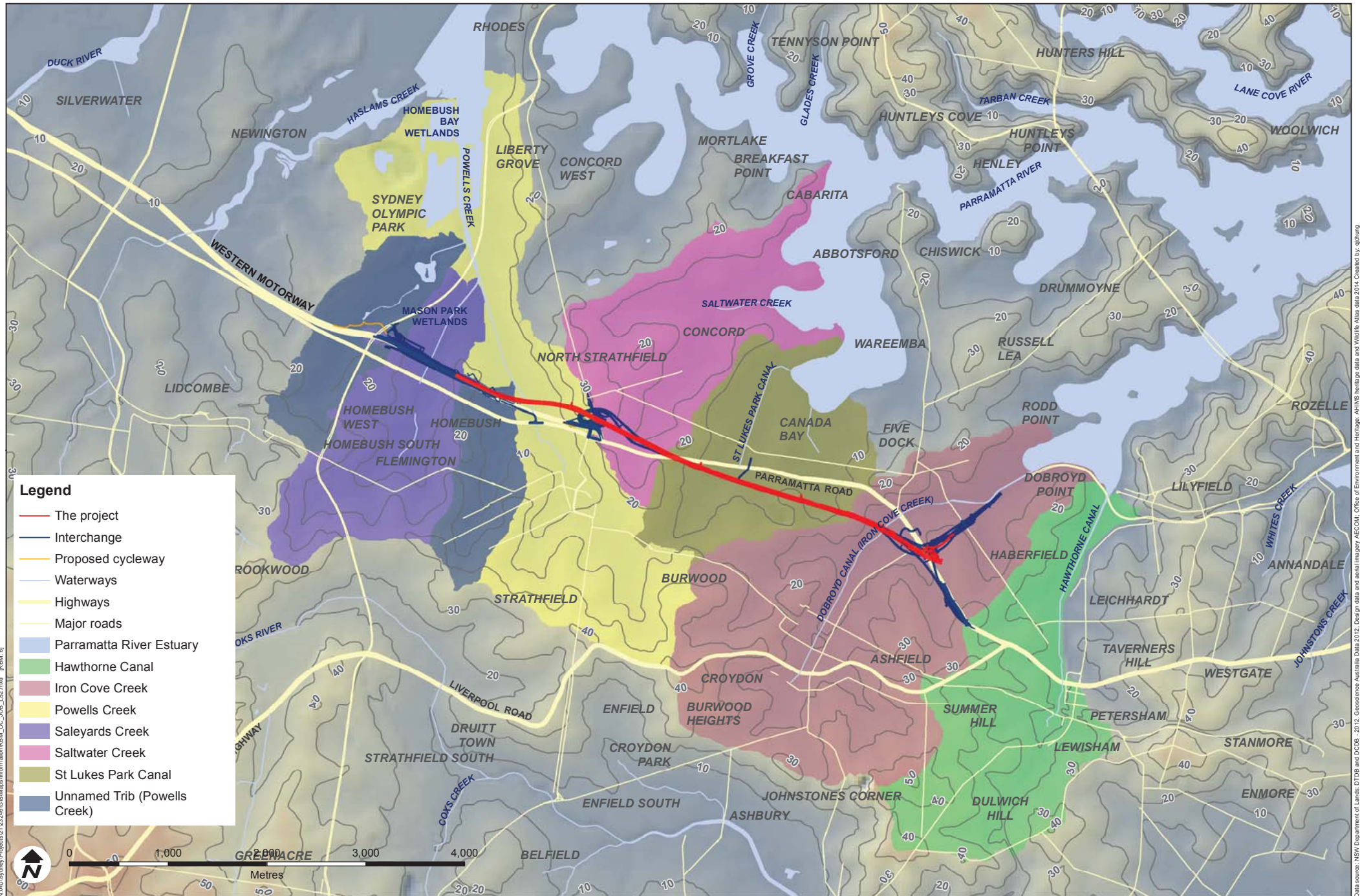
The predominant environmental features of the project footprint are:

- Four waterways that cross the proposed road alignment and discharge into the Parramatta River estuary, with a fifth waterway close to the project footprint (see **section 4.2**)
- Four of the aforementioned waterways (Saleyards Creek, Powells Creek, St Lukes Park Canal and Dobroyd Canal (Iron Cove Creek)) have associated riparian environments (of variable quality) that cross the proposed alignment (see **section 4.2**)
- A Nationally Important Wetland that is included in the Australian Government Protected Areas register at the downstream end of Powells Creek
- Two pockets of low probability acid sulfate soils (ASS) and one unknown pocket within the relevant sub-catchments
- Existing water quality in the Parramatta River that is often unsuitable for primary contact recreation.

Further detail on the environmental setting and key features is provided in the following sections.

### 4.2 Waterways

The proposed project will include above ground and tunnelling works that cross four main waterways and their associated catchments, with a fifth waterway close to the project footprint (see **Figure 4.1**). The total catchment area relevant to the proposed alignment is approximately 1,553 hectares.



**Legend**

- The project
- Interchange
- Proposed cycleway
- Waterways
- Highways
- Major roads
- Parramatta River Estuary
- Hawthorne Canal
- Iron Cove Creek
- Powells Creek
- Saleyards Creek
- Saltwater Creek
- St Lukes Park Canal
- Unnamed Trib (Powells Creek)

Figure 4.1 Waterways and catchment plan

Data source: NSW Department of Lands, DTDB and DCDB - 2012. Geosource Australia Data 2012. Design data and aerial imagery: AECOM; Office of Environment and Heritage; ANHS heritage data and Wildlife Atlas 2014. Created by: gfhng

### 4.2.1 Saleyards Creek

Saleyards Creek is a concrete-lined channel originating from Rookwood Cemetery and flowing in a northerly direction past Airey Park, underneath the M4 to Bressington Park, where it joins the Powells Creek channel at Mason Park. The tributary flows parallel to Homebush Bay Drive. The project is approximately 2.4 kilometres upstream of the Parramatta estuary at this waterway.

Saleyards Creek has a highly urbanised riparian corridor at the point where it is crossed by the project. The riparian corridor is a highly modified environment, consisting predominantly of commercial landuses and related impervious surfaces and pockets of localised vegetation.

### 4.2.2 Powells Creek

Powells Creek is predominantly a concrete-lined channel that flows through the suburbs of Strathfield and Concord, discharging into the Parramatta River via Homebush Bay. The creek flows parallel to the Northern rail line and adjacent to Powells Creek Reserve, Mason Park, Bicentennial Park and the Sydney Olympic Park precinct. The downstream reaches of the creek flow through the Badu Mangroves area, which has been identified as a Nationally Important Wetland in the Australian Government Protected Areas register. The project is approximately 2.7 kilometres upstream of the Parramatta River estuary at this waterway.

Powells Creek has a highly urbanised riparian corridor at the point where it is crossed by the project, for the proposed M4 on-ramp from Parramatta Road. The riparian corridor is a highly modified environment, consisting predominantly of commercial landuses and related impervious and grassed surfaces, with localised pockets of trees.

### 4.2.3 St Lukes Park Canal

The unnamed channel that flows through St Lukes Park at Concord is a concrete-lined channel that originates at Parramatta Road. The channel flows adjacent to Concord Oval, between St Lukes Park and Cintra Park before discharging into Canada Bay north of the western arm of Barnwell Park Golf Club. For ease of reference, this document refers to this canal as the St Lukes Park Canal. The project is approximately 1.4 kilometres upstream of the Parramatta River estuary at this waterway.

St Lukes Park Canal is piped at the point where it is crossed by the mainline tunnels. Adjacent to Cintra Park, the riparian corridor comprises grassland with scattered trees.

### 4.2.4 Barnwell Park Canal

Another unnamed concrete channel discharges into Kings Bay, just south of Canada Bay. While the open canal does not cross the project alignment, this channel is of relevance as it emerges at the intersection of William Street and Kings Road in Five Dock (within the zone of downstream influence of the project), from where it flows north alongside the Barnwell Park Golf Course to Kings Bay. For ease of reference, this document will refer to this canal as the Barnwell Park Canal. The project is approximately 2.1 kilometres upstream of the Parramatta River estuary at this waterway.

### 4.2.5 Dobroyd Canal (Iron Cove Creek)

Dobroyd Canal (also known as Iron Cove Creek) is the eastern-most of the five waterways relevant to the project. This canal drains parts of the inner west suburbs of Ashfield, Burwood, Haberfield, Croydon, Drummoyne and Canterbury (Cardno Lawson Treloar 2008). This waterway is of importance to the project as the canal crosses the project footprint and then runs parallel to the Wattle Street interchange before discharging into Iron Cove. The project is approximately 1.6 kilometres upstream of the Parramatta River estuary where it crosses this waterway.

Dobroyd Canal has a highly urbanised riparian corridor at the point where it is crossed by the mainline tunnels. At Reg Coady Reserve, adjacent to the Wattle Street and Walker Avenue civil site, the riparian corridor comprises grassland with scattered trees.

### 4.3 Topography

The project footprint is contained within the Parramatta River catchment and is located in low relief landscape, with elevations generally below 20m Australian Height Datum (AHD) and slopes less than five per cent. Elevated sections of the existing motorway (between Homebush Bay Drive, Homebush and Concord Road, North Strathfield) elevate the road surface over creeks, roads and other infrastructure (M4 East Homebush Bay Drive to Parramatta Road and City West Link State Significant Infrastructure Application Report, RMS 2013).

The topography of the sub-catchments surrounding the project footprint is predominantly undulating. The upstream extents of the sub-catchments are at approximately 40 to 50 metres elevation, down to between 10 and 20 metres elevation where they cross the project footprint alignment.

The principal topographic features of the lower Parramatta River catchment are shown on **Figure 4.2** and include:

- Low relief landscape along the river foreshores (downstream of the project)
- The lowest lying areas (less than 10 metres elevation) are around Homebush Bay and Millennium Parklands, Camellia, Rosehill and further along the Duck River to South Granville. The North Strathfield/Concord West region is also low lying at less than 10 metres elevation
- The highest elevation points in the upper catchment are approximately 120 metres elevation and are located along a ridgeline in the Baulkham Hills LGA in the vicinity of North Rocks and West Pennant Hills
- The highest points to the north of the Parramatta River are generally around 120 metres while the highest points to the south are approximately 40 metres in elevation.

(Cardno Lawson Treloar 2008)

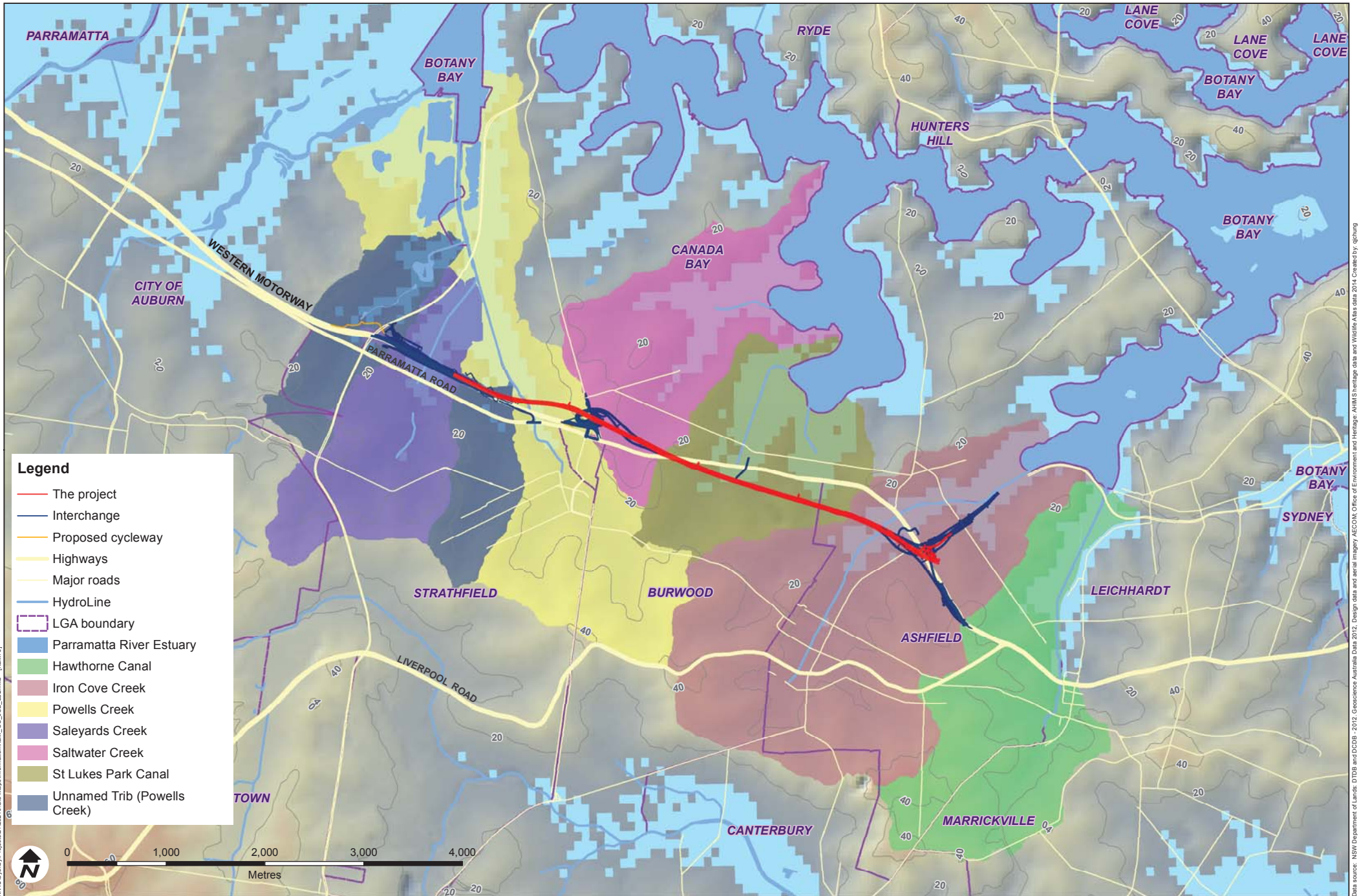


Figure 4.2 Predominant topographic features plan

## 4.4 Rainfall and climate

The waterways identified in **section 4.2** are predominantly stormwater drainage channels. Climate is a dominant factor in the behaviour of these waterways, with rainfall and evaporation being the most significant processes.

Generally, the climate of the local area is warm and temperate with wet, humid summers and mild, dry winters (Cardno Lawson Treloar 2008).

Further information on the rainfall and climate characteristics relevant to the project are provided in the *Surface water: Flooding and Drainage* report (Lyall and Associates 2015), prepared as part of the EIS.

## 4.5 Soil landscapes and geology

The project footprint is generally aligned parallel to the Parramatta River over a distance of approximately seven kilometres. The project footprint is generally aligned parallel to the Parramatta River over a distance of approximately seven kilometres. The 1:100 000 Sydney Basin geology map (NSW Department of Mineral Resources 1983) indicates the surface geology of the study area primarily consists of Triassic-aged Ashfield Shale deposits, which comprise shallow marine sediments characterised by black to dark grey shale and laminite, and some sandstone beds. Below this geology, Hawkesbury Sandstone is the predominant geological group through which the tunnel is planned to be constructed. Further details of the underlying geology in the project footprint are provided in the *Groundwater Impact Assessment* (GHD 2015b).

Pockets of silty quartz sand, silt, and clay, ferruginous and humic cementation in places are also found along the proposed alignment. Three soil landscapes (Birrong, Blacktown and Disturbed) are encountered across the project footprint (refer to **Figure 4.3**). The predominant soil type in the Parramatta River catchment is the Blacktown landscape. The character of these residual soils is moderately reactive highly plastic subsoil, low soil fertility and poor soil drainage.

There is the potential for portions of the project footprint to be reclaimed land or landfill and consequently classified as a disturbed soil. Soil landscape classes are generally classified for the project footprint as 'Residual' (RMS 2013).

Disturbed soils are also a feature of the study area. This is particularly apparent along the Parramatta River estuary margins, where nearshore areas have been reclaimed for human usage in a number of locations (Cardno Lawson Treloar 2008).

### 4.5.1 Acid sulfate soils

ASS are widespread among low lying coastal areas of NSW, in estuarine floodplains and coastal lowlands. Based on the results in the Soil and Land Contamination Assessment report, there is a low likelihood of ASS across the project footprint, and a low likelihood of widespread ASS in the area between Broughton Street, Concord and Iron Cove Creek in Croydon (GHD 2015a). Generally, ASS has the potential to be associated with areas mapped as 'disturbed terrain'. Disturbed terrain may include filled areas, which often occur during reclamation of low lying swamps for urban development. Other disturbed terrain includes areas which have been mined or dredged, or have undergone heavy ground disturbance through general urban development or construction of dams or levees. Soil investigations are required to assess these areas for acid sulfate potential. Disturbed terrain has been identified in the vicinity of Bedford Road and Verley Drive at Homebush, and in the vicinity of Concord Oval at Burwood and Wattle Street at Haberfield as shown on **Figure 4.3**. The assessment identifies that these areas of disturbed terrain could have the potential for ASS; however, the results of soil testing at Homebush and Concord Oval suggest that there is a low likelihood of widespread ASS. Further information on the potential location of ASS can be found in the *Soil and Land Contamination Assessment* report (GHD 2015a).

The NSW Department of Natural Resources Natural Resource Atlas provides information on the probability of the occurrence of ASS within the wider Parramatta River estuary catchment area. Small pockets of foreshore lands throughout the area are affected, with soils identified as having a high probability of occurrence for ASS. The estuary bed itself has also been identified as having a low probability of ASS.

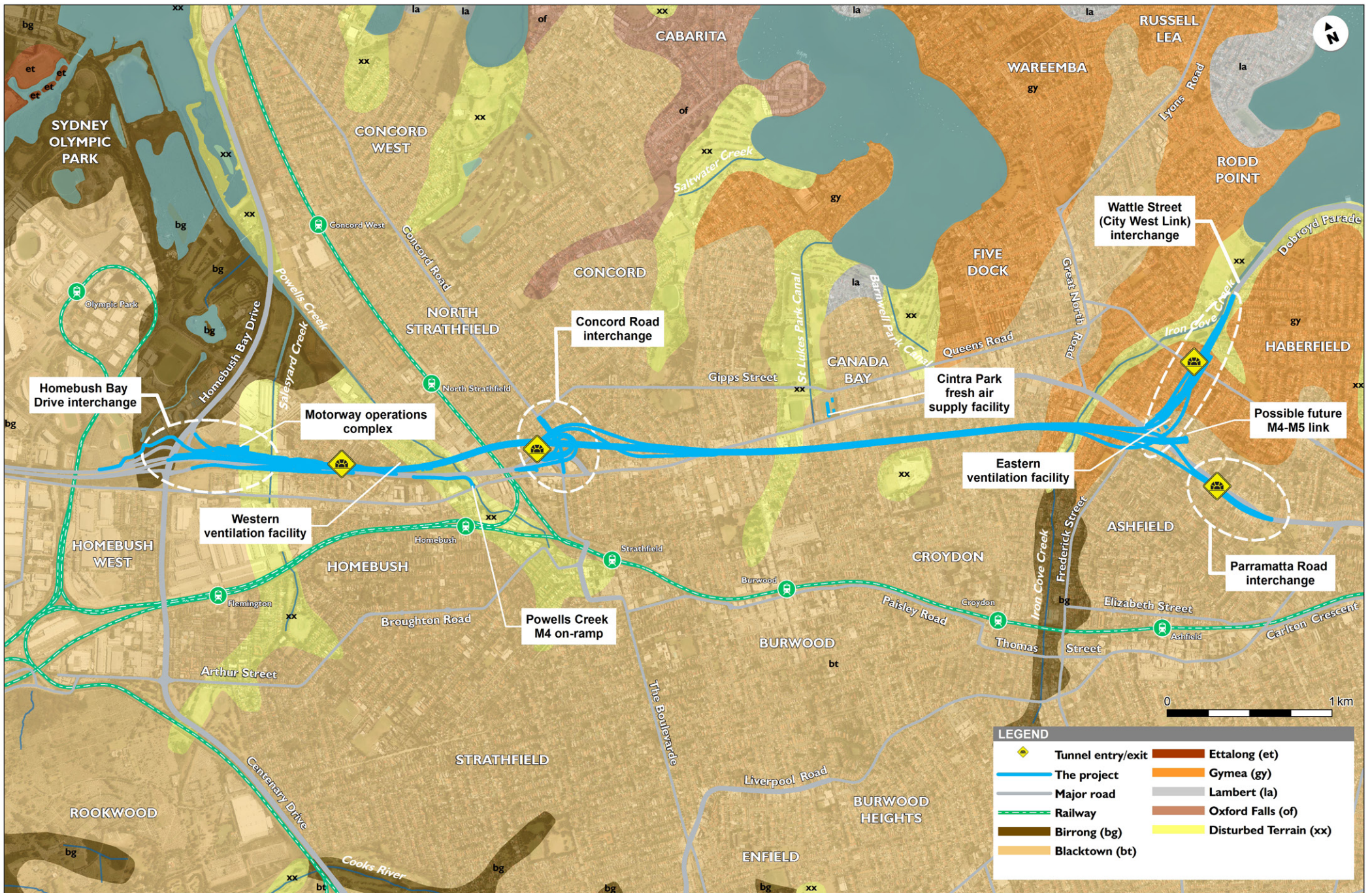


Figure 4.3 Published soils along the project alignment

## 4.5.2 Soil salinity

Saline soils and groundwater are a natural part of the Australian landscape, and land management practices are now increasingly recognised as significant contributors to the expansion of salt affected areas. In particular, urban salinity is increasingly occurring around populated areas due to clearing and site development.

Salinity occurs when salts found naturally in the soil or groundwater are mobilised. Capillary rise and evaporation concentrate the salt on, and close to, the ground surface. Urban salinity becomes a problem when the natural hydrogeological balance is disturbed by human interaction. This may occur in urban areas due to changes to the water balance, increases in the volume of water into a natural system altering subsurface groundwater flows and levels, exposure of saline soils, and removal of deep rooted vegetation reducing rates of evapotranspiration. Even small changes in sensitive areas can result in the balance being irreversibly altered and salinisation occurring.

Salinity is part of the natural landscape of the Parramatta River sub-catchments with salt being found in the rocks, soils and the estuarine sections of the sub-catchments. These salts can potentially be mobilised during construction works.

## 4.6 Sensitivities of receiving environment

The ultimate receiving environment for stormwater runoff from the project is the Parramatta River estuary. The four identified waterway channels discharge into the estuary and are all concrete-lined and, with the exception of the downstream end of Powells Creek, have little riparian vegetation.

The Parramatta River estuary water quality processes are dominated by the catchment inputs from the major waterways and waterside catchments discharging into the estuary, tidal fluctuation and oceanic processes, and in-estuary processes including biological interactions with sediments and the atmosphere. The sources of inflow are both point and diffuse.

The Cardno Lawson Treloar (2008) data collection study found that the water quality within the estuary is poor, with only limited areas of the Parramatta River estuary considered suitable for secondary contact. Human activities have resulted in elevated levels of nutrients and gross pollutants entering the estuary. Sediment contamination due to urbanisation and industrialisation of the catchment has also had an impact on water quality within the estuary. Extensive alteration of the estuarine foreshore has limited tidal flushing in some areas, further reducing the water quality (Cardno Lawson Treloar 2008).

A sensitive receiving environment of note for these watercourses is the Homebush Bay wetlands mangrove area at the downstream end of the Powells Creek channel (**Figure 4.1** identifies the location of these wetlands). Saleyards Creek also discharges into Powells Creek.

## 4.7 Overland flows

The assessment of surface water quantity including flooding and overland flows has been addressed in the *Surface Water: Flooding and Drainage* report prepared for the EIS by Lyall and Associates (2015).

## 4.8 Existing water quality

The water quality of the creeks relevant to the project is largely influenced by stormwater, aquatic weeds and erosion of the catchment upstream. High pollutant loads including cadmium, copper and zinc have been recorded in Powells Creek (WDA 2013).

A number of studies have been conducted on stormwater quality and the Parramatta River water. These studies were summarised and assessed in terms of the water quality implications for the Parramatta River estuary in the Lower Parramatta River Stormwater Management Plan (Woodlots and Wetlands) 1999, cited in Cardno Lawson Treloar (2008).

The Lower Parramatta River Stormwater Management Plan provided a detailed discussion of Dobroyd Canal (Iron Cove Creek) and Hawthorne Canal. The study also provided a summary of key catchment issues relating to stormwater quality. It was found that the types of pollutants entering the Lower Parramatta River depend on land use. In highly urbanised areas, such as along Iron Cove Creek and Hawthorne Canal, large amounts of faecal material and dissolved nutrients were recorded. This suggests inputs from sources such as sewer overflows, sewer leaks and animal faeces (Woodlots and Wetlands et al 1999, cited in Cardno Lawson Treloar 2008).

Hawthorne Canal and Dobroyd Canal contain high levels of heavy metals, predominantly from cars and runoff from roads (Birch and Scollen 2003; Barry et al. 1999; Barry et al. 2000, cited in Cardno Lawson Treloar 2008). Sydney Water previously proposed a sand filter within Dobroyd Canal to treat the heavy metals. However, the project was never initiated due to public objection and an inability to reach agreement on funding arrangements.

#### 4.8.1 Parramatta River estuary

Water and sediment quality within the estuary is generally poor, largely due to polluted stormwater runoff (Cardno 2012).

There has been a significant increase in the impervious area within the catchments that contribute to the estuary and this has resulted in an increase in the stormwater runoff from the catchments. The increase in impervious area can be attributed to infrastructure and buildings constructed in place of once vegetated or green open space areas. The reduction in pervious area results in the runoff from the catchments reaching the estuary quicker than previously and can cause erosion and the transportation of sediment as a result. The reduction in pervious area also reduces the likelihood of pollutants and sediments, transported in the stormwater runoff, to settle or deposit out before entry into the estuary or contributing waterways. It should be noted that the channelisation through concrete lined waterways mitigates against erosive processes in these channels but reduce the ability for sediments to be deposited from upstream catchments prior to discharge into the estuary.

The sources of pollutants discharging to the Parramatta River estuary are both point and diffuse. Point sources are generally specific locations such as industrial sites, wastewater overflows or historically contaminated sites within the catchment. Diffuse sources are generally more difficult to manage and can come from illegal dumping or spills and land use activities such as littering or fertiliser use. These sources are all relevant for the Parramatta River estuary and the waterways that provide the conduit of stormwater runoff from the sub-catchments to the estuary.

#### **Pollutants**

There are a large number of sources of pollutants from urban areas in the Parramatta River estuary catchment (Cardno 2012), such as:

- Nutrients, eg from fertilisers and cleaning products
- Heavy metals, eg from some industrial sites and roads
- Organochlorine (such as dichlorodiphenyltrichloroethane (DDT)) and organophosphate pesticides
- Polycyclic aromatic hydrocarbons (PAHs) associated with heavy industry/combustion
- Phenols used in industrial chemical synthesis
- Sewage from sewer overflows.

Based on data collected under the Office of Environment and Heritage (OEH)'s Harbourwatch program, water quality in the estuary is often unsuitable for primary contact recreation due to high faecal coliform counts (Cardno Lawson Treloar (2008) cited in Cardno 2012). This is believed to result from faecal coliforms entering the estuary in stormwater runoff from the catchment or sewer overflows, which can result in water quality issues in certain bays where rates of tidal flushing are low. Overall there are only limited areas of the Parramatta River estuary that are considered suitable for primary and secondary contact recreational activities (Cardno Lawson Treloar (2008) cited in Cardno 2012).

Water quality data collected by Sydney Water from the Parramatta River estuary includes monitoring of the following parameters:

- Dissolved oxygen
- pH
- Nitrogen (total nitrogen and biological available forms: ammonia, nitrates/nitrites)
- Phosphorous (total phosphorous and biologically available filterable reactive phosphorous)
- Chlorophyll a
- Faecal coliforms and enterococci.

As discussed in the Sydney Harbour Catchment Water Quality Improvement Plan: Data Compilation and Review (cited in Cardno 2012), an analysis of the data indicates that average concentrations of these water quality parameters exceed the ANZECC (2000a) aquatic ecosystem health guidelines for south-east Australian estuaries. Particular hotspots include Duck River and the Silverwater Bridge area, upstream of the project. The exception is for pH, for which the average values are in the acceptable range (Cardno 2012).

### **Sedimentation**

Ongoing erosion and sedimentation is a natural process in the Parramatta River estuary catchments. The increased urbanisation of the catchments results in an increased mobilisation of these sediments during rainfall events.

The Data Compilation and Review Study (Cardno Lawson Treloar 2008) found that there was limited information on rates of sedimentation in the estuary. Investigation of this issue is also complicated by the history of dredging and reclamation works that have been conducted in the estuary.

Historical accounts suggest very high rates of sedimentation during the early development of the catchment but more recent analysis of sediment cores suggests a rate of sedimentation of between 1.5 and 3.5 mm a year over the last 150 to 200 years, which is generally on par with other similar estuaries types of a less disturbed nature in NSW (Geoscience Australia 2012, cited in Cardno 2012).

The construction of canals, weirs and similar features has probably reduced the amount of sediment that can reach the estuary from the lower catchment. However, erosion and sedimentation may continue to occur from the upper catchment or from natural creek lines. As previously discussed, sediments introduced to the waterway can have a negative impact on local water quality and estuarine habitats (eg seagrass) (Cardno 2008).

#### **4.8.2 Pre-construction baseline sampling**

A water quality monitoring program has been established to determine the current baseline for water quality in the waterways that may potentially be impacted by the project. The results of the initial two rounds of pre-construction baseline surface water quality sampling conducted in June and July 2015 indicates that:

- Generally the existing nutrient loading in the monitored waterways exceeded the ANZECC Guidelines
- Petroleum hydrocarbons were only detected at one site (BAR1) in June 2015 (C15-C28 at 170 µg/L and C29-C36 at 260 µg/L) and at one site (DOB2) in July 2015.
- Concentrations of heavy metals copper and zinc exceeded the ANZECC Guidelines at all sites in July 2015. In June 2015, in about half the locations sampled, the concentrations of these heavy metals exceeded the ANZECC Guidelines limits. No traces of heavy metals were detected at the other sites in June 2015
- Suspended solid readings generally decreased slightly in July 2015 compared with the results from June 2015

- Between June and July 2015, a general increase in pH levels was noted (however two locations decreased in pH slightly)
- Turbidity levels at all locations are generally within ANZECC Guidelines.

Further information on this monitoring program is provided in **section 7.1.4**.

## 4.9 Drainage network

The stormwater drainage network controls stormwater flows for the smaller storm events throughout the LGAs relevant to the project footprint. This network manages stormwater flows predominantly from the roads and impervious areas of the catchments before discharging them into the Parramatta River estuary, in some instances via waterways and canals.

It is expected that the age or quality of these stormwater drainage assets is commensurate with the buildings and houses in the area and therefore, in some areas, the assets are potentially nearing or at the end of their design life.

There are numerous crossings of drainage networks across the proposed road alignment. This is of particular relevance for those areas of the project footprint where the proposed road works are at or near the surface ie the western and eastern ends of the project, interchanges, cut-and-cover sections and tunnel portals.

## 4.10 Existing water quality treatment measures

### 4.10.1 Gross pollutants

It is the responsibility of councils within the Parramatta River estuary catchment area to monitor and manage gross pollutants that may become entrained in stormwater and make their way to the estuary.

Gross pollutants are not only aesthetically unappealing, but also affect water quality where degradation occurs. Given the urbanised nature of the catchment and based on observations made, it is apparent that litter and floatables contribute significantly to water quality issues in the Parramatta River estuary.

Water quality improvement devices have been incorporated into the stormwater system at a number of locations within the wider project area to reduce the amount of gross pollutants entering the estuary from stormwater drainage.

Council proposes to install a GPT at Powells Creek, within the Strathfield LGA, and will be located in the catchment area downstream of the project.

Within the Ashfield LGA, litter booms are located at either end of the Dobroyd Canal, and are maintained by Sydney Water and Roads and Maritime. In addition, there are approximately three GPTs in use around Iron Cove. No other information was available on the locations, number or type of water quality treatment devices in the local area (Cardno Lawson Treloar 2008). In addition to the onshore litter collection devices, Roads and Maritime also has a water-based litter collection program for the Parramatta River estuary.

Sydney Water owns and maintains a number of stormwater quality improvement devices within the area, such as:

- A boom with central net at Saleyards Creek, Powells Creek catchment
- Rocla CleansAll GPTs (two units) at Gipps Street, Concord, Hen and Chicken Bay catchment
- Bandalong Boom, Dobroyd Canal, Iron Cove Bay catchment.

City of Canada Bay Council monitors the gross pollutants collected from major GPT located within its LGA. **Table 4.1** shows the total volumes of gross pollutants collected from GPTs relevant to the project.

**Table 4.1 Volumes of gross pollutants collected from GPTs within the Canada Bay LGA 2004-2012**

Site	Locations	Year			
		2004-2005 (tonnes)	2005-2006 (tonnes)	2006-2007 (tonnes)	2011--2012 (tonnes)
1	Barnstaple Road, Five Dock	11.3	6.9	7.6	4.3
2	Duchess Avenue/Noble Street, Five Dock	8.2	3.6	6.8	2.9
3	Barnwell Park Golf Course, Canada Bay	n/a	n/a	1.2	0
4	Massey Park Concord	72.4	13.6	111	112.6
5	Cabarita Park, Cabarita	N/A	N/A	N/A	1.0
6	Brett Park, Drummoyne	N/A	N/A	N/A	7.0
7	Henley Street, Drummoyne	N/A	N/A	N/A	5.3
8	Rhodes Park, Concord West	N/A	N/A	N/A	2.8
9	Lovedale Place, Concord West	N/A	N/A	N/A	2.2

Source: City of Canada Bay Council website (accessed July 2015)

#### 4.10.2 Sedimentation and water quality treatment basins

Enquiries were made with the councils relevant to the project requesting additional information on stormwater quality treatment measures and devices within each respective LGA. The inquiries did not reveal the presence of any additional sediment and/or water quality treatment basins along the project footprint.

#### 4.10.3 Creek naturalisation

Sydney Water is naturalising the creek and riverbed in Powells Creek. The work will involve the removal of the current concrete channel lining and replacement with banks stabilised with native plants, trees and rocks. Works are currently in the detailed design phase and the specific area of the naturalisation or construction timeframe are unknown at present. It is understood that the naturalisation works area is downstream of the project and beyond the construction footprint.

## 5 Assessment of construction impacts

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The construction of the project has the potential to impact on the surface water quality of the area and also the water quality of the receiving waterways downstream. The following section describes these potential construction impacts, the activities that are expected to cause the impacts and those areas of the project and downstream that are expected to be affected. Comment is also included on the impacts associated with the erosion of soils and resultant sedimentation issues. The impacts are identified relative to the proposed surface construction works and the works associated with the tunnel construction.

### 5.1 Potential construction impacts

During construction, the highest risk of impacts on water quality would be associated with:

- Exposure of soils during earthworks (including stripping of topsoil, excavation, stockpiling and materials transport), which may result in soil erosion and off-site movement of eroded sediments by wind and/or stormwater to receiving waterways, resulting in increased levels of sediment, nutrients, metals and other pollutants
- Disturbance of contaminated land causing contamination of downstream waterways, impacting on aquatic and riparian habitats. As contaminated land is disturbed during construction there is the potential for soil and contaminants attached or mixed with the soil to be mobilised by rainfall and stormwater runoff through the disturbed area. If appropriate management measures aren't applied, the mobilised soils containing the contaminants have the potential to be washed into downstream waterways. This could either be directly into the watercourses or indirectly via the stormwater drainage network throughout the construction areas.
- Accidental leaks or spills of chemicals, fuels, oils and/or greases from construction plant and machinery, which may result in pollution of receiving waterways and groundwater sources
- Exposure of acid sulfate soils (as a result of earthworks or dewatering), which may result in generation of sulfuric acid and subsequent acidification of waterways and groundwater sources and mobilisation of heavy metals in the environment
- Direct disturbance of waterway beds and banks during the widening of Saleyards Creek bridge, which may lead to sediment entering and polluting the waterways
- Infiltration of surface water to groundwater sources, including sediments and particles and soluble pollutants (such as acids, salts, nitrates and soluble hydrocarbons), for example through recharge activities
- Removal of riparian vegetation, which may result in soil and streambank erosion and increased sediment loads in nearby creeks.

### 5.2 Surface works

The proposed project alignment as set out in **section 1.1** would require surface works including:

- Homebush Bay Drive interchange including cycleway and Saleyards Creek bridge (cut-and-cover sections will be addressed under the impacts from tunnel works)
- Construction of water quality and spill containment basins at Saleyards Creek and the Cintra Park site
- Construction of surface buildings such as the maintenance facility and motorway control centre, substations, ventilation facilities and fire pump rooms and tanks
- Temporary construction access portals at Northcote Street and Cintra Park tunnelling sites
- Concord Road interchange and the connections to Concord Road and the existing M4, and reconfigured cul-de-sacs on Sydney Street, Edward Street and Alexandra Street
- Fresh air supply intake construction at the Cintra Park tunnel site
- Construction of the M4 on-ramp at Powells Creek

- Construction of the cycleway on-ramp at Queen Street
- The connection to the Wattle Street interchange and associated linkage works to side streets such as Ramsay Street and Martin Street
- The connection to the Parramatta Road interchange, including associated side roads such as Bland Street, Chandos Street and Orpington Street.

**Table 5.1** sets out a summary of the potential impacts on surface water quality from construction in each of these surface works areas. The potential impacts are discussed in more detail throughout this section.

**Table 5.1 Summary of impacts on water quality from surface works**

Construction activity	Potential surface water quality impact	Location	Waterways potentially affected
Clearing of vegetation	Erosion and sedimentation of waterways	Homebush Bay Drive interchange, maintenance facility and motorway control centre	Saleyards Creek
		Underwood Road/Ismay Avenue	Powells Creek
		Powells Creek M4 on-ramp	Powells Creek
		Concord Road interchange	Stormwater pipe network Powells Creek
		Cintra Park hockey field	St Lukes Park Canal
		Northcote Street tunnel site	Stormwater pipe network
		Connection to the Wattle Street interchange and associated linkage works to side streets such as Ramsay Street and Martin Street	Dobroyd Canal
		The connection to Parramatta Road including associated side roads such as Bland Street, Chandos Street and Orpington Street	Dobroyd Canal
Construction of new ramps, overpasses and road widening	Erosion and sedimentation of waterways	Homebush Bay Drive interchange Maintenance Facility and Motorway Control Centre.	Saleyards Creek
		Powells Creek – connection of surface M4 to Parramatta Road	Powells Creek
		Concord Road interchange	Powells Creek

Construction activity	Potential surface water quality impact	Location	Waterways potentially affected
		Connection to the Wattle Street interchange and associated linkage works to side streets such as Ramsay Street and Martin Street	Dobroyd Canal
		The connection to Parramatta Road including associated side roads such as Bland Street, Chandos Street and Orpington Street	Dobroyd Canal
	Contamination of waterways	Powells Creek M4 on-ramp	Powells Creek
		Homebush Bay Drive interchange, maintenance facility and motorway control centre	Saleyards Creek
		Connection to Parramatta Road	Dobroyd Canal
Operation of machinery	Leakage/spills of hydrocarbons or other chemicals	Whole of project	Saleyards Creek Powells Creek St Lukes Park Canal Dobroyd Canal Parramatta Estuary
Construction of buildings	Erosion and sedimentation of waterways	Homebush Bay Drive interchange, maintenance facility and motorway control centre	Saleyards Creek
		Underwood Road/Isma y Avenue	Powells Creek
		Cintra Park site	St Lukes Park Canal
		Connection to the Wattle Street interchange and associated linkage works to side streets such as Ramsay Street and Martin Street	Dobroyd Canal
Construction of/widening bridge	Erosion and sedimentation of waterways	Homebush Bay Drive interchange, maintenance facility and motorway control centre	Saleyards Creek
Construction of permanent water quality and spill containment basins	Erosion and sedimentation of waterways	Homebush Bay Drive interchange, maintenance facility and motorway control centre	Saleyards Creek
		Cintra Park site	St Lukes Park Canal

The surface construction activities associated with the project are located at various points along the project alignment. As identified earlier, the waterways relevant to the project are highly modified with low aesthetic and water quality value. The removal of vegetation associated with the construction works is expected to be in small pockets and therefore the potential impact of sediment and erosion deposition, on downstream waterways, caused by vegetation removal is not expected to be significant. Similarly, the disturbance and movement of soil due to the construction of buildings, ramps and road widening/realignment is localised and not expected to result in mass sedimentation in the downstream waterways. Appropriate containment and stabilisation practices, in accordance with the Blue Book, will be implemented as part of the project to mitigate potential impacts.

There are locations where sediment detention basins are to be constructed directly adjacent to waterways, see **section 2.3**. The impact of potential sediment during construction of these basins on the low value waterways immediately adjacent is not expected to be significant, nonetheless appropriate management techniques such as containment and stabilisation practices will be employed in accordance with the Blue Book, for the project to manage sediment movement.

The project area and the catchment areas of the relevant waterways have pockets of commercial/industrial land use. It is expected that this land use has contributed to the relatively low value and degraded water quality of the waterways. The potential impacts from construction activities such as the operation of machinery, resulting in hydrocarbon spills, are expected to be unlikely and of minor significance. However, in the unlikely event of a larger spill from a storage compound, the downstream impacts could be significant in the Parramatta River.

### **Impacts on waterways**

As identified in **section 4.2**, four key waterways are traversed by the proposed project alignment. A fifth waterway, while not traversed, is within the immediate vicinity of the alignment. These waterways are concrete-lined canals with grassed or vegetated riparian areas in a number of sections. The waterways are subject to construction water quality impacts caused by runoff from the nominated construction sites potentially transporting and depositing pollutants into the waterways.

Construction activities would be required in the vicinity of Saleyards Creek, Powells Creek, St Lukes Park Canal and Dobroyd Canal (Iron Cove Creek). While the canals are concrete-lined, disturbance of the land around the canals could result in erosion and movement of sediment into the canals. Proposed works in riparian areas and removal of vegetation associated with the construction of the road over Saleyards Creek, for example, have the potential to decrease soil stability. A decrease in soil stability can result in erosion and contribute to the potential sediment loading in the waterways from runoff during storm events from stockpiles and areas of open cut that aren't appropriately stabilised or contained.

### **Construction compounds**

The project concept design has nominated 10 construction compound sites:

- Homebush Bay Drive civil site (C1)
- Pomeroy Street civil site (C2)
- Underwood Road civil and tunnel site (C3)
- Powells Creek civil site (C4)
- Concord Road civil and tunnel site (C5)
- Cintra Park tunnel site (C6)
- Northcote Street tunnel site (C7)
- Eastern ventilation facility site (C8)
- Wattle Street and Walker Avenue civil site (C9)
- Parramatta Road civil site (C10).

**Table 5.2** provides a breakdown of the potential impacts on surface water quality from the establishment and operation of each of the identified construction sites, including activities relating to spoil handling, transport and stockpiling.

**Table 5.2 Impacts on water quality from construction sites**

Construction site	Construction activity	Potential surface water quality impact
Homebush Bay Drive civil site (C1)	<ul style="list-style-type: none"> <li>• Vegetation removal to establish compound</li> <li>• Earthworks to provide suitable compound</li> <li>• Stockpiling</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel storage</li> <li>• Activities associated with construction for the permanent works (eg raised structures works, road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Saleyards Creek.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Saleyards Creek.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>
Pomeroy Street civil site (C2)	<ul style="list-style-type: none"> <li>• Vegetation removal to establish compound</li> <li>• Earthworks to provide suitable compound</li> <li>• Stockpiling</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel storage.</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Saleyards Creek.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Saleyards Creek.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>

Construction site	Construction activity	Potential surface water quality impact
Underwood Road civil and tunnel site (C3)	<ul style="list-style-type: none"> <li>• Vegetation removal to establish compound</li> <li>• Earthworks to provide suitable compound</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site.</li> <li>• Operation of construction water treatment plant</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into stormwater network before discharging to Powells Creek. Leakage/spills of hydrocarbons or other chemicals from machinery running off into stormwater network before discharging to Powells Creek. Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>
Powells Creek civil site (C4) Concord Road civil and tunnel site (C5)	<ul style="list-style-type: none"> <li>• Vegetation removal to establish compound</li> <li>• Earthworks to provide suitable compound</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site.</li> <li>• Operation of construction water treatment plant</li> <li>• Activities associated with construction for the permanent works (eg raised structures works, road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into the stormwater pipe network and ultimately Powells Creek (and Parramatta Estuary). Leakage/spills of hydrocarbons or other chemicals from machinery entering into the stormwater pipe network and ultimately Powells Creek (and Parramatta Estuary).</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>

Construction site	Construction activity	Potential surface water quality impact
Cintra Park tunnel site (C6)	<ul style="list-style-type: none"> <li>• Removal of existing hockey facilities to establish compound</li> <li>• Vegetation removal to establish compound.</li> <li>• Earthworks to provide suitable compound.</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site.</li> <li>• Operation of construction water treatment plant</li> <li>• Activities associated with construction for permanent works (eg raised structures works, road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into St Lukes Park Canal.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into St Lukes Park Canal.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>
Northcote Street tunnel site (C7)	<ul style="list-style-type: none"> <li>• Removal of existing buildings</li> <li>• Vegetation removal to establish compound.</li> <li>• Earthworks to provide suitable compound.</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site.</li> <li>• Operation of construction water treatment plant</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Dobroyd Canal.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Dobroyd Canal.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>

Construction site	Construction activity	Potential surface water quality impact
Eastern ventilation facility site (C8)	<ul style="list-style-type: none"> <li>• Removal of existing buildings</li> <li>• Vegetation removal to establish compound.</li> <li>• Earthworks to provide suitable compound.</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site.</li> <li>• Operation of construction water treatment plant</li> <li>• Activities associated with construction for the permanent works (eg raised structures works, road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Dobroyd Canal.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Dobroyd Canal.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>
Wattle Street and Walker Avenue civil site (C9)	<ul style="list-style-type: none"> <li>• Removal of existing buildings</li> <li>• Vegetation removal to establish compound.</li> <li>• Earthworks to provide suitable compound.</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site</li> <li>• Activities associated with construction for the permanent works (eg road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Dobroyd Canal.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Dobroyd Canal.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>
Parramatta Road civil site (C10).	<ul style="list-style-type: none"> <li>• Removal of existing buildings</li> <li>• Vegetation removal to establish compound.</li> <li>• Earthworks to provide suitable compound.</li> <li>• Stockpiles</li> <li>• Access and egress of vehicles to the site and public roads.</li> <li>• Chemicals/fuel stored on site</li> <li>• Activities associated with construction for the permanent works (eg road/pavement works)</li> </ul>	<p>Erosion and sedimentation from open cuts/exposed soils and stockpiles being transported by stormwater runoff and entering into Dobroyd Canal.</p> <p>Leakage/spills of hydrocarbons or other chemicals from machinery running off into Dobroyd Canal.</p> <p>Vehicles entering and exiting surface construction sites transferring soil to adjacent roads and being washed into the stormwater pipe network and ultimately adjacent waterways.</p>

## Demolition works

The demolition works required within the surface sections of the project are predominantly associated with the removal of buildings and residential dwellings along the alignment. Sources of pollutants that could affect water quality from demolition works include:

- Asbestos and other building materials
- Toxic or pollutant laden soils including fertilisers and pesticides
- Heavy metals
- Chemicals including hydrocarbons and fluids associated with demolition processes and machinery
- Dust and airborne pollutants.

The development and preparation of the construction compounds, as identified in **Table 5.20**, are expected to require large amounts of demolition. The typical impacts on surface water quality from the demolition in these areas would be through mobilised dust, litter and other building materials being deposited and picked up by surface water runoff, waterways or stormwater management infrastructure thereby degrading the quality of the natural receiving environment. The transportation of building waste from the demolition sites could potentially impact on the quality of the waterways through accidental spills/material drops. As identified previously, some materials that are typically found in building demolition, such as lead-based paints and chemicals, can be easily transported from the demolition site through off site stormwater runoff. These pollutants can be ingested by aquatic fauna and result in dead or sick marine life. These impacts are of relevance to those compounds directly adjacent to the identified waterways:

- Homebush Bay Drive civil site (C1) – Saleyards Creek
- Underwood Road civil and tunnel site (C3) – Powells Creek
- Cintra Park tunnel site (C6) – St Lukes Park Canal
- Wattle Street and Walker Avenue civil site (C9) – Dobroyd Canal.

### 5.2.1 Tunnelling activities

The proposed mainline tunnels for the project are approximately 5.5 kilometres in length and will be constructed by either excavation using a heading and bench construction methodology or cut and cover construction methodology. The bench (lower section) in the mainline tunnels would be excavated using drill and blast techniques, reducing the reliance on road headers. These construction works have the potential to impact on both surface and ground water quality.

During the construction phase of the tunnel it is expected that water would be discharged from the tunnel from the following activities:

- Heat and dust suppression
- Wash down of cut faces for shotcreting and concrete works
- Groundwater seepage
- Rainfall runoff from tunnel portals and ventilation shafts.

A high proportion of the water discharged from the tunnel would be collected from groundwater seepage. The quality of this groundwater is likely to be variable and potentially affected by contaminated or ASS within the catchments. The use of chemicals in the treatment and curing process of concrete as well as the concrete dust itself could result in this water having an increased alkalinity.

Water discharged from the tunnel construction has the potential to result in contamination of downstream waterways and receiving environments. Appropriate management is required in particular at the following sites:

- The temporary construction access portal at Allen Street, adjacent to Powells Creek

- The Cintra Park fresh air intake and water treatment facilities, adjacent to St Lukes Park Canal.

## **Groundwater**

Final long-term tunnel inflows in the Hawkesbury Sandstone are typically in the order of one litre per second per kilometre (L/s/km). This is an average, long-term value and does not take in to account localised or short-term inflows. It also reflects cases where localised high inflow areas of a tunnel have been grouted.

Modelling of a range of aquifer hydraulic properties and recharge rates, undertaken by GHD as part of the *Groundwater Impact Assessment* (GHD 2015b), indicates inflows during construction are likely to be in the order of seven litres per second (L/s), but could also be as high as around 16 L/s during the peak of tunnel excavation, without progressive partial grouting of the sandstone or sealing of shallow approach structures. The short-term inflow will depend on the rate of tunnel progress, tunnel construction method and the presence of localised zones with potential for high short-term inflows.

Based on the local groundwater chemistry and experience in other tunnels in the Hawkesbury Sandstone in the region, this inflow is likely to contain elevated concentrations of iron and calcium carbonate with potential to cause staining (GHD 2015b).

## 6 Assessment of operational impacts

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The operation of the project has the potential to impact on the surface water quality of the area and also the water quality of the receiving waterways downstream. The following section describes these potential operational impacts, the activities that are expected to cause the impacts and those areas of the project and downstream that are expected to be affected. The discussion is split into the potential impacts from surface and tunnel infrastructure.

### 6.1 Potential operational impacts

During operation, the main potential impact on water quality would be associated with the mobilisation of pollutants in stormwater runoff during rainfall events causing acute or chronic contamination of water quality in downstream waterways.

The small increase in impervious surfaces associated with the project could have the potential for minor adverse impacts on the hydrological regime due to increased runoff volumes and peak flows and associated increases in erosion and sedimentation of downstream watercourses.

Pollutants in stormwater runoff include sediments, nutrients, hydrocarbons, metals and microbials. These deposits build up on road surfaces and pavement areas during dry weather and get washed off and transported to downstream waterways when it rains. Other pollutants in the atmosphere, derived from local and regional sources, would also continue to be deposited and build up on the M4 motorway road pavement and impact on water quality following rain. The project's widened roadway at Homebush Bay Drive interchange, for example, would marginally contribute to these impacts.

Discussion on these potential operational risks and impacts on water quality associated with the operation of the project is provided in the following sections.

#### 6.1.1 Impacts from surface infrastructure

The project is split into sections of above ground carriageway, including interchanges with existing surface roads and the existing M4, and subsurface road through tunnels. The operational water quality impacts from the above ground permanent infrastructure are predominantly due to an increase in runoff from a small increase of impervious area and the related mobilisation of pollutants from the carriageway. The areas of the project where the greatest increase in impervious surfaces is expected, i.e. at the Homebush Bay Drive interchange, are located adjacent and upgradient of the permanent stormwater quality management measures proposed by the preferred design. Increased stormwater runoff (quantity and quality)

The catchments adjacent to the project are currently a combination of pervious and impervious land use drained through a piped stormwater network for the management of the smaller storm events. These drainage networks discharge into the waterways that manage bulk flows and discharge into the Parramatta River estuary. The increase in impervious area from the above ground sections of the project would result in an increase in the quantity of point discharge flows from the catchments into the identified waterways. In comparison to sheet flow, point source discharge, while producing a concentrated discharge of pollutants, is relatively easier to manage and control through stormwater quality and treatment measures as the pollutants can be managed in specified location/s and the extent of management required can be quantified more readily.

Operational impacts of the project on the quality of stormwater runoff would be similar to existing impacts from the operation of the M4 Motorway and light and heavy vehicle traffic. Contamination of the downstream waterways can be caused through stormwater runoff containing typical pollutants such as oils and greases, petrochemicals and heavy metals as a result of vehicle leaks, operational wear and road wear. Atmospheric deposition and maintenance activities during operation may also result in herbicides, fertilisers, nutrients and eroded material to be transferred to surface waters. The contamination of the waterways by the aforementioned pollutants can therefore result in habitat degradation and negatively impact on the health of aquatic flora and fauna species. Although the project will result in a minor increase in impervious area, the project will also change the traffic volumes and result in a reduction in the number of heavy vehicles on some of the surface roadways, such as Gipps Street. As such, the additional operational impacts of the project on stormwater runoff pollutants will be marginal.

These potential impacts are of particular relevance to the above ground sections of the project. The Homebush Bay Drive interchange would require the management of additional runoff from the widened carriageway in this area. Similarly at the interchanges and connections to existing roads including Concord Road, Wattle Street and Parramatta Road east of Wattle Street, would also lead to increased runoff from an increased impervious area footprint.

## **Spills**

The project would be a major element of Sydney's road infrastructure. The potential impacts on water quality from spills during the operation of the project would therefore be directly related to the potential spill of vehicle oils, lubricants, hydraulic fluids and other accidental spills, including chemicals in transit through leakage or as the result of a crash.

Any such spill has the potential to pollute the downstream waterways via the stormwater and therefore cause degradation of water quality and detrimental effects for the riparian and Parramatta River estuary receiving environments.

Once the generation of flows has developed, the to surface water features. To avoid impacts from construction activities, chemical storage, handling and emergency response procedures will need to be developed. These measures will be developed in accordance with Australian guidance and in consultation with relevant authorities (such as the NSW EPA and NOW) and documented in a construction and environmental management plan (CEMP).

## **Erosion and sedimentation**

Once the construction phase of a project such as the M4 East has been completed, there is a period within the operational phase where recently disturbed soils are susceptible to scour and erosion from stormwater runoff. This will be potentially an issue in areas where soft landscaping is proposed in the vicinity of Saleyards Creek and Dobroyd Canal, for example at the Homebush Bay Drive, Concord Road and Wattle Street interchanges, and the construction compounds.

The modification and realignment of overland flowpaths can also cause an increase in scour of surface soil, banks or bed material and resultant sedimentation in downstream waterways as areas that were once not subject to concentrated stormwater runoff now are.

The potential for sediment transport and sedimentation issues during operation of the project is influenced by factors such as severity of storm events, the slope and footprint of disturbance within an area and the management controls that are implemented on site. Key landform types where erosion could potentially occur during the operational phase of the project include:

- Cut batters
- Fill embankments.

These areas are expected to be susceptible to erosion, particularly in the early operational phase, during which time topsoil is settling and vegetation is establishing. The erosion of these areas during rainfall events can cause sediment loads to enter into the waterways, either directly or indirectly through the stormwater pipe network. This contributes to the degradation of water quality in the receiving waterways and impacts to aquatic environments.

## **Infrastructure near riparian areas**

Operational impacts of roads and related infrastructure in or near riparian areas relate to:

- The quality of runoff from the road allowed to enter the riparian zone
- The disturbance of riparian vegetation and habitats from litter
- Potential impacts from vehicle accidents.

These can cause degradation of habitat and ultimately additional erosion and scour resulting in sedimentation of waterways.

It should be noted that while the major waterways identified in **section 4.2** are predominantly concrete-lined channels, there are sections of the canal banks and riparian areas that have small pockets of vegetation and could be directly affected by the operation of the project. Bank surfaces and the areas in the vicinity of the waterways are proposed to be revegetated and/or stabilised post-construction, so as to minimise ongoing erosion and associated impacts to water quality. This is of particular relevance at the Homebush Bay Drive interchange where it crosses Saleyards Creek.

The existing sections of urbanised riparian corridors potentially impacted by the project include those at Saleyards Creek, Powells Creek, St Lukes Park Canal and Dobroyd Canal (Iron Cove Creek). These areas of riparian corridor are small and highly modified urban environments with pockets of vegetation i.e. grass and trees. The small areas of riparian vegetation disturbed by the construction works will be re-established as part of the project.

### **Impact on existing drainage network**

With an increase in impervious area associated with the project and therefore surface water runoff captured in the downstream stormwater networks, in addition to the discharge of treated groundwater tunnel inflows at the surface, there are potential operational impacts on the capacity of existing drainage infrastructure. Along the project alignment the road connects into existing systems; therefore, the capacity of these systems to accommodate this increase in runoff should be assessed through to the outlet, to avoid exacerbating or increasing surcharge and therefore flood risk. This can be mitigated through the inclusion of appropriate quantity controls and management measures, and is further addressed in the flooding and drainage technical paper (Lyalls and Associates 2015).

As described in **section 4.10.1**, GPTs are located at a number of locations relevant to the project. The potential operational impacts of the permanent project infrastructure on these existing water quality treatment measures is expected to be consistent with the impacts from the existing developed catchment. Gross pollutants such as litter and large particulates would be deposited along the project roadway (as is consistent with the existing land use), and would enter the stormwater drainage network before discharging to the identified waterways and captured by the GPTs.

Groundwater inflow into the tunnel is likely to contain elevated concentrations of iron and calcium carbonate with potential to cause staining and possible blockage of drainage systems in the long term. The scaling potential of the ambient groundwater may be exacerbated by leaching of chemicals, such as sodium silicate, used in grouts as well as secondary ions derived from minerals dissolved in the highly alkaline grout leachate (GHD 2015b).

### **Increased impervious areas**

The project includes sections of tunnel and above ground carriageway. The above ground sections also include the interchanges with other roads and the widening of existing roads to manage the traffic flow as they exit or enter the project. In these locations, it would be necessary to convert once pervious areas such as lawns, public parks and vegetated areas alongside the existing carriageways into impervious pavement. Such locations include:

- Homebush Bay Drive interchange, at the western end of the project, where the existing M4 is to be widened before the alignment enters the tunnelled section of the project
- Concord Road interchange
- The Wattle Street interchange, in the vicinity of Dobroyd Canal
- The Parramatta Road interchange, at the eastern end of the project.

Operation of the Wattle Street interchange could affect Dobroyd Canal through increased runoff; however, it is expected that these impacts would be relatively minor, as the surface component of the project directly adjacent to Dobroyd Canal would not differ greatly from the current landuse and hardstand footprint.

Associated with a minor increase in impervious paved area from the above ground component of the project, there would be a minor increase in stormwater runoff and therefore the mobilisation of stormwater pollutants that would otherwise be filtered out by pervious surfaces prior to discharge into waterways downstream. As identified previously, an increase in impervious surface also causes an increase in the volume and velocity of flows, which can scour surface soil and increase sediment

loading in downstream waterways. As there will only be a minor increase in impervious areas as a result of the project, along with the proposed permanent water quality basin, the associated potential impacts to downstream waterways are expected to be marginal.

### 6.1.2 Impacts from tunnel infrastructure

The proposed design and construction of the project incorporates dive structures, cut into the ground as the road drops into the tunnel. The proposal would therefore have impacts on the movement and collection of stormwater across and in the vicinity of these sections of the road alignment.

During large storm events, or in circumstances where road drainage may become blocked, there is the potential for stormwater to run down the roadway and collect in the tunnel. This runoff would carry with it the matter (ie pollutants, sediment) dropped on the road carriageway and any other runoff from within the tunnel. This runoff would be captured and discharged from the tunnel by means of a pumping system and treated at an on-site stormwater treatment plant. The runoff could contain concentrations of pollutants that would ultimately be discharged into the receiving waterways downstream, which would have potential negative impacts on the water quality and natural habitats in these receiving waters.

Given the depth of the tunnel and predicted long-term groundwater levels, there is also potential for lateral inflow of saline water from existing unlined tidal drains at the western and eastern ends of the tunnel as well as the potential for drawing up deeper saline groundwater. Such saline inflow may not develop immediately and may take several years to impact on inflow water quality; however, it is likely to develop over the design life of the tunnel. Further discussion on the tunnelling activities, and groundwater and dewatering requirements, management and treatment are provided in the *Groundwater Impact Assessment* (GHD 2015b).

The project includes a tunnel sump and pump room (approximately between Byron Street and Scott Street) to convey stormwater and groundwater captured within the operational tunnel to the surface for treatment. Groundwater chemistry will require management prior to discharge and as such these inflows will be managed at the permanent water treatment plant proposed at the Cintra Park site, in a system which will be designed to treat the water to meet the water quality discharge criteria outlined in **section 2.3**. To avoid impacts during operation, the operational design includes a drainage system which will keep groundwater seepage separate from surface water run-off and the surface water drainage system, which will minimise the potential for impacts on groundwater seepage quality.

The assessment of groundwater chemistry presented in the GHD *Groundwater Impact Assessment* (2015b) suggests that there are inherent aspects of the existing groundwater quality, particularly with regard to salinity, pH, metals, sulfate and nitrate, which may require management at the surface treatment plant. Of these, it is thought that salinity may be managed by strategic placement of discharge points in downstream areas that are more influenced by saline conditions (GHD 2015b).

In addition to the impacts of stormwater and groundwater inflow, the collection and surface discharge of fire suppressant and pollutant spills in the tunnel as well as tunnel washing, which may occur during operation, would mobilise fine particulates and pollutants from the tunnel internal surfaces into the surface water treatment systems. Discharge of this water has the potential to impact on water quality in the adjacent waterways and degradation of water quality and the natural habitats in downstream receiving waters if appropriate treatment measures are not carried out. Water containing fire suppressant and pollutant spills, as well as water from washing of the tunnels, would be collected in the tunnel sump and conveyed to the surface water treatment plant system and discharged in accordance with the water quality discharge criteria outlined in **section 2.3**.

# 7 Management of impacts

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The construction and operational impacts associated with the project identified in the previous sections are to be managed during both phases to mitigate the impact on the surface water runoff and ultimately the receiving waterways. **Chapter 2** discusses the objectives and targets of the construction and operational phase mitigation and management measures to be employed throughout the life of the project, as proposed in the concept design by WDA. This section identifies additional measures that are to be employed for management of the impacts, in addition to those outlined in **Chapter 2**, and also specifies a proposed water quality monitoring programme.

## 7.1 Construction phase mitigation measures

As a general guiding principle for major civil design and construction works, construction water quality mitigation and management measures should be implemented in accordance with the relevant requirements of:

- *Managing Urban Stormwater – Soils and Construction* Volumes 1 and 2D (the Blue Book), Landcom 2004 and 2008
- *Soil and Landscape Issues in Environmental Impact Assessment (DLWC 2000)*
- Guidelines for Controlled Activities (NSW Office of Water (now DPI Water) 2010 and 2011)
- *NSW Office of Water Guidelines for Controlled Activities on Waterfront Land (2012)*
- *Code of Practice for Water Management – Road Development and Management* (RTA 1999).
- *Controlled Activities – Guidelines for Riparian Corridors* (NOW 2011a)
- *Controlled Activities – Guidelines for Laying Pipes and Cables in Watercourses* (NOW 2011b)
- *Controlled Activities – Guidelines for Watercourse Crossings* (NOW 2010a)
- *Controlled Activities – Guidelines for Instream Works* (NOW 2010b)
- *Controlled Activities – Guidelines for Outlet Structures* (NOW 2010c)
- *Fish Passage Requirements for Waterway Crossings* (Fairfull and Witheridge 2003a)
- *Guidelines for Design of Fish and Fauna Friendly Waterway Crossings* (Fairfull and Witheridge 2003b)
- *Fisheries Management Act 1994*
- *NSW State Rivers and Estuaries Policy* (NSW Water Resources Council 1993).
- Environmental Protection Licensing requirements.

A Soil and Water Management Plan (SWMP) would be prepared in conjunction with the EPA and NOW, as part of the overall Construction Environmental Management Plan (CEMP). The SWMP would define the control and mitigation of potential surface water quality impacts during construction. The SWMP would incorporate the controls and measures in accordance with the Blue Book requirements and give consideration to the principles and guidance of the *Soil and Landscape Issues in Environmental Impact Assessment (DLWC 2000)*. The SWMP would be updated to suit the changing needs as the project works progress. Due consideration would also be given to the extent of works and situation relative to the sensitivity of the surrounding environment in relation to the construction activity.

### 7.1.1 Identification of mitigation measures

The potential surface water impacts of construction of the project are moderate, most construction related risks, such as earthworks, spills, and location of stockpiles and equipment, can be managed with standard controls and methodologies.

Typical mitigation measures that would be implemented where relevant include:

- Disturbed areas would be minimised and would be progressively revegetated or stabilised as soon as practical throughout construction
- Cleared vegetation would be utilised for mulching wherever practicable, to minimise erosion and filter runoff to trap coarse sediments
- Appropriate erosion control measures would be installed such as silt fencing, straw bales, check dams, temporary ground stabilisation, diversion berms or site regrading
- Clean water runoff would be diverted away from disturbed areas
- Water quality basins would be utilised as appropriate
- Appropriately bunded areas would be provided for storage of hazardous materials such as oils, chemicals and fuels
- Work platforms or access tracks required in the vicinity of waterways would be constructed to mitigate against the movement of erodible soils and provide a means of stabilisation, e.g. utilisation of large clean rock material wrapped or underlain with geofabric
- A qualified soil conservationist would be employed to develop the initial project erosion and sediment control plans and advise on appropriate controls, implementation and monitoring and management processes
- Site staff would be engaged through tool box talks or similar with appropriate induction on soil and water management practices
- Work method statements would be prepared for waterway works with particular emphasis on the early implementation of erosion and scour protection requirements.

Erosion and sediment loads would gradually diminish after construction as disturbed areas are stabilised.

Additional detail on these measures and their implementation for the construction phase of the project are provided in the following sections.

The potential surface water impacts associated with the proposed tunnel construction and associated activities will be managed by other non-standard construction mitigation measures, including the installation and commission of a construction water treatment plant, as discussed in the following sections.

### 7.1.2 Surface works including construction sites

During construction, sedimentation basins will be installed as approved by the EPA and managed in accordance with the Blue Book to protect water quality as identified in **section 2.3**. Other construction phase mitigation measures, identified in **section 7.1.1**, will also be included in the construction management plan. Together these measures will form a train of treatment and holistic suite of mitigation measures to manage potential construction surface water quality impacts associated with the project.

#### **Preliminary basin sizing and location**

The detention and management of sediment or other fine pollutant-laden stormwater is key to the management of water quality during the construction phase of the project. The exact size and layout of sediment basins would be determined as part of detailed design and in accordance with the requirements of the relevant Environment Protection Licence (EPL). The design, construction and management of all basins are to be in accordance with the Blue Book.

In addition to those sediment basins identified in **Chapter 2** it is expected that appropriate water quality treatment measures would be provided adjacent to Dobroyd Canal to manage the stormwater runoff during construction of the Wattle Street connection.

Surface water would be reused on site for applications (where feasible and of an appropriate quality) such as dust suppression during demolition. Other opportunities for the reuse of treated stormwater would be investigated and implemented where appropriate.

## Erosion and sediment control/waterways and riparian areas

In order to address the erosion and sediment control issues, the following controls would be implemented in the construction phase as part of the project CEMP; and are consistent with the Blue Book and are considered good practice:

- As the works progress, disturbed areas would be revegetated or stabilised as soon as practical both during and post construction
- Wherever practicable, clean water would be diverted away from the works or disturbed areas
- Measures would be employed to control ground stability and limit run-off lengths and velocities within the construction sites
- Erosion control measures such as sediment fences, check dams, temporary ground stabilising, diversion berm or site regrading would be installed as appropriate
- Adequate controls e.g. bunds around stockpile areas and excavation works would be installed to minimise the risk of contaminants being washed into waterways or stormwater systems. Stockpiles would be located outside overland flowpaths, and where left exposed and undisturbed for longer than 28 days, would be finished and contoured to minimise loss of material in flood or rainfall events
- Materials which require stockpiling for longer than 28 days would be stabilised by compaction, covering with anchored fabrics, or seeded with sterile grass where appropriate
- Stockpiles containing potential acid sulfate soils would be lined, bunded and covered in accordance with relevant guidelines
- If encountered, excavated PASS would be appropriately managed to prevent the production of ASS or the movement of sediment or leachate, eg through wetting down and bunding
- Erosion and sedimentation controls would be regularly inspected to maintain performance to the design criteria and design specifications. Controls are to be upgraded or altered if these objectives are found to not be satisfied
- Where practical, permanent scour protection measures required for the operational phase would be installed early in the construction phase
- Wheel wash or rumble grid systems would be installed at construction compound heavy vehicle exit points where practical, to minimise the transfer of soil from construction areas to roadways.

The design and construction of the waterway crossings should be designed and constructed with particular reference to the *NSW Office of Water Guidelines for Controlled Activities on Waterfront Land (2012)*.

With appropriate strategies in place, the risk of sedimentation of the local watercourses in the vicinity of the works location would be reduced.

### 7.1.3 Tunnelling activities

Water discharged from the tunnel during excavation and construction would require collection and treatment prior to discharge to any receiving environment. Relevant measures to treat this water would be identified as part of the CEMP and could include, for example, a treatment basin with appropriate settling and flocculation employed, and proprietary or mechanical treatment devices as relevant.

The project would include the installation and commission of construction water treatment plants (WTPs) to treat tunnel groundwater and dirty construction water at the sites identified in **section 2.3**.

Monitoring of the discharged water from these systems would be required throughout construction to confirm that the discharged water quality meets the required standards of the receiving environment and the project EPL.

## 7.1.4 Implementation and monitoring (construction water quality monitoring framework)

### General

The monitoring program for the construction phase of the project would be part of a larger program that also includes pre- and post-construction phases. Pre-construction monitoring is currently being undertaken and, where feasible, the locations of the monitoring should be retained for consistency throughout the construction and operational phases of the monitoring program. This would provide consistency of approach and comparison of monitoring results.

A baseline surface water monitoring program has commenced, and is monitoring surface water quality at a total of 10 locations on the five waterways that are crossed by the project. Where possible, this includes an upstream and downstream location on each waterway. In addition, monitoring is being conducted at two reference sites, one each to the east and west of the project area. These reference sites allow identification of water quality impacts unrelated to the project. The first surface water baseline monitoring event was completed on 29 June 2015, with a second event completed in July 2015.

### Monitoring construction

A surface water quality monitoring program would be developed for the construction period and would monitor water quality upstream and downstream of the construction areas. Monitoring during the construction phase of the project would examine a range of appropriate indicators in accordance with the ANZECC Guidelines (*Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Australian and New Zealand Environment and Conservation Council (ANZECC), 2000a) and *Australian and New Zealand Guidelines for Water Quality Monitoring and Reporting* (ANZECC, 2000b)).

Monitoring during the construction period would be carried out periodically and after rainfall events as part of the assessment of the function of water quality mitigation measures during construction.

Water quality mitigation controls (eg sediment fences, sediment basins) would be inspected regularly and following rainfall to detect any breach in performance.

The framework and implementation of monitoring the construction impacts on water quality for the project would be developed and undertaken in conjunction with the *RTA Guideline for Construction Water Quality Monitoring* (issue date unknown).

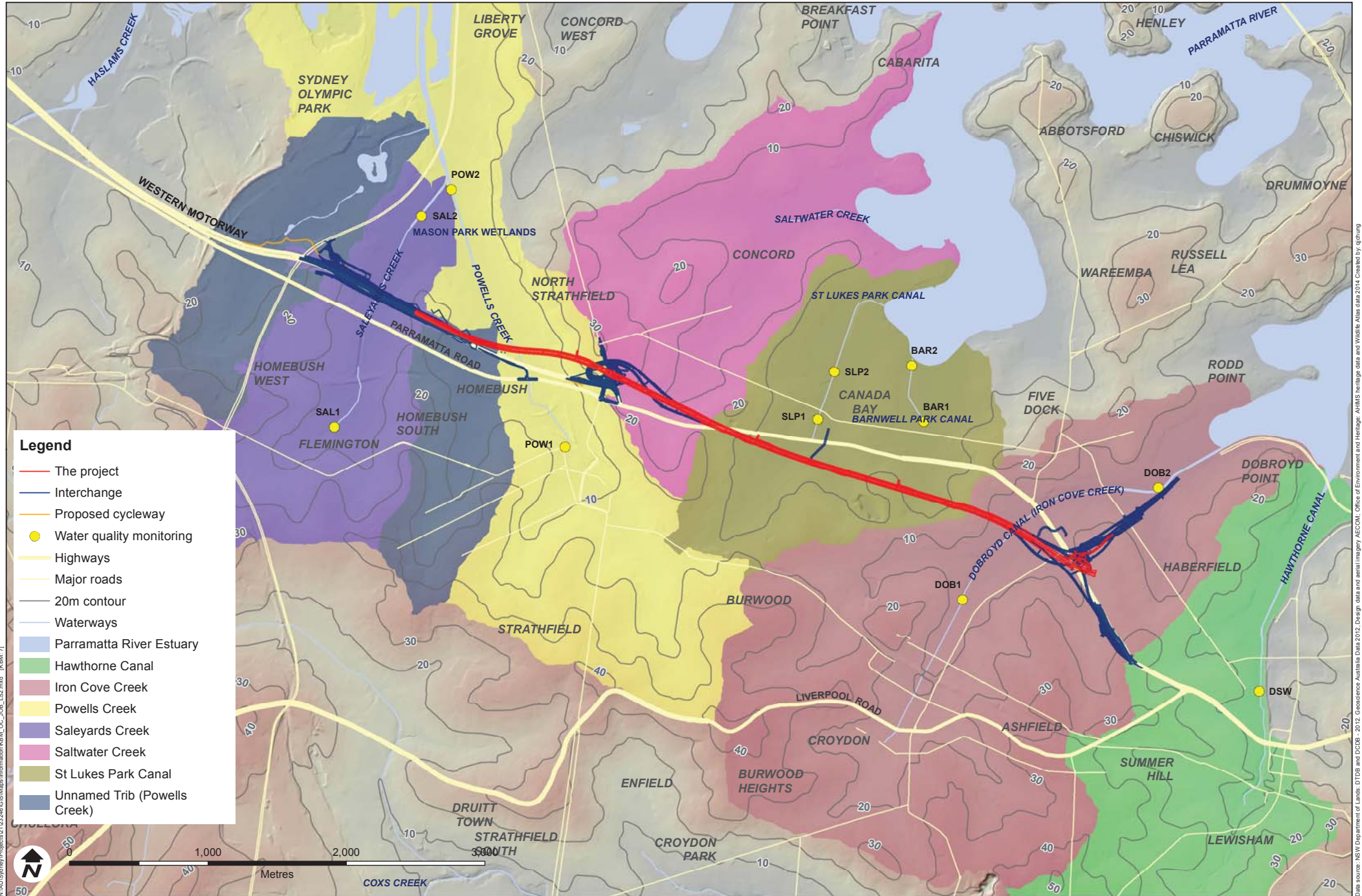
The water quality monitoring program established to determine the current baseline for water quality in the waterways that may potentially be impacted by the project has accounted for an upstream reference site above the works, with upstream and downstream sites on each waterway that is crossed by the infrastructure and then one downstream site in the nearest receiving water. This equates to 12 sites (see **Figure 7.1**). The sites selected, including reference sites not directly related to the project, are presented in **Table 7.1**.

Where appropriate, sites proposed as part of the pre-construction monitoring program should be retained for monitoring during construction and post-construction phases. These sites will be reviewed during detailed design and the final suite of sites will be approved by the relevant regulators through development of the construction water quality monitoring program and during the EPL discharge point selection and approval process.

**Table 7.1 Baseline surface water quality monitoring sites**

Name	Upstream/ Downstream	Creek	Street Address
USW	US	Finlaysons Creek	68 Killeen Street, Wentworthville (Lytton Street Park)
SAL1	US	Saleyards Creek	Airey Park, Kessel Avenue, Homebush
SAL2	DS	Saleyards Creek	5 Underwood Road, Homebush
POW1	US	Powells Creek	4 Elva Street, Strathfield
POW2	DS	Powells Creek	Mason Park, Conway Avenue Homebush
BAR1	US	Barnwell Park Canal	104 William Street car park, Five Dock

<b>Name</b>	<b>Upstream/ Downstream</b>	<b>Creek</b>	<b>Street Address</b>
BAR2	DS	Barnwell Park Canal	2 Bellbird Close, Canada Bay
SLP1	US	St Lukes Park Canal	Northern carpark, Concord Oval, Gipps Street entrance
SLP2	DS	St Lukes Park Canal	Crane Street car park, Concord
DSW	DS	Hawthorne Canal	Hawthorne Parade
DOB1	US	Dobroyd Canal (Iron Cove Creek)	Gregory Avenue
DOB2	DS	Dobroyd Canal (Iron Cove Creek)	Henley Marine Drive, Timbrell Park



During the baseline water quality monitoring, monthly samples are also analysed for dissolved metals and organics. The water quality parameters reflect ANZECC Guidelines for water quality (2000) and consist of grab samples collected *in situ*. Water analysis for baseline parameters are collected fortnightly and additional analysis for metals and organics collected on a monthly basis.

Baseline water quality monitoring currently consists of:

- Total nitrogen (includes TKN and NOx)
- Total phosphorus
- Chlorophyll-a (nuisance plants, ie algal growth for monitoring of nutrient loading)
- Turbidity
- Suspended solids
- Conductivity
- pH
- Dissolved oxygen.

Sampling would be conducted to assess:

- Dissolved metals
- Organics TRH (C6-C40) and BTEXN.

The monitoring program would be periodically reviewed so that it provides appropriate information relevant to the project's implementation phase.

## 7.2 Operational phase mitigation measures

During the operational phase of the project, the predominant sources of surface water pollutants are expected to come from sedimentation and erosion (lessening over time) and the deposition of pollutants through spills such as hydrocarbons (fuels) from vehicles.

To address the potential operational surface water quality impacts of the project, a combination of GPTs, water quality treatment plant and water quality treatment basins will be employed (refer to **section 2.3**). These mitigation measures will work together to form a treatment train in which the larger pollutants are primarily managed by the GPTs and the finer pollutants will be managed by the basins and treatment plants.

To specifically address groundwater water quality management for the tunnel sections a water treatment facility will be constructed at Cintra Park. Groundwater seepage in the tunnel will be collected in the groundwater system, which discharges to a sump located near the tunnel low point. Groundwater will then be pumped from the groundwater seepage chamber in the tunnel sump to the water treatment plant. The treatment plant will include a balance tank to regulate flows into the plant. The plant will discharge treated water into the stormwater system that leads into the St Luke's Park Canal located adjacent to Cintra Park.

### 7.2.1 Water quality treatment measures

#### Operational water quality basins

Operational water quality basins are identified in **Chapter 2**, with the inclusion of a 500 square metre bio-retention basin at the Homebush Bay Drive Interchange. Where practical, these basins are to be sized and located based on the location of proposed construction basins. The retention of these basins mitigates the need to build new basins in areas where space may be limited. The basins will be part of the suite of water quality treatment measures during the operational phase of the project and will provide the final polishing of surface water prior to discharge into receiving waterways.

## **Operational tunnel water treatment plant**

The proposed operational water quality treatment plant at the Cintra Park site would be configured to manage and treat tunnel water during operation, to meet discharge objectives and criteria outlined in **section 2.3.1**. Monitoring of discharge water quality and quantity will be undertaken during operation, the frequency and scope of which would be determined in consultation with the regulators and in accordance with operational licences and approval conditions.

### **7.2.2 Implementation and monitoring (operational water quality monitoring framework)**

Where appropriate, post-construction monitoring should be consistent with the parameters and locations identified for the pre-construction monitoring, as discussed in **section 7.1.4**. The post-construction monitoring should continue for an appropriate period of time to allow for settlement and establishment of vegetation. To allow for the capture of water quality data that takes into account the impact of seasonal and vehicle load variability, the monitoring is to continue for a period of at least 12 months post-construction or until the affected waterways and/or groundwater resources are certified by an independent expert as being rehabilitated to an acceptable condition as required by any condition of approval.

## 8 Conclusion

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This report identified and assessed the potential surface water quality impacts associated with the construction and operation of the project.

Without impact mitigation and management measures in place, the construction and operation of the project could result in impacts on surface water quality. This in turn could have effects on downstream environments. The catchments within the project footprint are already highly modified and the receiving environment has been identified as low quality.

To protect surface water quality on-site and downstream of the project footprint, impact mitigation and management measures have been incorporated into the construction and operational phases of the project. During the construction phase, these measures would include the development of a SWMP that details how construction runoff would be collected, conveyed and treated throughout all stages of the construction process. Techniques include the use of sedimentation basins, catch and diversion drains and swales, sediment control measures, in addition to minimising the exposure of subsoils, minimising stockpiling and progressive stabilisation. In addition, works within waterways would be subject to specific control measures.

To protect receiving waterways from ongoing impacts during the operation of the project, permanent water quality controls will be designed and implemented. These include water quality basins (with spill containment capabilities), separate spill containment and management measures, water treatment facilities and GPTs. If practicable, infrastructure used during the construction phases would be retained or adapted for the operational phase.

Water quality monitoring will be undertaken prior to construction, and during construction and operation. A monitoring plan would detail the requirements of the monitoring and reporting procedures required by regulators and the project EPL.

In developing the detailed design, further optimisation of the water quality controls would be undertaken. Throughout this refinement process, other solutions that conform to the guidelines and meet the design criteria may be considered. The final design would optimise water quality controls, maintenance and cost effectiveness, taking into account environmental requirements and site constraints.

Provided the proposed water quality controls are implemented, maintained and monitored during the construction and operational phases of the project, it is unlikely that there would be significant water quality impacts on waterways crossed by or sensitive receiving environments downstream of the project.

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## 10 Limitations

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The following clarifications and limitations apply to the information and scope undertaken and presented in this report:

- This report has been prepared on the basis of information provided by WDA and a desktop literature search undertaken by GHD. The information presented herein has been collated from these aforementioned sources and relies on the accuracy of these. Where information is provided from other studies or reports this has been referenced accordingly. The information presented herein and references to other reports are made on the basis of information available at the time of preparation of this report.