



Transport for NSW

Beaches Link and Gore Hill Freeway Connection

Appendix U

Socio-economic assessment

Transport for NSW

Beaches Link and Gore Hill Freeway Connection

Technical working paper: Socio-economic assessment

December 2020

Prepared for

Transport for NSW

Prepared by

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Glossary and acronyms

Term	Definition
ABS	Australian Bureau of Statistics
ASGS	Australian Statistical Geography Standard
CBD	Central business district
ERP	Estimated Resident Population
LGA	Local government area
NSW	New South Wales
Project	Beaches Link and Gore Hill Freeway Connection subject to this Environmental Impact Statement
SA1	Statistical Area Level 1
SA2	Statistical Area Level 2
Transport for NSW	Transport for New South Wales

Executive Summary

The Western Harbour Tunnel and Beaches Link program of works is a NSW Government initiative to provide additional road network capacity across Sydney Harbour and to improve connectivity with Sydney's Northern Beaches. The Beaches Link and Gore Hill Freeway Connection component of the works (the project) includes a new tolled motorway tunnel connection from the Warringah Freeway to Balgowlah and Frenchs Forest, and upgrade and integration works to connect to the Gore Hill Freeway.

Transport for NSW is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* to construct and operate the project, which would comprise two main components:

- Twin motorway tunnels connecting the Warringah Freeway at Cammeray and the Gore Hill Freeway at Artarmon to the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Killarney Heights, and an upgrade of Wakehurst Parkway (the Beaches Link)
- Connection and integration works along the existing Gore Hill Freeway at Artarmon (the Gore Hill Freeway Connection).

Subject to planning approval, construction of the project is planned to commence in early 2023, with completion of the main construction works planned for around the end of 2027. Construction works for the new and improved public open space and recreation facilities are planned to commence in 2023 and would be progressively staged to be fully completed in late 2028.

This technical working paper is one of a number of technical documents that forms part of the environmental impact statement for the project. The purpose of this technical paper is to identify and assess the potential impacts of the project during both construction and operation in relation to socio-economics. In doing so, this paper responds directly to the Secretary's environmental assessment requirements, which are outlined in Section 1.7.

Key features of the project are discussed in Section 1.2. A detailed description of the project is provided in Chapter 5 (Project description) of the environmental impact statement.

Socio-economic impact assessment

Property impacts

Based on the current project design, an estimated 46 properties would be acquired and seven leased by the project. Land owned by Transport for NSW would also be used for construction and operation of the project, including eight residential properties previously acquired by Transport for NSW for the project.

Forty-one properties would be fully acquired for the project including 12 private commercial properties, 28 residential lots and one property owned by Sydney Water. A further five properties would be partially acquired for the project, including land owned by the State of NSW. This includes land at Artarmon Park. The tunnel alignment would also pass under numerous properties, including residential, commercial and social infrastructure uses.

Temporary leases would also be required during construction for use as construction support sites, including some land accommodating parks and open space at Artarmon Park, Flat Rock Reserve, Manly Dam, Spit West Reserve and Balgowlah Golf Course. Community access to space within the construction footprint at these locations would be temporarily restricted during construction. It is expected that the amenity of these parks and open space would also be diminished to varying degrees during construction and may detract from the enjoyment of people visiting accessible parts of the parks or nearby facilities. Land owned by Sydney Water at Killarney Heights and Willoughby City Council at Artarmon would also be affected by temporary lease during construction. Leased land would be rehabilitated in consultation with the relevant landowners, which include councils and government agencies, and returned as soon as practicable at the completion of construction.

Equity, population and demography

Construction of the project has potential to have a moderate impact on equity due to temporary impacts associated with noise, air quality and access arrangements. During operation the local environment and amenity improvements in the study area and surrounding region, and improved access and connectivity for residents, business and industry in the study area, northern suburbs, north western suburbs, and south-western suburbs, and the Greater Sydney region would have a positive impact on equity.

During construction the project is likely to have a negligible impact on population and demography. During operation the project is likely to contribute to the acceleration of development locally and regionally, particularly when considered in conjunction with the Western Harbour Tunnel and Warringah Freeway Upgrade project.

Employment, business and industry

During construction, the project would have positive impacts for local employment and businesses, through:

- The creation of direct construction-related employment opportunities on the project
- Increase expenditure on local goods and services, resulting in beneficial impacts for local businesses.

Construction of the project has potential to:

- Temporarily impact community values, residential and visual amenity, parks/open space and use of Middle Harbour, through potential noise and dust from construction activities, road infrastructure, construction support sites and cofferdams and vegetation removal
- Result in temporary adjustments and potential delays to local access and connectivity due to construction works and additional traffic, including for businesses, bus services, pedestrians and cyclists.

In the long term, the project would improve travel times, enhance the reliability and resilience of the road network across Sydney and improve access to the north, north-west and north-east of Sydney. The project would also improve access and connectivity to community services and facilities within the study area for local residents, through travel time savings and improved travel time reliability.

Social infrastructure

Construction and operation of the project would require the closure of Balgowlah Golf Course and associated golf club, requiring members and visitors to access golf courses elsewhere. However, the project would return an area, equivalent to around 90 per cent of the current open space, to the community as new and improved public open space and recreation facilities. Residual land, primarily to the east and north of the new access road, would progressively become available through the construction period, which would facilitate re-purposing it to the new and improved open space and recreation facilities. This would allow it to be handed over progressively for use by the community. The new open space and recreation facilities to the west of the proposed access road, between the access road and Burnt Bridge Creek Deviation, would be constructed and handed over to Northern Beaches Council after completion of the project.

A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council would take place to give the community an opportunity to provide input on the final layout of the new and improved open space and recreation facilities at Balgowlah. As part of this consultation process, a community reference group will be established, with representative stakeholder groups and the community, to support Transport for NSW and Northern Beaches Council with the development of this important public space. Use of the residual land for such facilities would address the current under supply of sporting grounds available for public use in the local area, although would require members and users of the golf course to use alternate golfing facilities.

The project would require conversion of a portion of land at Artarmon Park adjacent to the Gore Hill Freeway zoned for public recreation for permanent project infrastructure, however this is not expected to impact on the long-term use of this park. Land at Cammeray Golf Course would be partially acquired as part of the Western

Harbour Tunnel and Warringah Freeway Upgrade and used during construction and operation of the Beaches Link and Gore Hill Freeway Connection project. Cammeray Golf Course would be reconfigured to enable ongoing use of the golf course during construction and operation.

Community values

Some people near the project may experience a level of stress and anxiety associated with the acquisition of their property, the location of the tunnels beneath their properties, or the proximity of their properties to infrastructure such as operational support facilities. This has potential to impact on the health and wellbeing of some individuals. Relocation of residents due to acquisition for the project may also impact on community cohesion through disruption to social networks and community relationships, if residents are required to move away from the area and from existing social and support networks.

The project would require operational support facilities, including within and adjacent to the Warringah Freeway at Cammeray, adjacent to the Gore Hill Freeway at Artarmon (on the corner of Punch Street and Lambs Road), adjacent to Burnt Bridge Creek Deviation at Balgowlah, and on the Wakehurst Parkway at Killarney Heights (about 500 metres north of Seaforth Oval). The operation of support facilities is likely to influence people's perceptions of air quality at these locations and may be of particular concern for surrounding residents and users of nearby social infrastructure such as recreation facilities, schools and childcare centres. Further detail about the air quality impacts of the project are provided in Technical working paper: Air quality (refer to Appendix H of the environmental impact statement).

Potential air quality impacts for local communities near tunnel portals and associated operational support facilities were raised by some community members as a concern during consultation for the project. The ventilation outlets would be designed to effectively disperse emissions from the tunnels and contribution of the operation support facilities to air pollutant concentrations would be negligible. Any predicted changes in air quality would mainly be due to changes in traffic volumes on surface roads. Noticeable decreases in pollutant concentrations are predicted along Military Road, Spit Road, Manly Road and Warringah Freeway, reflecting reductions in traffic on these roads. Increases in pollutant concentrations were predicted along the Wakehurst Parkway, although the section of Wakehurst Parkway affected by changes in air quality is adjacent to bushland and no sensitive receivers are located close to the road. At a regional level, potential impacts on air quality would be negligible and generally undetectable.

Operation of the project is predicted to increase traffic noise levels for some sensitive receivers near the tunnel connections and the Warringah Freeway due to forecast increases in traffic volumes, although for many of these receivers, potential increases in traffic noise levels are likely to be minor and barely perceptible. Conversely, some communities near the Gore Hill Freeway connection, Warringah Freeway Upgrade and along roads such as Military Road and Warringah Road are predicted to experience reduced traffic noise due to the forecast reduction in traffic volumes along existing surface roads. Further detail regarding the operational noise impacts of the project is provided in Appendix G of the environmental impact statement (Technical working paper: Noise and vibration).

Access and connectivity

The project would result in reduced traffic along key routes including Military Road, Spit Road, Warringah Road, Eastern Valley Way, Brook and Miller Street. The project would also improve average travel speeds through the Warringah Freeway and North Sydney area. Changes to traffic patterns caused by the project may result in some increased localised delays for traffic through Frenchs Forest, particularly on Warringah Road and the Wakehurst Parkway. The potential increased localised delays at intersections would primarily result from the redistribution of traffic from Warringah Road to Beaches Link, but would also occur from an increase in forecast demand through the area. Even with these localised delays, road users would generally benefit from substantial overall travel time savings on the broader network (for example via Beaches Link, Warringah Road, the Wakehurst Parkway, and beyond) and traffic at individual intersections in the area would receive a substantial net benefit due to the broader connectivity and efficiency improvements.

Management of impacts

The implementation of safeguards and management measures would assist in avoiding or mitigating potential impacts on the socio-economic environment of the study area during construction and operation, while maximising or enhancing project benefits. Consultation with affected property owners, businesses and communities as well as community participation would be ongoing to guide the planning, environmental management and monitoring phases during construction and operation. Safeguards and management measures relevant to socio-economic impacts of the project are identified in Section 7 of this report.

1. Introduction

This section provides an overview of the Beaches Link and Gore Hill Freeway Connection (the project), including its key features and location. It also outlines the Secretary's environmental assessment requirements addressed in this technical working paper.

1.1 Overview

The Greater Sydney Commission's *Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018) proposes a vision of three cities where most residents have convenient and easy access to jobs, education and health facilities and services. In addition to this plan, and to accommodate for Sydney's future growth the NSW Government is implementing the *Future Transport Strategy 2056* (Transport for NSW, 2018), that sets the 40 year vision, directions and outcomes framework for customer mobility in NSW. The Western Harbour Tunnel and Beaches Link program of works is proposed to provide additional road network capacity across Sydney Harbour and Middle Harbour and to improve transport connectivity with Sydney's Northern Beaches. The Western Harbour Tunnel and Beaches Link program of works include:

- The Western Harbour Tunnel and Warringah Freeway Upgrade project which comprises a new tolled motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to connect to the Beaches Link and Gore Hill Freeway Connection project
- The Beaches Link and Gore Hill Freeway Connection project which comprises a new tolled motorway tunnel connection across Middle Harbour from the Warringah Freeway and the Gore Hill Freeway to Balgowlah and Killarney Heights and including the surface upgrade of the Wakehurst Parkway from Seaforth to Frenchs Forest and upgrade and integration works to connect to the Gore Hill Freeway at Artarmon.

A combined delivery of the Western Harbour Tunnel and Beaches Link program of works would unlock a range of benefits for freight, public transport and private vehicle users. It would support faster travel times for journeys between the Northern Beaches and areas south, west and north-west of Sydney Harbour. Delivering the program of works would also improve the resilience of the motorway network, given that each project provides an alternative to heavily congested existing harbour crossings.

1.2 The project

Transport for NSW is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* to construct and operate the Beaches Link and Gore Hill Freeway Connection project, which would comprise two components:

- Twin tolled motorway tunnels connecting the Warringah Freeway at Cammeray and the Gore Hill Freeway at Artarmon to the Burnt Bridge Creek Deviation at Balgowlah and the Wakehurst Parkway at Killarney Heights, and an upgrade of the Wakehurst Parkway (the Beaches Link)
- Connection and integration works along the existing Gore Hill Freeway and surrounding roads at Artarmon (the Gore Hill Freeway Connection).

A detailed description of these two components is provided in **Section 1.4**.

1.3 Project location

The project would be located within the North Sydney, Willoughby, Mosman and Northern Beaches local government areas, connecting Cammeray in the south with Killarney Heights, Frenchs Forest and Balgowlah in the north. The project would also connect to both the Gore Hill Freeway and Reserve Road in Artarmon in the west.

Commencing at the Warringah Freeway at Cammeray, the mainline tunnels would pass under Naremburn and Northbridge, then cross Middle Harbour between Northbridge and Seaforth Bluff. The mainline tunnels would then split under Seaforth into two ramp tunnels and continue north to the Wakehurst Parkway at Killarney Heights and north-east to Balgowlah, linking directly to the Burnt Bridge Creek Deviation to the south of the existing Kitchener Street bridge.

The mainline tunnels would also have on and off ramps from under Northbridge connecting to the Gore Hill Freeway and Reserve Road east of the existing Lane Cove Tunnel. Surface works would also be carried out at the Gore Hill Freeway in Artarmon, Burnt Bridge Creek Deviation at Balgowlah and along the Wakehurst Parkway between Seaforth and Frenchs Forest to connect the project to the existing arterial and local road networks.

1.4 Key features of the project

Key features of the Beaches Link component of the project are shown in **Figure 1-1** and would include:

- Twin mainline tunnels about 5.6 kilometres long and each accommodating three lanes of traffic in each direction, together with entry and exit ramp tunnels to connections at the surface. The crossing of Middle Harbour between Northbridge and Seaforth Bluff would involve three lane, twin immersed tube tunnels
- Connection to the stub tunnels constructed at Cammeray as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project
- Twin two lane ramp tunnels:
 - Eastbound and westbound connections between the mainline tunnel under Seaforth and the surface at the Burnt Bridge Creek Deviation, Balgowlah (about 1.2 kilometres in length)
 - Northbound and southbound connections between the mainline tunnel under Seaforth and the surface at the Wakehurst Parkway, Killarney Heights (about 2.8 kilometres in length)
 - Eastbound and westbound connections between the mainline tunnel under Northbridge and the surface at the Gore Hill Freeway and Reserve Road, Artarmon (about 2.1 kilometres in length).
- An access road connection at Balgowlah between the Burnt Bridge Creek Deviation and Sydney Road including the modification of the intersection at Maretimo Street and Sydney Road, Balgowlah
- Upgrade and integration works along the Wakehurst Parkway, at Seaforth, Killarney Heights and Frenchs Forest, through to Frenchs Forest Road East
- New and improved open space and recreation facilities at Balgowlah
- New and upgraded pedestrian and cyclist infrastructure
- Ventilation outlets and motorway facilities at the Warringah Freeway in Cammeray, the Gore Hill Freeway in Artarmon, the Burnt Bridge Creek Deviation in Balgowlah and the Wakehurst Parkway in Killarney Heights
- Operational facilities, including a motorway control centre at the Gore Hill Freeway in Artarmon, and tunnel support facilities at the Gore Hill Freeway in Artarmon and the Wakehurst Parkway in Frenchs Forest
- Other operational infrastructure including groundwater and tunnel drainage management and treatment systems, surface drainage, signage, tolling infrastructure, fire and life safety systems, roadside furniture, lighting, emergency evacuation and emergency smoke extraction infrastructure, Closed Circuit Television (CCTV) and other traffic management systems.

Key features of the Gore Hill Freeway Connection component of the project are shown in Figure 1-2 and would include:

- Upgrade and reconfiguration of the Gore Hill Freeway between the T1 North Shore & Western Line and T9 Northern Line and the Pacific Highway
- Modifications to the Reserve Road and Hampden Road bridges
- Widening of Reserve Road between the Gore Hill Freeway and Dickson Avenue
- Modification of the Dickson Avenue and Reserve Road intersection to allow for the Beaches Link off ramp
- Upgrades to existing roads around the Gore Hill Freeway to integrate the project with the surrounding road network
- Upgrade of the Dickson Avenue and Pacific Highway intersection
- New and upgraded pedestrian and cyclist infrastructure
- Other operational infrastructure, including surface drainage and utility infrastructure, signage and lighting, CCTV and other traffic management systems.

A detailed description of the project is provided in Chapter 5 (Project description) of the environmental impact statement.

Subject to obtaining planning approval, construction of the project is anticipated to commence in 2023 and is expected to take around five to six years to complete.

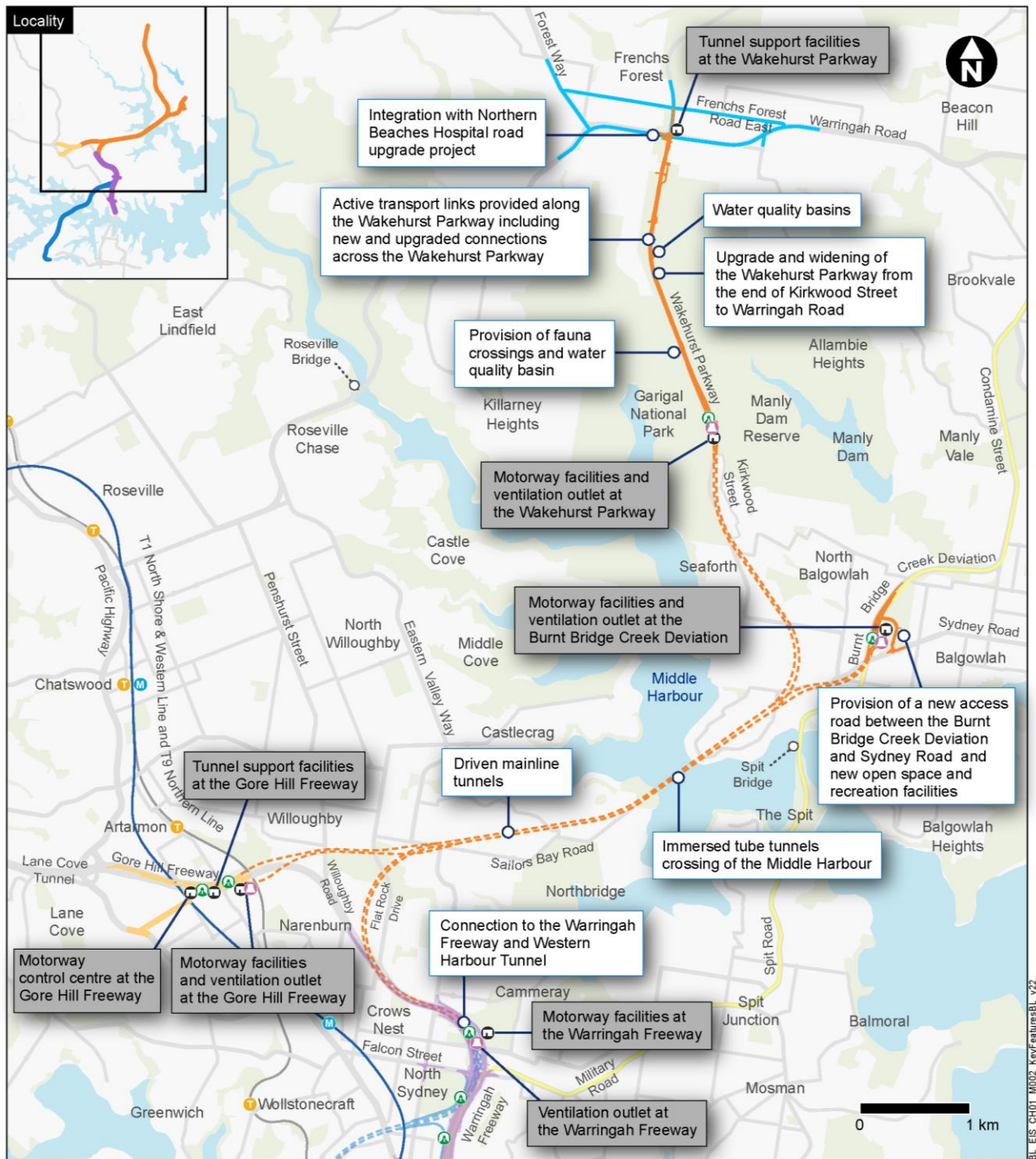


Figure 1-1 Key features of the Beaches Link component of the project

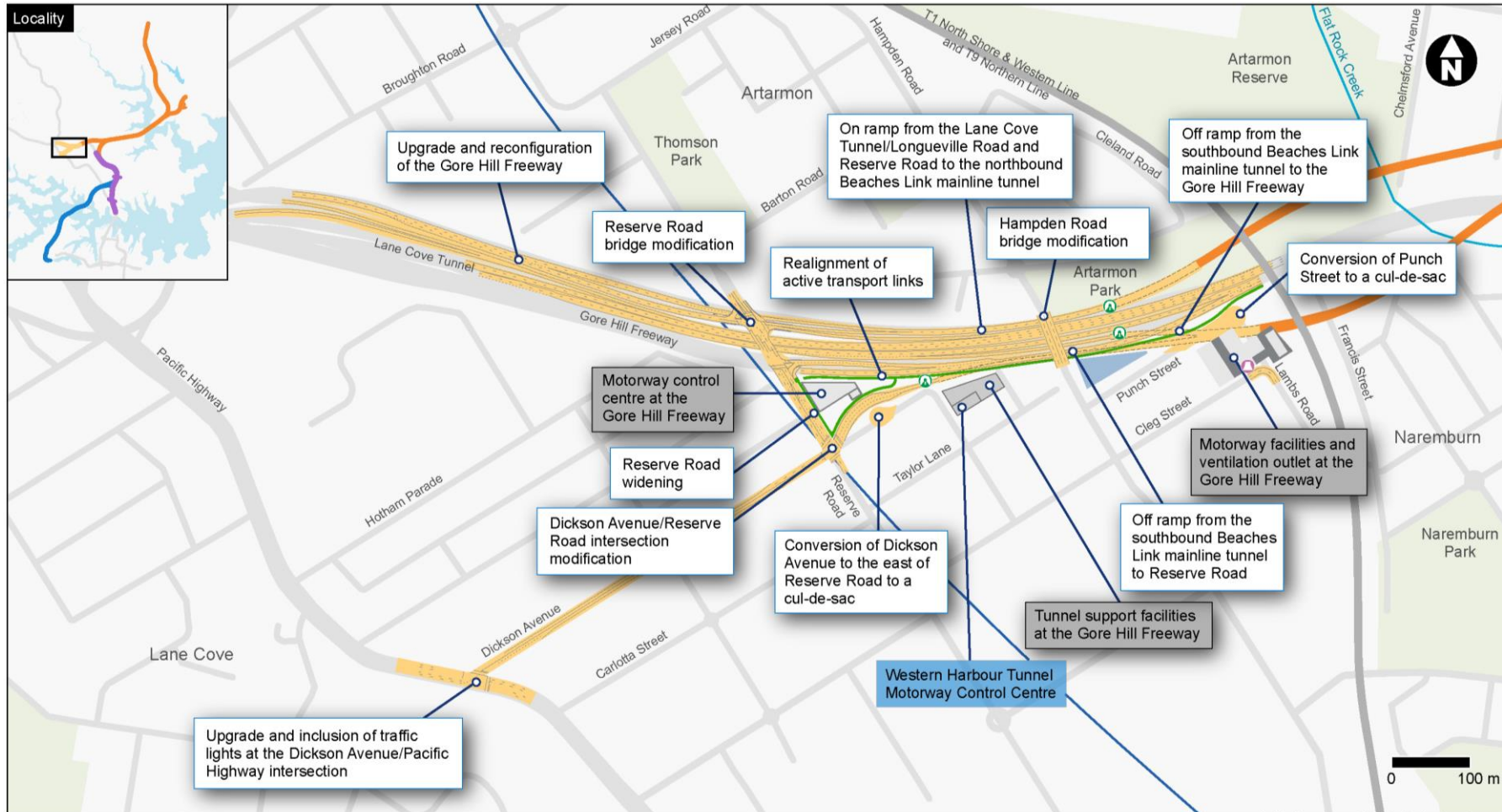


Figure 1-2 Key features of the Gore Hill Freeway component of the project

Beaches Link and Gore Hill Freeway Connection

1.5 Key construction activities

The area required to construct the project is referred to as the construction footprint. The majority of the construction footprint would be located underground within the mainline and ramp tunnels. However, surface areas would also be required to support tunnelling activities and to construct the tunnel connections, tunnel portals, surface road upgrades and operational facilities.

Key construction activities would include:

- Early works and site establishment, with typical activities being property acquisition and condition surveys, utilities installation, protection, adjustments and relocations, installation of site fencing, environmental controls (including noise attenuation and erosion and sediment control), traffic management controls, vegetation clearing, earthworks, demolition of structures, building construction support sites including acoustic sheds and associated access decline acoustic enclosures (where required), construction of minor access roads and the provision of property access, temporary relocation of pedestrian and cycle paths and bus stops, temporary relocation of swing moorings and/or provision of alternative facilities (mooring or marina berth) within Middle Harbour
- Construction of the Beaches Link, with typical activities being excavation of tunnel construction access declines, construction of driven tunnels, cut and cover and trough structures, construction of surface upgrade works, construction of cofferdams, dredging and immersed tube tunnel piled support activities in preparation for the installation of immersed tube tunnels, casting and installation of immersed tube tunnels and civil finishing and tunnel fitout
- Construction of operational facilities comprising:
 - A motorway control centre at the Gore Hill Freeway in Artarmon
 - Tunnel support facilities at the Gore Hill Freeway in Artarmon and at the Wakehurst Parkway in Frenchs Forest
 - Motorway facilities and ventilation outlets at the Warringah Freeway in Cammeray (fitout only of the Beaches Link ventilation outlet at the Warringah Freeway (being constructed by the Western Harbour Tunnel and Warringah Freeway Upgrade project), the Gore Hill Freeway in Artarmon, the Burnt Bridge Creek Deviation in Balgowlah and the Wakehurst Parkway in Killarney Heights
 - A wastewater treatment plant at the Gore Hill Freeway in Artarmon
 - Installation of motorway tolling infrastructure
- Staged construction of the Gore Hill Freeway Connection at Artarmon and upgrade and integration works at Balgowlah and along the Wakehurst Parkway with typical activities being earthworks, bridgeworks, construction of retaining walls, stormwater drainage, pavement works and linemarking and the installation of roadside furniture, lighting, signage and noise barriers
- Testing of plant and equipment and commissioning of the project, backfill of access declines, removal of construction support sites, landscaping and rehabilitation of disturbed areas and removal of environmental and traffic controls.

Temporary construction support sites would be required as part of the project (refer to **Figure 1-3**), and would include tunnelling and tunnel support sites, civil surface sites, cofferdams, mooring sites, wharf and berthing facilities, laydown areas, parking and workforce amenities. Construction support sites would include:

- Cammeray Golf Course (BL1)
- Flat Rock Drive (BL2)
- Punch Street (BL3)
- Dickson Avenue (BL4)
- Barton Road (BL5)

- Gore Hill Freeway median (BL6)
- Middle Harbour south cofferdam (BL7)
- Middle Harbour north cofferdam (BL8)
- Spit West Reserve (BL9)
- Balgowlah Golf Course (BL10)
- Kitchener Street (BL11)
- Wakehurst Parkway south (BL12)
- Wakehurst Parkway east (BL13)
- Wakehurst Parkway north (BL14).

A detailed description of construction works for the project is provided in Chapter 6 (Construction work) of the environmental impact statement.

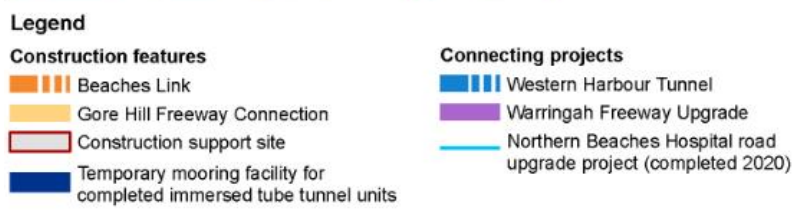
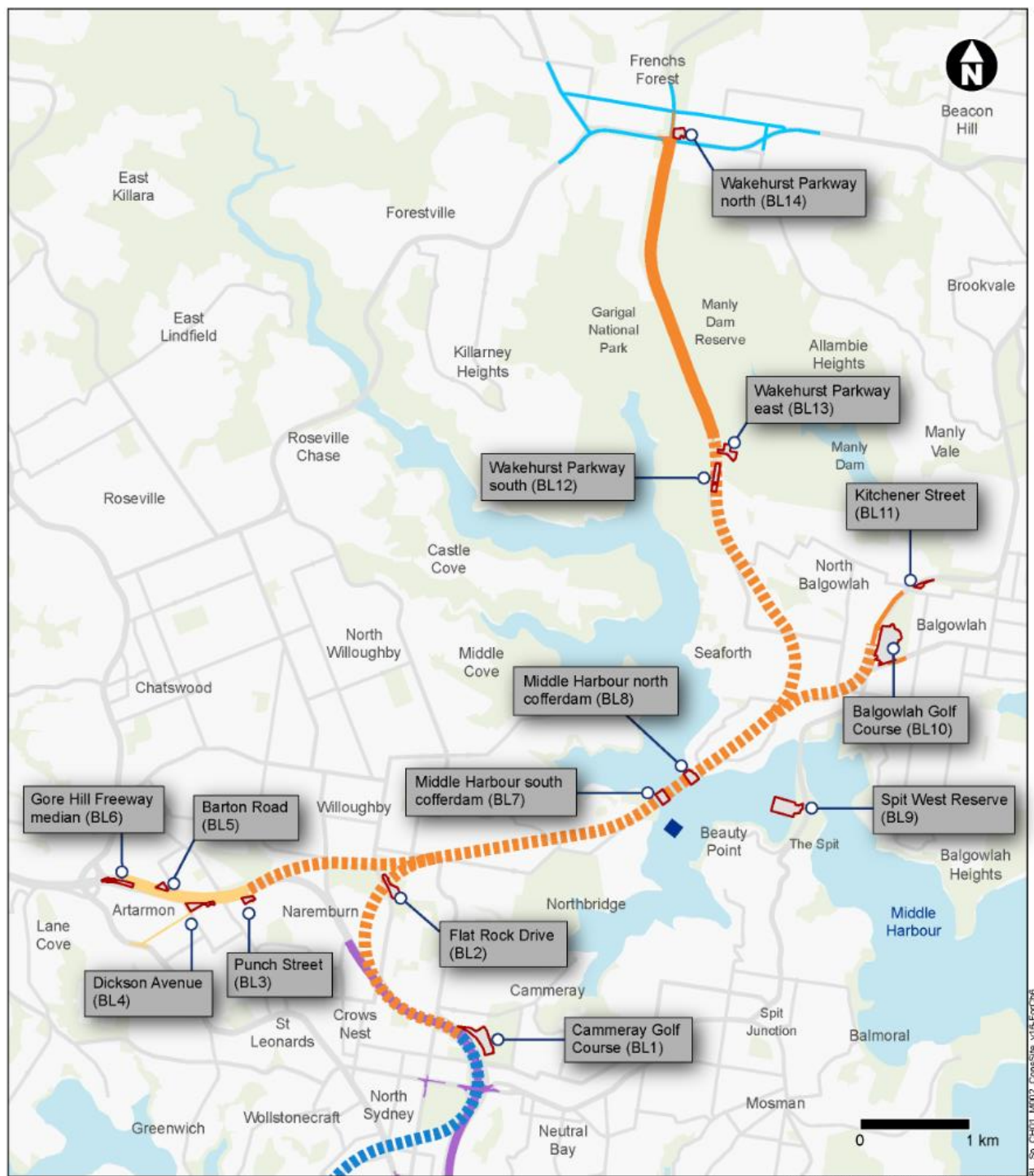


Figure 1-3 Overview of the construction support sites

1.6 Purpose of this report

This report has been prepared to support the environmental impact statement for the project and to address the environmental assessment requirements of the Secretary of the NSW Department of Planning, Industry and Environment.

The purpose of this report is to assess potential socio-economic benefits and impacts of the project. It includes:

- A description of the existing socio-economic baseline conditions of potentially affected communities and groups near the project
- An assessment of potential changes to socio-economic conditions from the construction and operation of the project
- Recommended mitigation and monitoring measures to enhance the project’s benefits and to avoid, manage or mitigate its potential socio-economic impacts.

1.7 Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements relating to socio-economic impacts, land use and property and where these requirements are addressed in this report are outlined in Table 1-1.

Table 1-1 Secretary's environmental assessment requirements – Socio-economic assessment

Secretary's environmental assessment requirement	Where addressed
Socio-economic, Land Use and Property (Key issue 8)	
1. The Proponent must assess social and economic impacts (of all phases of the project) in accordance with the current guidelines (including cumulative construction and operational impacts of the proposal and other major projects in the vicinity of the project) and in consultation with relevant land owners (such as the Ports Authority of NSW and those land owners whose property is being acquired).	Socio-economic impacts – Section 6 Cumulative impacts – Section 6.9 and Chapter 27 (Cumulative impacts) of the environmental impact statement Consultation – Chapter 7 (Stakeholder and community engagement) of the environmental impact statement

Secretary’s environmental assessment requirement	Where addressed
<p>2. The Proponent must assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users, including amenity impacts (including from cumulative and extended construction time frames and construction fatigue), property acquisitions/adjustments, future land uses, access, relevant statutory rights, and community severance and barrier impacts resulting from the project.</p>	<p>Property impacts – Section 6.1 and Chapter 20 (Land use and property) of the environmental impact statement Business impacts – Annexure A of this report Impacts on recreational uses – Section 6.6 Impacts on land and water users – Section 6.8, Section 6.1 and Section 6.6 Amenity impacts – Section 6.7 Cumulative impacts and construction fatigue – Section 6.9 and Chapter 27 (Cumulative impacts) of the environmental impact statement Property acquisition – Section 6.1 and Chapter 20 (Land use and property) of the environmental impact statement Community severance and barrier impacts – Chapter 20 (Land use and property) of the environmental impact statement</p>

2. Assessment methodology

This section provides an overview of the methodology for this socio-economic assessment, including the study area, study methodology and community and stakeholder consultation.

2.1 Study methodology

This assessment has been developed in accordance with the *Environmental Impact Assessment Practice Note N05 – Socio-economic assessment January 2020*¹ (Transport for NSW, 2020) and to address the socio-economic matters outlined in the environmental assessment requirements issued by the Secretary of the Department of Planning, Industry and Environment. Land use and property impacts due to the construction and operation of the project are addressed in Chapter 20 (Land use and property) of the environmental impact statement.

Socio-economic impact assessment involves identifying, assessing and evaluating changes to, or impacts on, communities, businesses and industry that are likely to occur as a result of a development, to inform mitigation or management of those impacts and to maximise benefits. The first step in the assessment of the project involved scoping the likely range of potential socio-economic impacts and identifying businesses and communities likely to be affected by the project. This was informed by:

- The Secretary's environmental assessment requirements for the project
- *Environmental Impact Assessment Practice Note N05 – Socio-economic assessment January 2020* (Transport for NSW, 2020)
- Socio-economic assessments and business impact assessments carried out for other relevant road and transport infrastructure projects in NSW and elsewhere
- Outcomes of community and stakeholder consultation carried out for the project.

An outcome of step one also included the definition of the study area as described in Section 2.2.

The second step of the assessment involved describing existing socio-economic and business characteristics, values and conditions in the study area. The existing baseline involved consideration of both qualitative and quantitative analysis, including:

- Reviewing existing State and local government policies and strategies relevant to the social environment
- Analysing population and demographic data for communities in the study area, such as population size and growth, diversity, socio-economic disadvantage and housing, as well as data on employment and income, workers and visitors to the study area
- Reviewing existing social infrastructure near the project such as education facilities, health and emergency services, recreation uses and transport facilities
- Analysing existing business and industry characteristics
- Identifying existing community values relating to factors such as amenity and sense of place, access and connectivity, and community health and safety.

The description of existing socio-economic conditions principally draws on information from the Australian Bureau of Statistics (ABS) Census of Population and Housing 2016, supplemented with information and data from:

- Government agencies such as the ABS and local councils

¹ The *Environmental Impact Assessment Practice Note N05 – Socio-economic assessment January 2020* updates the previous version of the socio-economic practice note released in 2013

- NSW Government and local council publications, reports, guidelines and websites
- Community consultation carried out for the project (as summarised in Chapter 7 (Stakeholder engagement) of the environmental impact statement)
- Survey of businesses within the study area (refer to Section 2.1.1 for further details).

The next step for the socio-economic assessment involved identifying and evaluating changes to existing socio-economic and business conditions and values in the study area due to the project's construction and operation. This included direct and indirect benefits and impacts as well as cumulative impacts of other projects proposed, planned or under construction. The assessment considered potential project benefits and impacts relating to:

- Property impacts, including impacts of property acquisition and temporary lease of property for construction
- Equity, including the distribution of project benefits and impacts
- Potential changes to population and demography
- Employment, including direct and indirect employment impacts
- Business and industry, including from direct property impacts and changes in the local business environment
- Social infrastructure, including from property acquisition, temporary lease of land, and changes in local access and connectivity and amenity
- Community values, including changes to local amenity, community cohesion, local character and identity, health and safety, and environmental and natural features
- Changes to local access and connectivity, including for pedestrians, cyclists, public transport users, maritime transport users, and motorists.

This assessment was informed by other studies carried out for the environmental impact statement including Appendix F (Technical working paper: Traffic and transport), Appendix G (Technical working paper: Noise and vibration impact assessment), Appendix H (Technical working paper: Air quality), Appendix N (Technical working paper: Groundwater), Appendix I (Technical working paper: Human health impact assessment), the Business impact assessment (HillPDA, 2020) and Chapter 20 (Land use and property) of the environmental impact statement.

Cumulative impacts relating to socio-economic issues are also considered due to the potential for impacts from the project to interact or overlap with impacts from other projects within the study area.

An evaluation matrix was used to assess the potential socio-economic impacts, considering the likely extent, duration and severity of each impact and the consequences and probability of the impact occurring. Only negative impacts are assigned a level of significance. Further information on the evaluation matrix is provided in Section 2.1.2.

The final step of the assessment involved identifying measures to avoid, minimise or mitigate impacts on communities, social infrastructure and business and industry arising from the project.

2.1.1 Business impact assessment

This assessment has been informed by a business impact assessment prepared by HillPDA. A copy of the business impact assessment report is provided in Annexure A.

A business survey was conducted to inform the business impact assessment. The purpose of the survey was to understand how businesses near the project currently operate and the main issues, perceptions and concerns of businesses relating to the project's construction and operation. The business surveys were conducted in

local centres considered to be more susceptible to direct or indirect effects of construction and/or operation of the project.

The survey was conducted by HillPDA over a three-week period in November 2017. Businesses were surveyed at nine locations across the study area. For the purposes of this assessment, the study area has been divided into two ‘precincts’ located south (Western Precinct) and north (Eastern Precinct) of Middle Harbour. Businesses were approached at random with over 218 businesses participating in the survey. The survey covered a wide variety and representative sample of business types including retail shops, industrial premises, real estate agencies, cafes, pubs, restaurants, auto service centres and professional service businesses. Business owners had the further opportunity to comment on the project as part of the wider project engagement in December 2018. Further engagement with business stakeholders will be carried out during the environmental impact assessment exhibition period.

Table 2-1 provides an overview of the nine locations and the number of businesses surveyed at each location. The number of surveys collected in each precinct varied slightly depending on the precinct’s size and number of businesses present.

Table 2-1 Business surveys

Survey location	Number of businesses surveyed
Western Precinct	
Artarmon/Northbridge Plaza	33
Military Road	30
Spit Junction	18
Eastern Precinct	
Austlink Business Park	15
Balgowlah	26
Frenchs Forest	18
Manly Vale	26
Warringah Mall	24
Seaforth/Spit Bridge	28
Total	218

2.1.2 Evaluation of significance

An evaluation matrix was used to evaluate the significance of potential negative socio-economic impacts associated with the construction and operation of the project. This assessment considers both positive and negative social and economic impacts of the project’s construction and operation; however, only negative impacts have been assigned a level of significance in accordance with the process outlined in *Environmental Impact Assessment Practice Note N05 – socio-economic assessment January 2020* (Transport for NSW, 2020). The significance of identified impacts was assessed by considering the sensitivity of the receptor and the magnitude of the proposed works (refer to Table 2-4).

Sensitivity of the existing environment

The sensitivity of a receptor (for example, communities, businesses, business clusters, social infrastructure, residences) refers to the qualities that influence a receptor’s vulnerability to changes from the project and/or capacity to adapt. This can be influenced by existing conditions relating to such things as amenity, demographic characteristics, economic activity and types of industry and/or businesses present, connectivity

and access, property and land use types and known future changes (for example rezoning), community values and community cohesion. Criteria for determining the sensitivity of receptors is described in Table 2-2.

Table 2-2 Levels of sensitivity

Sensitivity	Example
Negligible	No vulnerability and able to absorb or adapt to change
Low	Minimal areas of vulnerabilities and a high ability to absorb or adapt to change
Moderate	A number of vulnerabilities but retains some ability to absorb or adapt to change
High	Multiple vulnerabilities and/or very little capacity to absorb or adapt to change

Magnitude of impact

The magnitude of change due to the project relates to the scale, duration, intensity and scope of works. This can be influenced by such things as the geographical area affected, the type, frequency and duration of works; and operational uses and built form. The levels of magnitude are described in Table 2-3.

Table 2-3 Levels of magnitude

Magnitude	Example
Negligible	No discernible positive or negative changes caused by the impact. Change from the baseline remains within the range commonly experienced by receptors.
Low	A discernible change from baseline conditions. Tendency is that the impact is to a small proportion of receptors over a limited geographical area and mainly within the vicinity of the project. The impact may be short term, or some impacts may extend over the life of the project.
Moderate	A clearly noticeable difference from baseline conditions. Tendency is that the impact is to a small to large proportion of receptors and may be over an area beyond the vicinity of the project. Duration may be short to medium term or some impacts may extend over the life of the project.
High	A change that dominates over existing baseline conditions. The change is widespread or persists over many years or is effectively permanent.

Assessing level of significance

The significance of an identified negative impact is determined by the combination of sensitivity and magnitude compared to the existing baseline condition. In evaluating the level of significance, consideration was given to:

- The range of potential direct and indirect impacts during construction and operation
- Cumulative impacts with other projects.

Potential impacts have been considered using Table 2-4. The level of significance is presented for construction and operational impacts, with mitigation.

Table 2-4 Assessing the level of significance

		Magnitude			
		High	Moderate	Low	Negligible
Sensitivity	High	High impact	High-moderate impact	Moderate impact	Negligible impact
	Moderate	High-moderate impact	Moderate impact	Moderate-low impact	Negligible impact
	Low	Moderate impact	Moderate-low impact	Low impact	Negligible impact
	Negligible	Negligible impact	Negligible impact	Negligible impact	Negligible impact

2.2 Study area

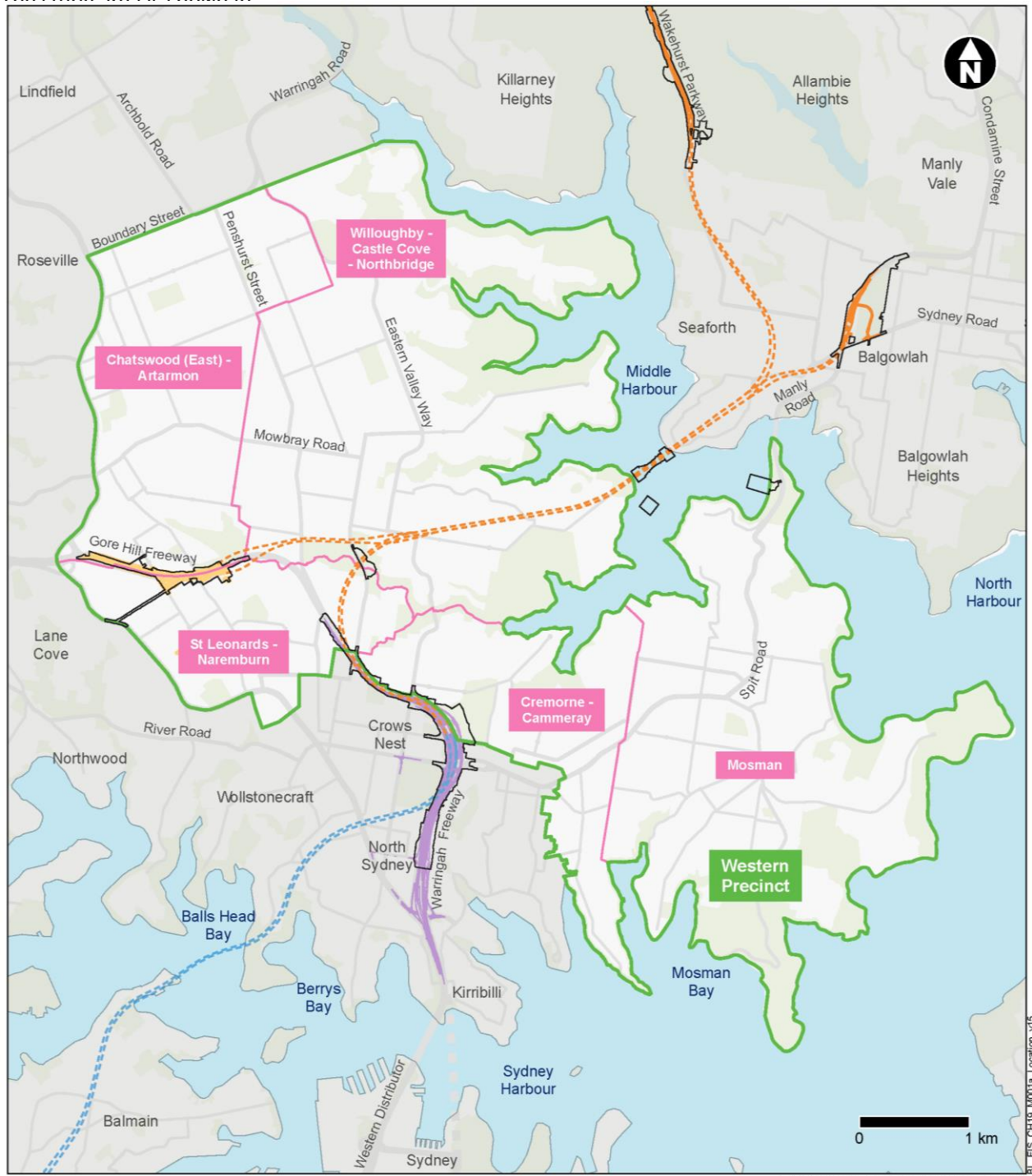
The study area for this socio-economic assessment includes those communities that may experience changes to socio-economic conditions due to the location of the project, construction activities and changes in travel patterns for residents, workers and visitors. It comprises the ABS Statistical Areas Level 2 (SA2) geographies that either overlap or are located near the project and the section of Middle Harbour near the project alignment.

For the purposes of this assessment, the study area has been divided into two ‘precincts’ located south (Western Precinct) and north (Eastern Precinct) of Middle Harbour. The ABS SA2 geographies within each precinct include:

- Western Precinct:
 - Cremorne-Cammeray
 - St Leonards-Naremburn
 - Chatswood (East)-Artarmon
 - Willoughby-Castle Cove-Northbridge
 - Mosman
- Eastern Precinct:
 - Balgowlah-Clontarf-Seaforth
 - Manly Vale-Allambie Heights
 - Forestville-Killarney Heights
 - Frenchs Forest-Belrose.

Some benefits and impacts would also be experienced by communities in the wider region. As such, this assessment also considered potential impacts on communities and businesses in the North Sydney, Willoughby, Mosman and Northern Beaches local government areas and the Greater Sydney region at a broader level, where relevant.

The study area is shown in



Indicative only – subject to design development

Legend

Operational features

- Beaches Link
- Gore Hill Freeway Connection
- Construction footprint

Connecting projects

- Western Harbour Tunnel
- Warringah Freeway Upgrade

Western precinct

- Precinct boundary
- Statistical area boundary

(Figure 2-1a and Figure 2-1b). Table 2-5 provides a summary of the SA2 areas in the study area, along with the corresponding local government area.

Table 2-5 Statistical Areas Level 2 in the study area

Locality	Referred to in this social impact assessment	Local government area
Cremorne-Cammeray SA2	Cremorne-Cammeray	North Sydney Council
St Leonards-Naremburn SA2	St Leonards-Naremburn	
Chatswood (East)-Artarmon SA2	Chatswood (East)-Artarmon	City of Willoughby
Willoughby-Castle Cove-Northbridge SA2	Willoughby-Castle Cove-Northbridge	
Mosman SA2	Mosman	Mosman Council
Balgowlah-Clontarf-Seaforth SA2	Balgowlah-Clontarf-Seaforth	Northern Beaches Council
Manly Vale-Allambie Heights SA2	Manly Vale-Allambie Heights	
Forestville-Killarney Heights SA2	Forestville-Killarney Heights	
Frenchs Forest-Belrose SA2	Frenchs Forest-Belrose	

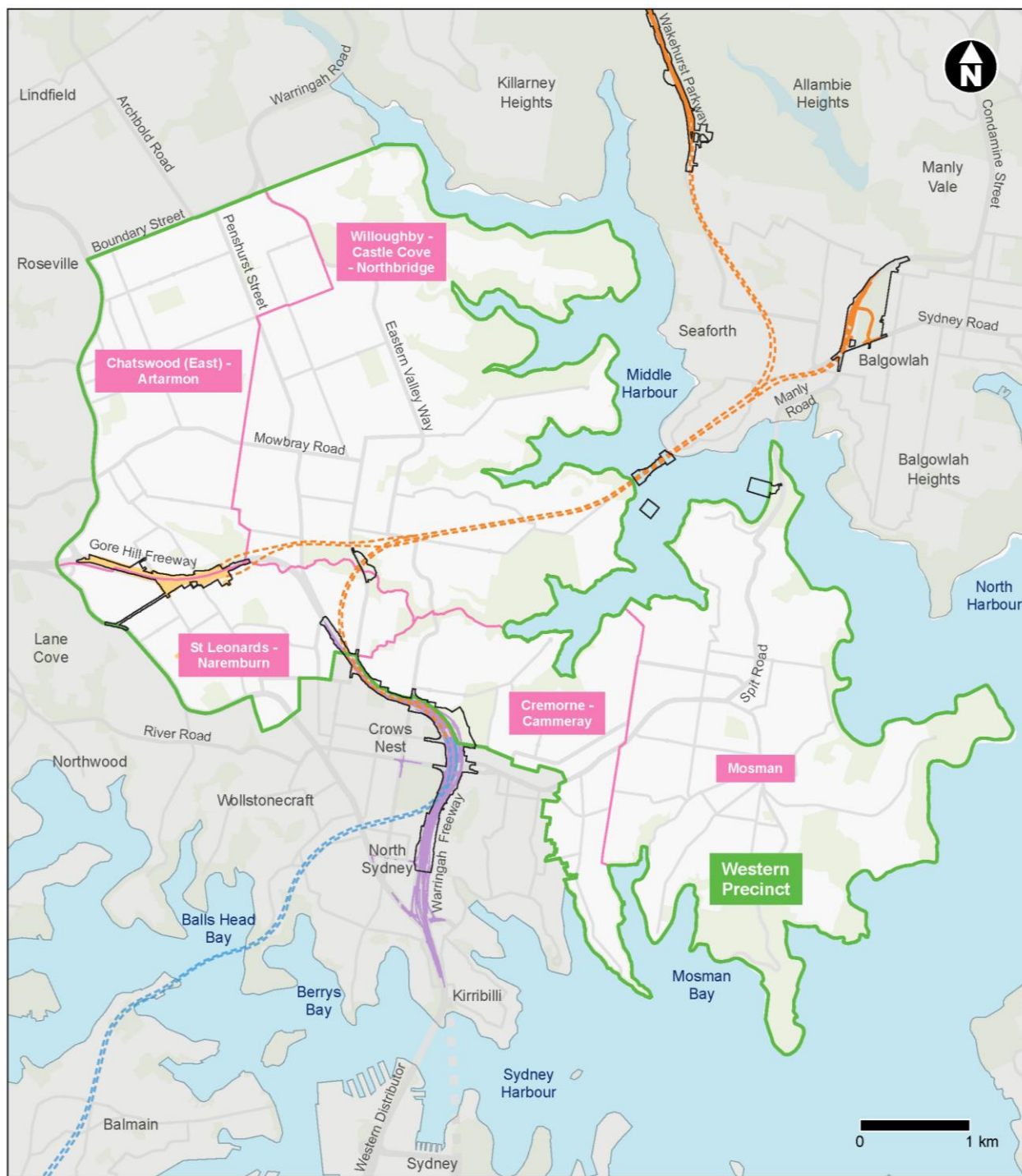


Figure 2-1a Socio-economic assessment study area (Western Precinct)

Note: Apart from the motorway facilities, cut and cover structures, trough structures and tunnelling works in Cammeray, the construction footprint shown on the Warringah Freeway would consist of low impact activities such as traffic control and management, line marking and staged surface roadworks tie in works, and utility and cable works required to connect to the Western Harbour Tunnel and Warringah Freeway Upgrade project and other local roads.

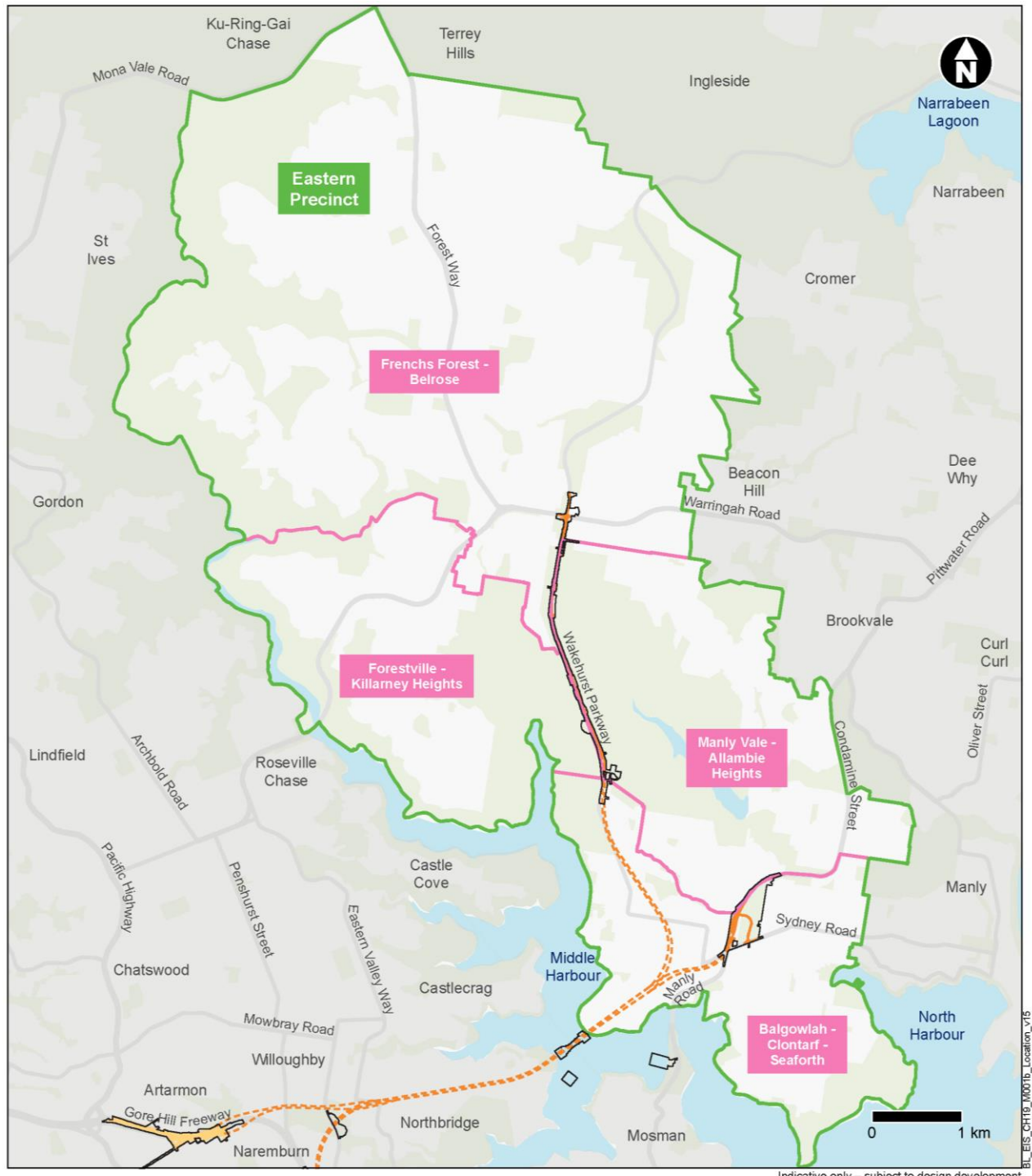


Figure 2-1b Socio-economic assessment study area (Eastern Precinct)

2.3 Community and stakeholder engagement

Community and stakeholder engagement, including with relevant land owners (such as Port Authority of NSW and owners of property being acquired), local communities, businesses and government agencies, has informed the project's development. This assessment has been informed by the outcomes of this engagement, including the identification of existing features and values important to communities in the study area, and assessment of potential benefits and impacts of the project.

Chapter 7 (Stakeholder and community engagement) of the environmental impact statement provides an overview of community and stakeholder engagement carried out for the project, along with the key issues raised. A summary of the key socio-economic issues raised through community and stakeholder engagement is provided in Section 5 of this report.

3. Socio-economic policy context

This section provides an overview of the broader social and economic policies and strategies relevant to the project and study area.

3.1 National and State strategies

Chapter 3 (Strategic context and project need) of the environmental impact statement provides a description of national and State strategic planning and transport policies which are relevant to the project. These include:

- *Australian Infrastructure Plan: Priorities and reforms for our nation's future* (Infrastructure Australia, 2016)
- *State Infrastructure Strategy 2018-2038* (Infrastructure NSW, 2018)
- *Future Transport Strategy 2056* (NSW Government, 2018)
- *Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018a)
- *North District Plan* (Greater Sydney Commission, 2018b)
- *Directions for a Greater Sydney 2017-2056* (Greater Sydney Commission, 2017)
- *NSW Freight and Ports Strategy* (Transport for NSW, 2013a).

The project would generally support the actions of these plans by reducing congestion, improving travel times and enhancing the reliability of the road network across Sydney and improving access to the north and north-east of Sydney.

3.2 Local government strategies

3.2.1 North Sydney Council

The *North Sydney Community Strategic Plan 2018-2028* (North Sydney Council, 2018) (North Sydney Community Strategic Plan) identifies the community's main priorities and aspirations for its future and provides strategies for achieving these outcomes. The North Sydney Community Strategic Plan was prepared in partnership with local residents and businesses, to develop the vision of "*shaping a progressive, vibrant and diverse North Sydney Community*" and priorities and strategies to help manage inevitable change while protecting what the community values most.

The North Sydney Community Strategic Plan outlines five strategic directions, each with desired outcomes and supported by specific strategies. The strategic directions relevant to the project include:

- Direction 1 – our living environment, which includes among other things a strategy for maximising use of existing, and protecting, enhancing and expanding public open space
- Direction 2 – our built infrastructure, which includes strategies relating to adapting existing infrastructure, improving public transport use, integrating major transport infrastructure, and improving safety for pedestrians, motorists and bus and bike riders
- Direction 3 – our future planning, which includes strategies relating to planning for North Sydney to continue to be one of NSW's pre-eminent commercial centres; and strengthening North Sydney CBD's competitiveness and identity, differentiating it from other centres.

The project would improve access to key commercial and employment centres including North Sydney, Artarmon, Chatswood and Macquarie Park and strategic centres in the Northern Beaches and enable faster, more reliable journey times for freight services, bus customers, and other road users on all road corridors crossing Middle Harbour. The project would also improve road safety by providing a free-flowing alternative

crossing of Middle Harbour to the Northern Beaches and relieving congestion on the Military Road/Spit Road and Warringah Road/Eastern Valley Way corridors.

The project would also provide new opportunities for public transport, such as express bus connections with North Sydney, the Sydney CBD, Macquarie Park, St Leonards and other key centres across greater Sydney via the motorway network. The project would also provide the opportunity for efficient access and interchange with the new Victoria Cross Metro Station at North Sydney.

The North Sydney Community Strategic Plan recognises challenges for North Sydney, including a growing and changing population and ageing infrastructure, and recognition that many private motor vehicles travel within and through North Sydney, leading to traffic congestion and impacting on pedestrian accessibility and amenity.

3.2.2 City of Willoughby

Our Future Willoughby 2028 – Community Strategic Plan (Willoughby City Council, 2018) (Willoughby Community Strategic Plan) is the community's long-term vision and priorities for the future of Willoughby City local government area. It sets the strategic direction for Willoughby City to 2028, its policies, services and activities to achieve the future vision for Willoughby City as '*Willoughby's diversity underpins our liveable and prosperous City*'.

The Willoughby Community Strategic Plan adopts five outcomes to achieve the community's vision, each supported by a number of priorities. The outcomes relevant to the project include:

- Outcome 2 – A City that is connected and inclusive, which includes priorities relating to enhanced transport choices and connections and reducing parking and traffic congestion
- Outcome 3 – A City that is liveable, which includes priorities relating to maintaining quality of life by balancing population growth with the provision of assets and services
- Outcome 4 – A City that is prosperous and vibrant, including priorities such as facilitating the development of all businesses and facilitating the vibrancy of village centres.

The project would improve road safety by reducing road network congestion and providing an alternative crossing of Middle Harbour to the Northern Beaches. Reduced congestion on the Warringah Road/Eastern Valley Way corridor would improve liveability for residents, making it easier for local residents to travel to home, work and amenities within their local area and the wider Northern Beaches area. The project would also provide new opportunities for public transport, with a new motorway tunnel allowing new public transport routes to be developed in response to diverse travel demands such as express bus connections with North Sydney, the Sydney CBD, Macquarie Park, St Leonards and other key centres across greater Sydney via the motorway network.

3.2.3 Mosman Council

A Plan for Mosman's Future – MOSPLAN Community Strategic Plan 2018-2028 (Mosman Council, 2018) (Mosman Community Strategic Plan) outlines the 10 year vision for the Mosman local government area as '*a vibrant harbourside village where community, lifestyle and heritage are valued and where residents feel safe and connected*'.

The Mosman Community Strategic Plan was prepared through engagement with the community to identify key issues and interests. Traffic congestion and management was identified as the most concerning issue for Mosman's residents. In particular, traffic congestion and insufficient public transport were identified as key factors influencing residents' dislike for Mosman, with traffic along the Military Road/Spit Road corridor identified as a key issue.

The Mosman Community Strategic Plan identifies seven strategic directions to achieve the community's vision, each supported by a number of priorities. The strategic directions relevant to the project include:

Beaches Link and Gore Hill Freeway Connection

- Strategic direction 6 – well designed, liveable and accessible places, which includes strategies relating to the provision of high quality public infrastructure and improving access for everyone to, from and within Mosman
- Strategic direction 7 – a healthy and active village lifestyle, which includes strategies to facilitate safe environments for everyday living, and protecting and enhancing Mosman’s village atmosphere.

The project would relieve congestion on the Military Road/Spit Road corridor by providing an alternative crossing of Middle Harbour to the Northern Beaches, which would result in associated improvements in road safety performance and urban amenity improvements along the Military Road/Spit Road corridor and in local centres. A reduction in congestion on surface roads would also contribute to improved conditions for cyclists.

3.2.4 Northern Beaches Council

Community strategic plan

The *Shape 2028 Northern Beaches Community Strategic Plan 2018-2028* (Northern Beaches Council, 2018) (Northern Beaches Community Strategic Plan) is the roadmap for the future of the Northern Beaches. It outlines the outcomes, goals and strategies to achieve the community’s vision over the next 10 years.

The Northern Beaches Community Strategic Plan identifies transport and infrastructure as a key issue within the local government area, with many roads operating at peak capacity and limited public transport options. The Northern Beaches Community Strategic Plan identifies traffic congestion as a major source of concern and frustration for the local community. It also recognises that traffic congestion has a *“profound impact on commuters, local businesses, and members of the community who are unable to drive (eg young people, elderly and people with disability)”*, affecting the wellbeing of the community, restricting mobility, increasing the risk of social isolation and adding to the general stresses of life.

The Northern Beaches Community Strategic Plan provides eight key community outcomes to support and implement the vision of *“a safe, inclusive and connected community that lives in balance with our extraordinary coastal and bushland environment”*. Outcomes relevant to the project include:

- Places for people, which includes strategies relating to provision of spaces to support active and passive recreation, and partnering with government agencies to facilitate and promote healthy and active living
- Vibrant local economy, which includes strategies such as promoting Northern Beaches as an attractive place to establish business
- Transport, infrastructure and connectivity, which includes strategies relating to ensuring transport planning is integrated with land use planning, maintaining and enhancing roads and road-related infrastructure, and facilitating and promoting safe cycling and walking networks as convenient transport options.

The project would relieve congestion on the Military Road/Spit Road and Warringah Road/Eastern Valley Way corridors by providing an alternative crossing of Middle Harbour to the Northern Beaches, which would result in associated improvements in road safety performance, travel times savings and travel reliability benefits. The project would also support pedestrian and cyclist connections through increased provision of dedicated shared paths and cycle links, helping to encourage greater use of existing infrastructure by pedestrians and cyclists. A reduction in congestion on surface roads would also contribute to improved conditions for cyclists and bus commuters. The project would also provide new opportunities for public transport, allowing new public transport routes to be developed such as express bus connections between major centres on the Northern Beaches and Frenchs Forest and those in the lower North Shore, Sydney CBD, the north-west and beyond and opportunity for efficient access and interchange with the new Victoria Cross Metro Station at North Sydney.

The project would deliver the new and improved open space and recreation facilities at Balgowlah as that would deliver broad benefits to the community. A dedicated consultation process jointly led by Transport for

NSW and Northern Beaches Council will take place to give the community an opportunity to provide input on the final layout of the new open space and recreation facilities.

Northern Beaches Sportsgrounds Strategy

The *Northern Beaches Sportsground Strategy* (Northern Beaches Council, 2017) (Sportsground Strategy) sets out Northern Beaches Council's plan to guide the development of sports fields and facilities for the next 15 years.

The Sportsground Strategy identified a current and growing shortfall in sporting fields and recreational facilities in the Northern Beaches local government area. The Northern Beaches local government area currently has around half or less sportsgrounds per person compared to other similar sized local government areas in Sydney. The Northern Beaches is experiencing high growth in sports participation, although this growth is being limited by the shortage of sports fields. At the same time, the Northern Beaches local government area has more than double the number of golf courses per person compared to other areas of Sydney, which are experiencing declining membership and demand.

Converting existing open space such as golf courses to sporting fields was identified as one of six actions to address the need for more sportsgrounds and new and improved facilities. Specifically, investigations carried out by Northern Beaches Council support the conversion of Balgowlah Golf Course to a 'sporting area incorporating fields and passive open space integrated with the adjoining Balgowlah Oval'.

The project would support Northern Beaches Council's strategy to increase sporting fields and recreational facilities through the development and re-purposing of land at Balgowlah as new and improved open space and recreation facilities for the community. A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council will give the community an opportunity to provide input on the final layout of the new open space and recreation facilities. This consultation will be separate to the consultation for the Beaches Link and Gore Hill Freeway Connection environmental impact statement. This process will start after the environmental impact statement public exhibition period and well in advance of construction starting. As part of this consultation process, a community reference group will be established, with representative stakeholder groups and the community, to support Transport for NSW and Northern Beaches Council with the development of this important public space.

4. Existing socio-economic environment

This section describes existing socio-economic characteristics and features of the study area to provide a baseline against which the project's socio-economic impacts can be assessed. This includes information on population and housing, the economy, community values, social infrastructure and transport and access.

4.1 Overview of precincts

4.1.1 Western Precinct

The Western Precinct includes the SA2s of Cremorne-Cammeray, St Leonards-Naremburn, Chatswood (East)-Artarmon, Willoughby-Castle Cove-Northbridge and Mosman within the North Sydney, Willoughby and Mosman local government areas.

The precinct includes the major commercial centre of Chatswood, as well as industrial areas at Artarmon near the Lane Cove tunnel and Pacific Highway. Pockets of high-density residential areas are located at Chatswood and Artarmon, with medium-density residential areas located at Cremorne and Cammeray.

The precinct is served by the Pacific Highway, the Warringah Freeway and the Gore Hill Freeway. The precinct is traversed by Military Road/Spit Road and Warringah Road/Eastern Valley Way which are a key links for Northern Beaches communities to the Sydney CBD, north-west and inner Sydney suburbs. The T1 North Shore and Western Line and T9 Northern Line also traverse the western part of the precinct, with stations located at Chatswood, Artarmon and St Leonards.

The Sydney Metro network, comprising Sydney Metro Northwest and Sydney Metro City & Southwest, would deliver metro services between Rouse Hill and Bankstown. The Chatswood to Sydenham component of Sydney Metro City & Southwest would extend from Chatswood, under Sydney Harbour and through the Sydney CBD to Sydenham and include metro stations at Victoria Cross in North Sydney, Crows Nest and Chatswood, as well as multiple locations within the Sydney CBD. Sydney Metro is planned to open in 2024 and will be operational at the opening of the project.

4.1.2 Eastern Precinct

The Eastern Precinct includes the SA2s of Balgowlah-Clontarf-Seaforth, Manly Vale-Allambie Heights, Forestville-Killarney Heights and Frenchs Forest-Belrose within the Northern Beaches local government area. It comprises predominantly low-density residential areas, such as at Killarney Heights, Forestville, Allambie Heights, Balgowlah and Frenchs Forest. Large areas of parkland and natural bushland are also located within the precinct, including the Garigal National Park, Dobroyd Head and Manly Warringah War Memorial State Park (Manly Dam).

The precinct is serviced by the Wakehurst Parkway, Manly Road, Burnt Bridge Creek Deviation, Sydney Road, Forest Way and Warringah Road. Burnt Bridge Creek Deviation and Manly Road connect to Military Road south of Middle Harbour via Spit Bridge providing access to the Sydney CBD and inner suburbs.

There are no heavy rail lines located within the precinct, with bus services being the primary mode of public transport. The Northern Beaches B-Line bus service is a fleet of modern double-deck buses which provide frequent and reliable services between Mona Vale and Wynyard, stopping at Narrabeen, Warriewood, Collaroy, Dee Why, Brookvale, Manly Vale, Spit Junction and Neutral Bay. Planning is also underway for a rapid bus service from Dee Why to Chatswood which is proposed to be operational before the project commences construction.

4.2 Community profile

This section describes the existing population, demographic and housing characteristics of the study area and each precinct. This includes information on population and growth, age and cultural diversity, disadvantage, need for assistance and health, community values, social infrastructure and transport and access.

Population and demographic data for the study area are presented for the study area as a whole and for each precinct. This is compared to population and demographic data for the Greater Sydney region. Further information on population and demographic characteristics of individual SA2s is provided in Annexure B.

4.2.1 Population size and growth

The study area had an estimated resident population of about 202,532 people in 2019, of which about 60 per cent resided in the Western Precinct (refer to Table 4-1). Between 2009 and 2019, the estimated resident population of the study area grew by about 22,105 people, an average of about 1.2 per cent annually. This was less than the rate of population growth in the Greater Sydney region over the same period.

Within the study area, St Leonards-Naremburn recorded the greatest population growth with an average annual growth rate of 2.5 per cent over the 10-year period, increasing to 2.8 per cent more recently. Chatswood (East)-Artarmon also recorded relatively high population growth, particularly over the five years between 2014 and 2019. This is likely to reflect recent residential developments in these areas. Lower rates of growth were recorded in Frenchs Forest-Belrose, Forestville-Killarney Heights and Mosman, reflecting the more established residential suburbs in these areas.

Table 4-1 Population growth, 2009 to 2019

Locality	Population			Population change (average annual growth) (per cent)	
	2009	2014	2019	2014-2019	2009-2019
Western Precinct	107,040	114,125	122,694	1.5	1.4
Eastern Precinct	73,387	77,015	79,838	0.7	0.8
Study area	180,427	191,140	202,532	1.2	1.2
Greater Sydney region	4,492,380	4,841,349	5,312,163	1.9	1.7

Source: Based on ABS Regional Population Growth, Estimated Resident Population (ERP) by SA2 and above (Australian Statistical Geography Standard (ASGS) 2016), 2001 onwards, Australia. Cat. 3218.0.

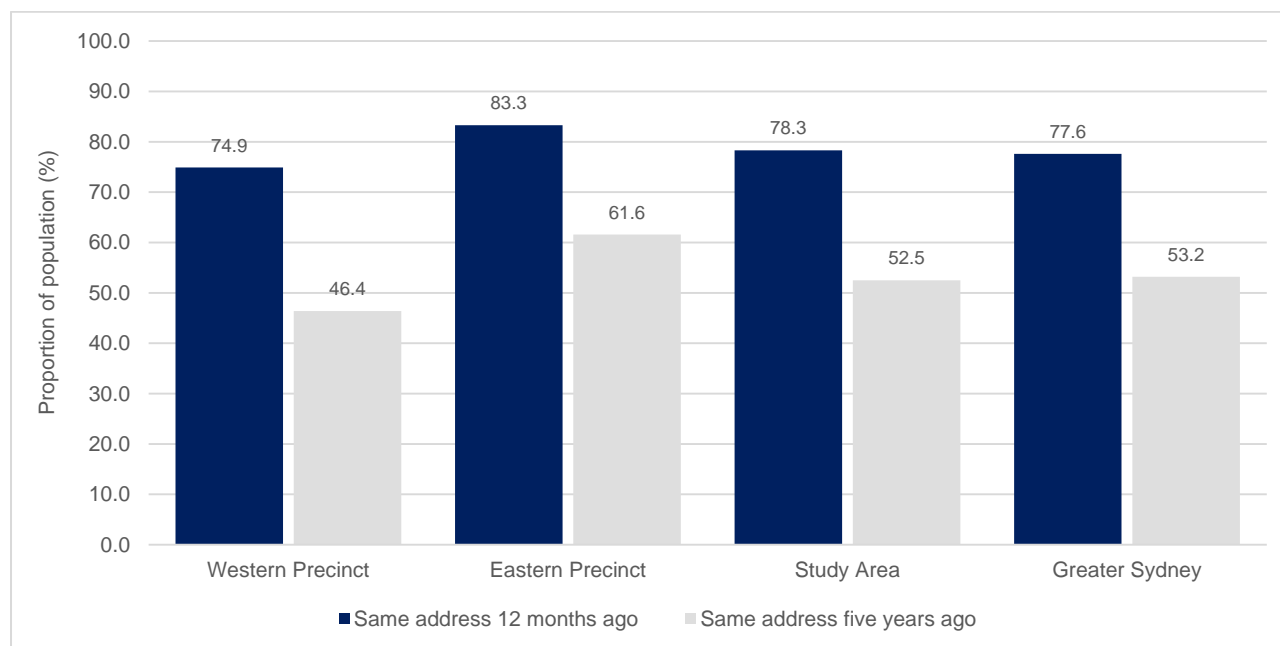
NSW Government information on population projections for the study area is available at a local government area level. Local government areas traversed by the study area are generally expected to experience lower rates of population growth over the 20 years to 2036 compared to the Greater Sydney region. Between 2016 and 2036, the combined population of local government areas traversed by the study area is projected to increase by an average rate of about 0.7 per cent annually, compared to about 1.8 per cent in the Greater Sydney region (refer to Table 4-2). North Sydney local government area is projected to have the highest population growth, although this is predicted to be below the rate of growth for the Greater Sydney region. The Mosman local government area is predicted to experience the lowest population growth.

Table 4-2 Population projections

Local government area	Population		Population change (2016-2036)	
	2016	2036	Number	Average annual change (per cent)
North Sydney	71,809	86,923	15,114	1.0
Willoughby	77,888	101,536	23,648	1.3
Northern Beaches	265,468	288,431	22,963	0.4
Mosman	30,260	30,786	526	0.1
Combined local government areas	445,425	507,676	62,251	0.7
Greater Sydney region	4,688,255	6,661,720	1,973,465	1.8

Source: Based on New South Wales 2019 Population Projections for ASGS 2019 local government area projections and Department of Planning, Industry and Environment Planning Region projections.

The study area as a whole had levels of population mobility similar to Greater Sydney over the 12 months and five years prior to the 2016 Census (refer to Figure 4-1). Within the study area, the Eastern Precinct had lower levels of population mobility with higher proportions of people who lived at the same address both one year and five years prior to the 2016 Census, reflecting the more established residential suburbs in this precinct.

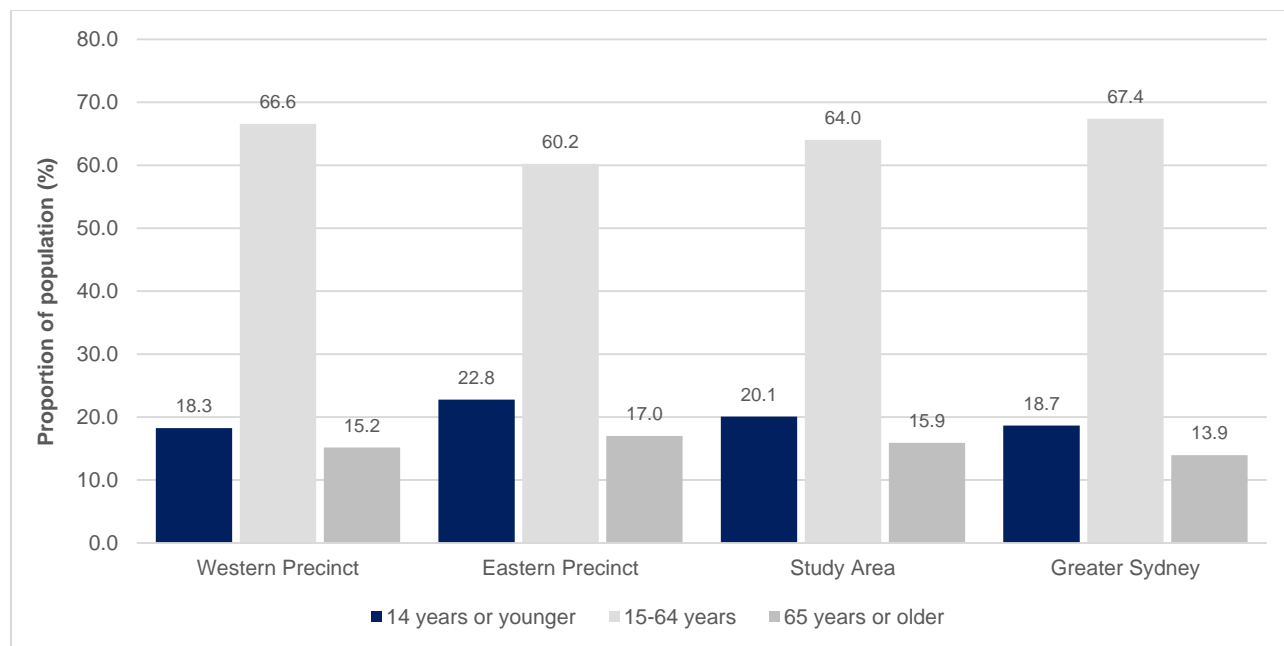


Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Figure 4-1 Population mobility, 2016

4.2.2 Age profile

The study area as a whole had an older population compared to the Greater Sydney region, with a higher median age and higher proportions of people aged 65 years or older (refer to Figure 4-2). The Western Precinct had lower proportions of children and elderly people and higher proportions of working aged people (that is, 15 to 64 years) compared to the Eastern Precinct. Balgowlah-Clontarf-Seaforth recorded the highest proportion of children within the study area, while Frenchs Forest-Belrose had the highest proportion of older people aged 65 years or over. St Leonards-Naremburn recorded the highest proportion of working aged people, with this group comprising more than 75 per cent of this SA2's population.



Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

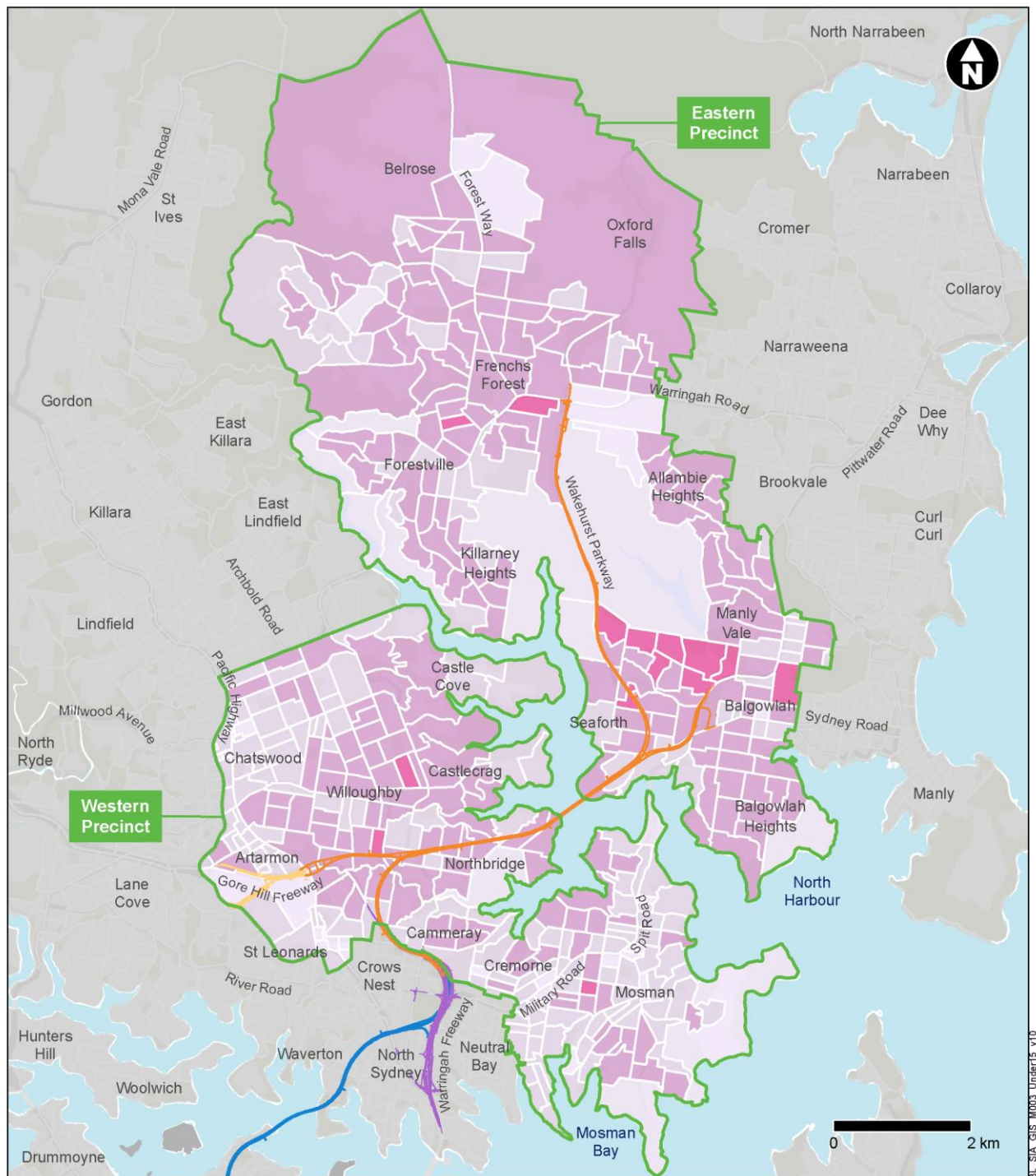
Figure 4-2 Population age profile, 2016

Figure 4-3 shows the proportion of people aged 65 years or older near the project. Apart from Northbridge and Willoughby in the Western Precinct, communities along the tunnel alignment generally comprise relatively low proportions of older people. Higher proportions of older people are located near the Wakehurst Parkway upgrade, possibly reflecting the location of aged care facilities in Frenchs Forest and Allambie Heights, including Eurobodalla Homes, Fred Hutley Village, Allambie Heights Village, William Charlton Retirement Village and Scalabrini Village Allambie Heights.

Figure 4-4 shows the proportion of the population aged 14 years or younger near the project. Children generally comprise between 20 per cent to 30 per cent of communities along the tunnel alignment. Pockets of higher proportions of children are located in North Balgowlah and Seaforth, including near the construction support site at Balgowlah Golf Course, and in Frenchs Forest near the Wakehurst Parkway upgrade.



Figure 4-3 Proportion of population aged 65 years or older near the project



Legend

The Project

- Beaches Link
- Gore Hill Freeway Connection

Connecting Projects

- Western Harbour Tunnel
- Warringah Freeway Upgrade

Percentage of people aged 14 years and younger

- Less than 10%
- 10% - 20%
- 20% - 30%
- 30% - 40%
- 40% - 50%
- Over 50%

- Precinct

Figure 4-4 Proportion of population aged 14 years or younger near the project

4.2.3 Cultural diversity

The study area recorded lower levels of cultural diversity compared to the Greater Sydney region, with communities in the study area recording lower proportions of Indigenous people and people who speak a language other than English. Levels of overseas born people are similar to the Greater Sydney region (refer to Table 4-3). Within the study area, the Western Precinct generally displayed higher levels of cultural diversity in relation to birthplace and language.

Table 4-3 Cultural diversity, 2016

Locality	Indigenous (per cent)	Born overseas (per cent)	Speaks a language other than English (per cent)
Western Precinct	0.2	40.6	29.9
Eastern Precinct	0.4	29.8	16.4
Study area	0.3	36.3	24.5
Greater Sydney region	1.5	36.8	35.8

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

In 2016, the most common countries of birth for people within the study area included:

- England (comprising 6.6 per cent of the study area’s total population)
- China (4.7 per cent)
- New Zealand (2.3 per cent).

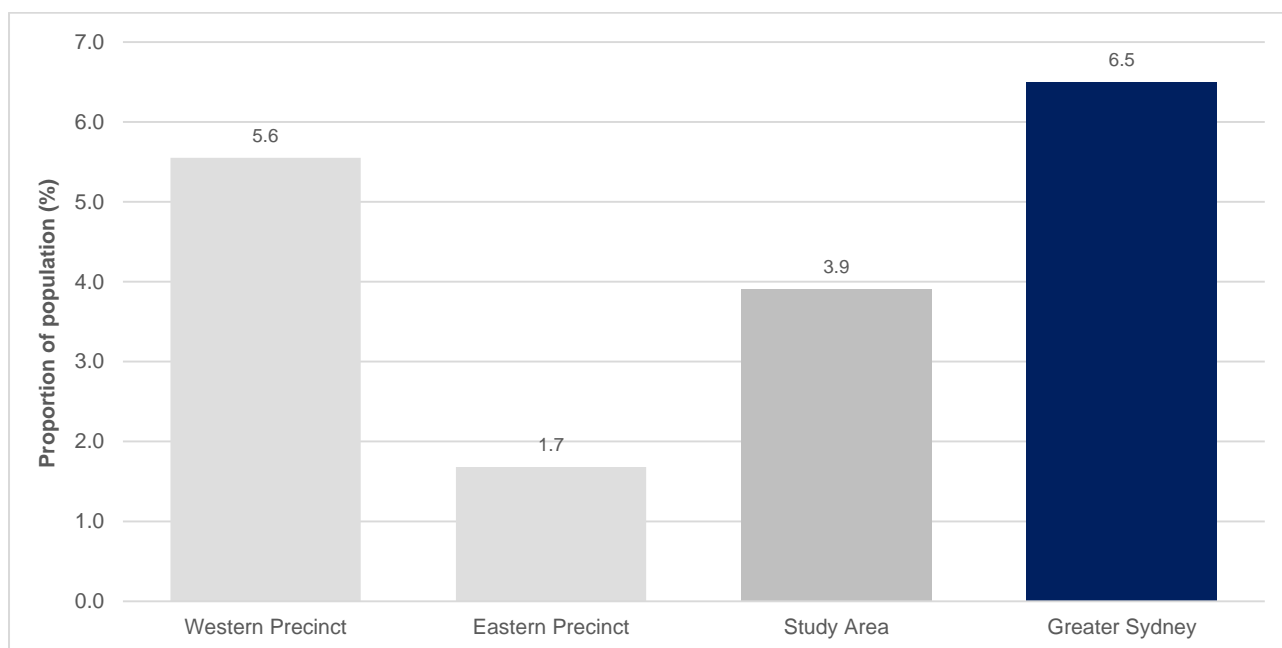
Within the study area, Chatswood (East)-Artarmon recorded the highest proportion of people born overseas (57.8 per cent), followed by St Leonards-Naremburn (44.7 per cent) and Cremorne-Cammeray (34.7 per cent).

About 26.0 per cent of people in the study area spoke a language other than English at home at the 2016 Census, below the average for the Greater Sydney region (35.8 per cent). Within the study area, Chatswood (East)-Artarmon and St Leonards-Naremburn had proportions of people who spoke a language other than English above the study area average. The most common languages other than English spoken by people in the study area included:

- Chinese languages, for example, Mandarin and Cantonese (9.0 per cent)
- Japanese (1.5 per cent)
- Korean (1.4 per cent)
- Indo-Aryan languages, for example, Hindi, Punjabi, Sinhalese and Urdu (1.4 per cent).

In 2016, about 3.9 per cent of people in the study area did not speak English well or at all. This was below the Greater Sydney region average (6.5 per cent) (refer to Figure 4-5). Chatswood (East)-Artarmon and St Leonards-Naremburn recorded proportions of people who did not speak English well or at all higher than the study area average, with Chatswood (East)-Artarmon recording proportions of people who did not speak English well or at all nearly double the Greater Sydney region average.

Overall, the study area had relatively low proportions of Indigenous people. At the 2016 Census, about 526 people in the study area registered as Aboriginal and/or Torres Strait Islander. This represented about 0.3 per cent of the study area’s total population, compared to about 1.5 per cent in the Greater Sydney region. While below the Greater Sydney region average, Manly Vale-Allambie Heights had the highest proportion of Indigenous people in the study area (0.5 per cent), followed by Forestville-Killarney Heights and Frenchs Forest-Belrose (0.4 per cent).



Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Figure 4-5 Speaks English not well or not at all, 2016

4.2.4 Vulnerability and need for assistance

ABS data on need for assistance refers to people who need help or assistance in one or more of the three core activity areas of self-help, mobility or communication due to disability, a long-term health condition or old age (ABS, 2016). People in this group may be more vulnerable to changes from the project, such as changes in local access, including to community services and facilities, effects associated with property acquisition, including loss of social and community networks, and changes in local amenity (that is, increased noise, dust and vibration).

Overall, the study area had a relatively low rate of people needing assistance compared to the Greater Sydney region. At the 2016 Census, 3.3 per cent of people in the study area reported needing assistance in either self-help, mobility or communication, compared to 4.9 per cent in the Greater Sydney region. Within the study area, the Eastern Precinct demonstrated a higher need for assistance, recording a rate above the study area average (3.7 per cent), while communities in the Western Precinct demonstrated lower proportions of people needing assistance (3.0 per cent). Manly Vale-Allambie Heights recorded the highest proportion of people needing assistance (4.4 per cent), followed by Frenchs Forest-Belrose (4.3 per cent), Forestville-Killarney Heights (4.0 per cent) and Chatswood (East)-Artarmon (3.5 per cent).

Figure 4-6 shows the proportion of people needing assistance near the project. A higher proportion of people needing assistance was recorded near the Wakehurst Parkway upgrade, which is likely to reflect the location of aged care facilities nearby as indicated in Section 4.2.2. Communities with higher proportions of people needing assistance were also located along the tunnel alignment in Northbridge possibly reflecting the location of aged care facilities such as Pathways Sailors Bay, St Paul’s Residential Aged Care and Northbridge Gardens Retirement.

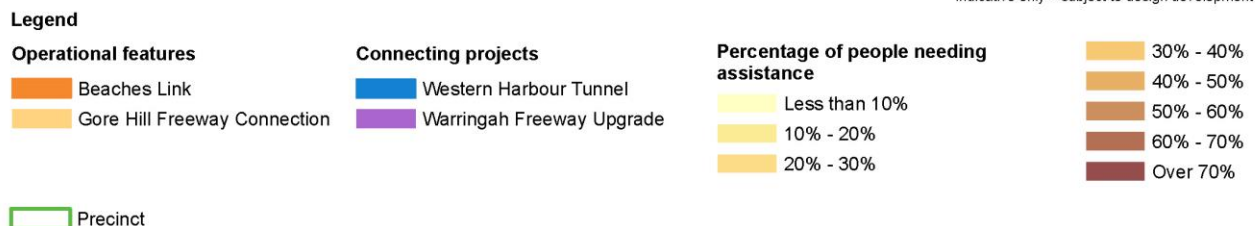


Figure 4-6 Proportion of people needing assistance near the project

4.2.5 Households and families

There were about 66,799 households in the study area at the 2016 Census (refer to Table 4-4). Family households were the predominant household type in the study area. The proportion of this household type was similar to the Greater Sydney region average, although this was mainly due to the Eastern Precinct with this household type comprising more than 80 per cent of households in this precinct. The study area had proportions of lone person households above the Greater Sydney region, with the Western Precinct particularly having high proportions of these households. Compared to the Greater Sydney region, the study area as a whole had lower proportions of group households, although this was mainly due to relatively low proportions of this household type in the Eastern Precinct.

Table 4-4 Household composition, 2016

Locality	Family household (per cent)	Lone person household (per cent)	Group household (per cent)	Number of households
Western Precinct	69.0	26.4	4.6	42,378
Eastern Precinct	80.8	17.3	2.0	24,421
Study area	73.3	23.0	3.6	66,799
Greater Sydney region	73.6	21.6	4.7	1,623,872

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

4.2.6 Dwellings

There were about 72,795 private dwellings in the study area at the 2016 Census, of which nearly 65 per cent were within the Western Precinct (refer to Table 4-5). The dwelling occupancy rate within the study area was below the Greater Sydney region average, with this mainly due to lower occupancy in the Western Precinct.

The predominant dwelling type varied across the study area, with the Eastern Precinct having higher proportions of separate houses, and the Western Precinct having higher proportions of flats, units or apartments. This is likely to reflect the recent residential development occurring in areas such as Chatswood and St Leonards and its proximity to employment centres at North Sydney and the Sydney CBD, and the more urban residential suburbs within the Eastern Precinct.

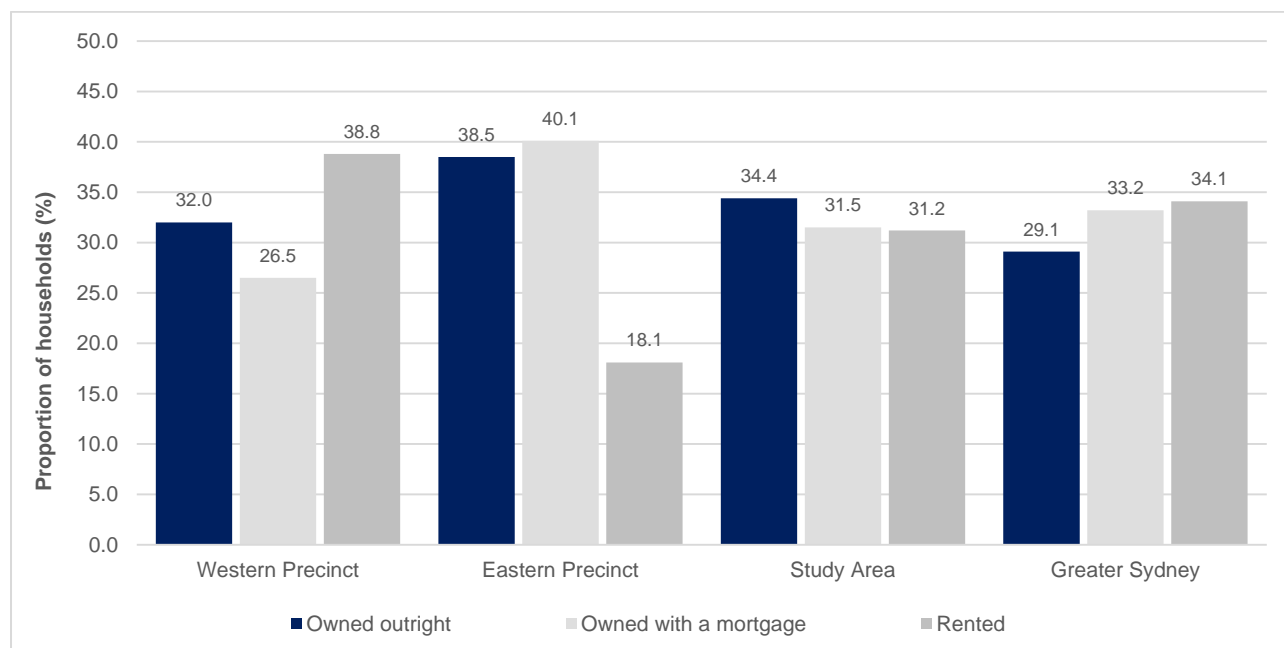
Table 4-5 Dwelling structure, 2016

Locality	Separate house (per cent)	Semi-detached house (per cent)	Flat, unit or apartment (per cent)	Total dwellings	Occupancy rate (per cent)
Western Precinct	32.9	8.9	48.4	46,734	90.7
Eastern Precinct	71.4	8.9	13.1	26,061	93.7
Study area	46.7	8.9	35.7	72,795	91.8
Greater Sydney region	52.5	12.9	25.9	1,759,927	92.3

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

In 2016, the Western Precinct had relatively high proportions of households that were renting, while the Eastern Precinct had relatively low proportions of households that were renting and high proportions of private dwellings that were owned outright. Around 34.4 per cent of private dwellings in the study area were owned outright, compared to the Greater Sydney region at 29.1 per cent (refer to Figure 4-7).

Within the study area, high proportions of rented dwellings are located in St Leonards-Naremburn (50.6 per cent), Chatswood (East)-Artarmon (9.4 per cent) and Cremorne-Cammeray (43.3 per cent).



Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Figure 4-7 Tenure type, 2016

Figure 4-8 shows the proportion of dwellings owned outright or with a mortgage near the project. At the 2016 Census, communities along the project alignment at Northbridge, Seaforth and Balgowlah included relatively high proportions of owner-occupied households. Communities in the Eastern Precinct generally displayed higher proportions of dwellings that were owned outright or with a mortgage than the Western Precinct.

At the 2016 Census, 691 occupied private dwellings in the study area were being rented from a State or Territory housing authority, representing about 1.0 per cent of total occupied private dwellings in the study area. This was below the proportion of State rental housing in the Greater Sydney region (4.2 per cent). Within the study area, Chatswood (East)-Artarmon had the highest proportion of State rental housing (2.3 per cent).

In addition to State rental housing, about 325 occupied private dwellings in the study area were rented from a housing cooperative, community or church group. This represented about 0.5 per cent of occupied private dwellings in the study area, which was slightly below the Greater Sydney region average (0.6 per cent). With the exception of Chatswood (East)-Artarmon, SA2s within the study area had proportions of dwellings rented from a housing cooperative, community or church group below the Greater Sydney region average.

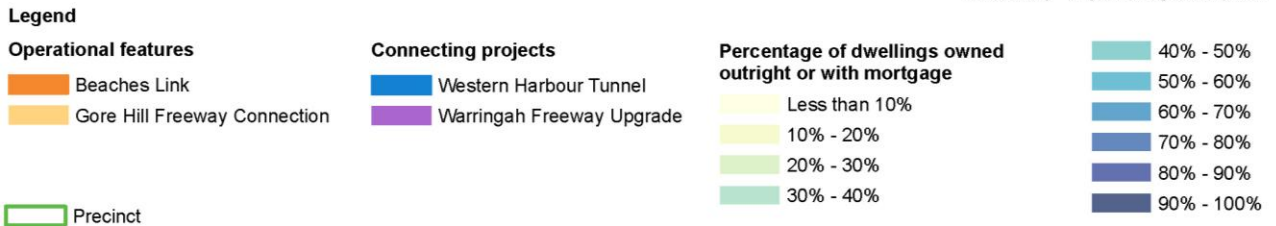
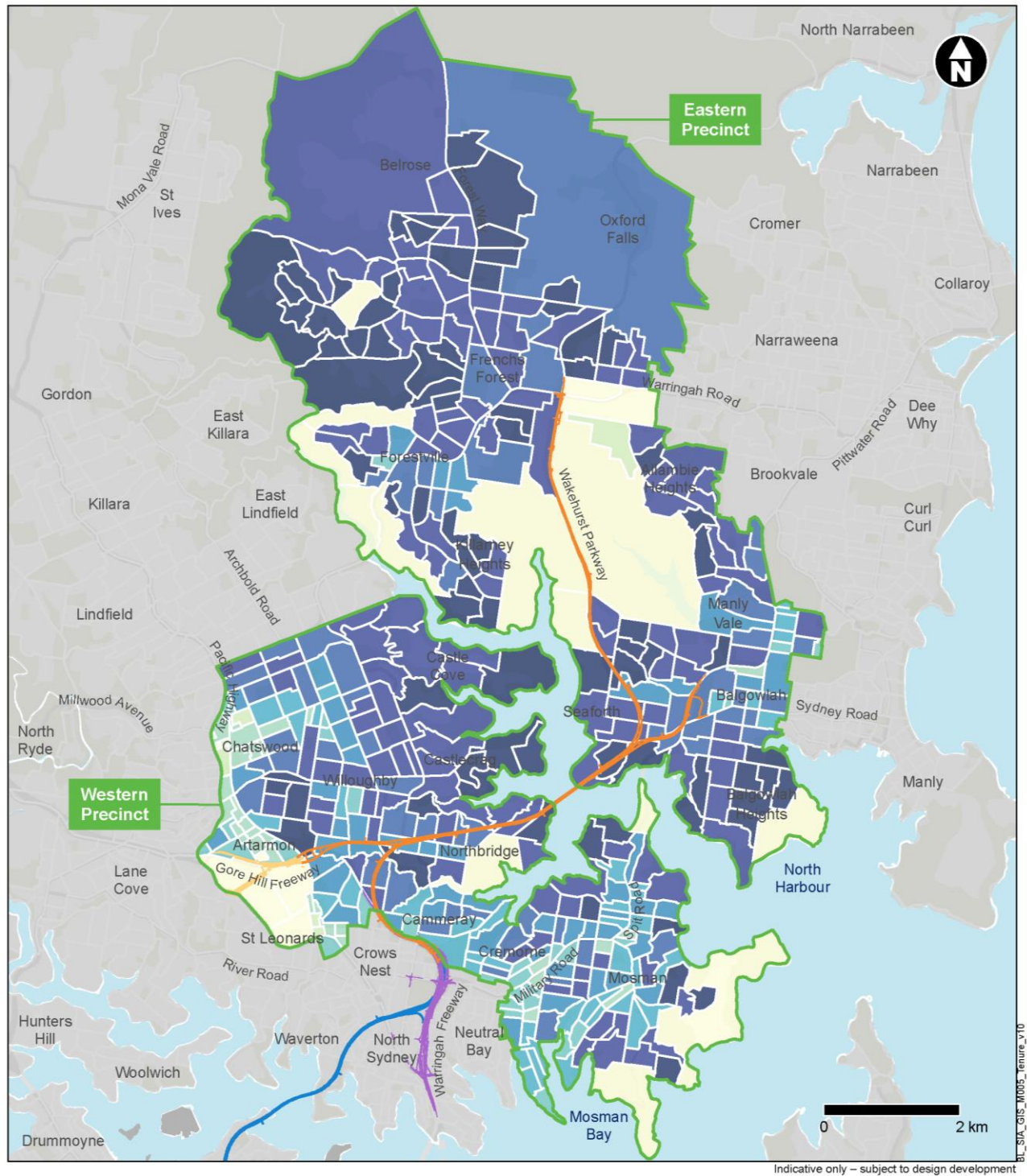


Figure 4-8 Proportion of dwellings near the project owned outright or with a mortgage

4.2.7 Vehicle ownership

The study area generally had higher proportions of car ownership compared to the Greater Sydney region. In particular, the Eastern Precinct had very high levels of car ownership, with low proportions of households with no access to a vehicle and high proportions of households with two or more vehicles compared to the Greater Sydney region (refer to Table 4-6).

Within the study area, Frenchs Forest-Belrose recorded the highest levels of car ownership, with 94.7 per cent of households having access to at least one vehicle, followed by Balgowlah-Clontarf-Seaforth and Forestville-Killarney Heights. Chatswood (East)-Artarmon and St Leonards-Naremburn had the lowest levels of car ownership, which is likely to reflect the proximity of these areas to employment centres and higher levels of public transport access.

Table 4-6 Vehicle ownership, 2016

Locality	Households with no vehicle (per cent)	Households with one vehicle (per cent)	Households with two or more vehicles (per cent)
Western Precinct	13.1	46.9	37.7
Eastern Precinct	4.5	31.6	61.6
Study area	9.9	41.3	46.5
Greater Sydney region	11.1	37.1	48.5

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

4.2.8 Income and employment

Communities in the study area recorded median personal and household incomes above the Greater Sydney region average at the 2016 Census (refer to Table 4-7). Compared to the Greater Sydney region, the study area also had lower proportions of low-income households (that is, with a weekly income of less than \$650) and higher proportions of high-income households (that is, with a weekly income of \$2000 or more). Chatswood (East)-Artarmon had the highest proportion of low-income households, with this the only SA2 above the Greater Sydney region. This was followed by Forestville-Killarney Heights, which had proportions of low-income households above the study area average.

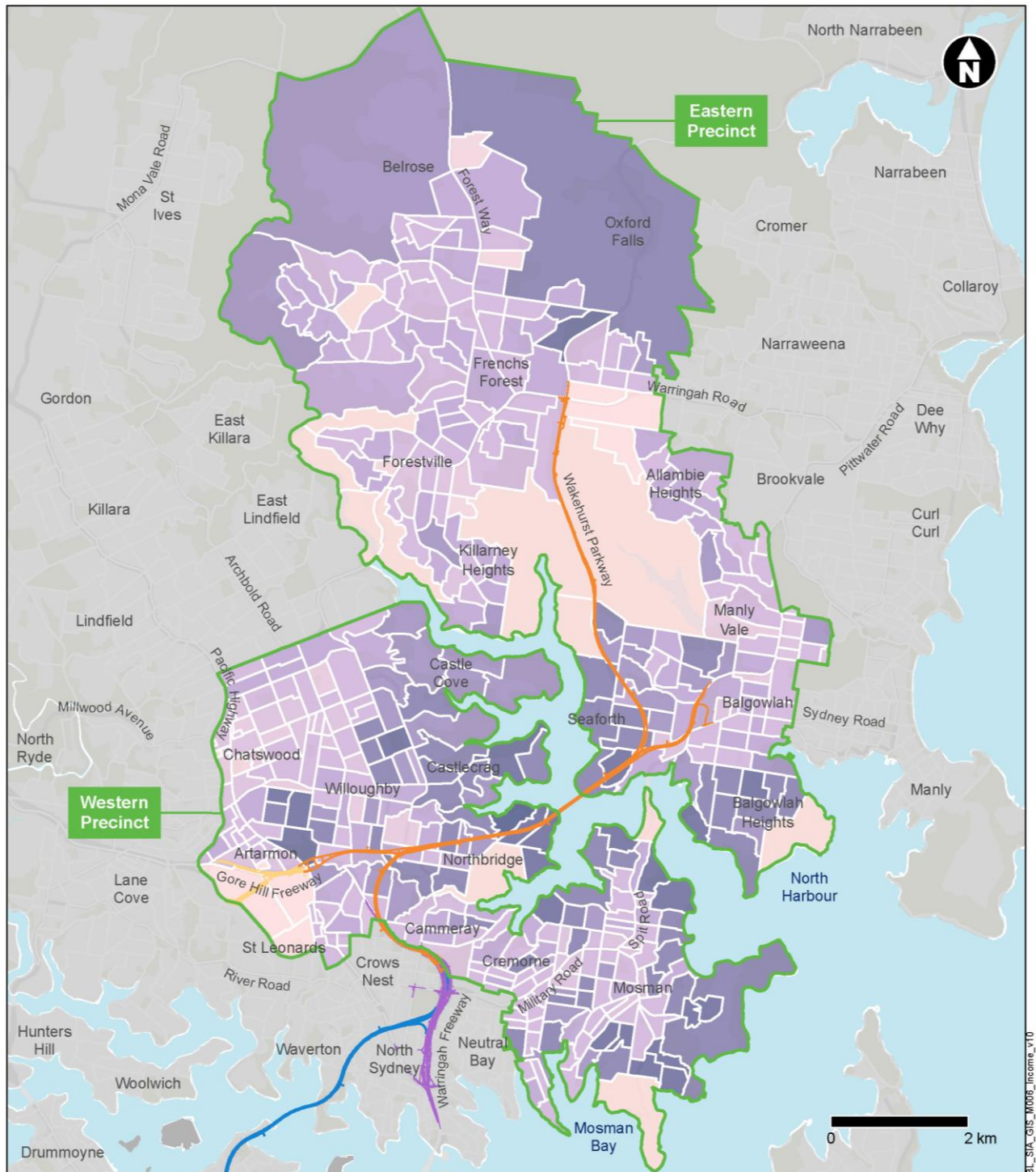
Figure 4-9 shows the distribution of median weekly household income near the project. At the 2016 Census, communities along the tunnel alignment at Artarmon, Northbridge, Seaforth and Balgowlah displayed relatively higher median incomes.

Table 4-7 Household income, 2016

Locality	Median total income (\$/ week)		Weekly household income (per cent)	
	Personal income	Household income	<\$650/ week	>\$2,000/ week
Western Precinct	\$1172	\$2423	6.0	73.2
Eastern Precinct	\$895	\$2419	4.8	70.6
Study area*	\$1049	\$2421	5.5	72.2
Greater Sydney region	\$719	\$1750	8.9	54.9

*Average of median incomes for SA2s in the study area

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.



Legend

Operational features

- Beaches Link
- Gore Hill Freeway Connection

Connecting projects

- Western Harbour Tunnel
- Warringah Freeway Upgrade

Median weekly household incomes

- Less than \$500
- \$500 - \$1000
- \$1000 - \$1500
- \$1500 - \$2000
- \$2000 - \$2500
- \$2500 - \$3000
- \$3000 - \$3500
- \$3500 - \$4000
- \$4000 - \$4500
- Over \$4500

- Precinct

Indicative only – subject to design development

Figure 4-9 Median weekly household incomes near the project

There were about 97,249 people in the study area aged 15 years or over who were either employed or looking for work at the 2016 Census. This represented a labour force participation rate of 65.0 per cent, which was above the average for the Greater Sydney region at 61.6 per cent (refer to Table 4-8).

The study area had a relatively low rate of unemployment, with 4.2 per cent of the study area's labour force unemployed at the time of the 2016 Census. This is compared to 6.0 per cent in the Greater Sydney region.

Table 4-8 Labour force, 2016

Locality	Labour force	Labour force participation (per cent)	Unemployment (per cent)
Western Precinct	59,410	64.8	4.5
Eastern Precinct	37,839	65.3	3.8
Study area	97,249	65.0	4.2
Greater Sydney region	2,418,899	61.6	6.0

Source: 2016 Census of Population and Housing, Australian Bureau of Statistics.

4.2.9 Travel to work

At the 2016 Census, about 47.8 per cent of people aged 15 years or over used a car for all or part of their journey to work (refer to Table 4-9). This was below the Greater Sydney region average (58.8 per cent). Within the study area, Frenchs Forest-Belrose had the highest proportion of residents who travelled to work by car (65.7 per cent), followed by Forestville-Killarney Heights (61.9 per cent). St Leonards-Naremburn had the lowest proportion of residents who used a car for all or part of their journey to work (31.1 per cent), which is likely to reflect the area's access to public transport, such as rail services at St Leonards station and proximity to employment centres at St Leonards.

Compared to the Greater Sydney region, the study area recorded a higher proportion of people aged 15 years or over who used the bus for all or part of their journey to work. About 1.6 per cent of people aged 15 years or over travelled to work by another form of motor vehicle (for example, truck, motorbike and taxi). The study area had a relatively high proportion of people who worked from home, compared to the Greater Sydney region.

Table 4-9 Travel to work, 2016

Method of travel	Western Precinct (per cent)	Eastern Precinct (per cent)	Study area (per cent)	Greater Sydney (per cent)
One method				
Train only	11.6	0.4	7.2	10.9
Bus only	16.8	13.6	15.6	5.5
Other public transport (including ferry)	1.5	0.7	1.2	0.7
Car only (as driver or passenger)	39.8	57.0	46.6	56.6
Walked or cycled	7.8	3.6	6.1	4.8
Truck	0.1	0.6	0.3	0.9
Motorbike/scooter	0.8	1.3	1.0	0.7
Other one method	11.6	0.5	0.6	0.5
Two methods				

Method of travel	Western Precinct (per cent)	Eastern Precinct (per cent)	Study area (per cent)	Greater Sydney (per cent)
Train and car (as driver or passenger)	0.5	0.4	0.5	1.8
Train and one other method (excluding car)	3.0	1.7	2.5	2.9
Bus and car (as driver or passenger)	0.5	1.2	0.8	0.4
Bus and one other method (excluding car)	0.6	0.4	0.6	0.1
Other two methods	0.6	0.8	0.6	0.6
Three methods				
Train and two other methods	0.6	0.5	0.6	0.6
Bus and two other methods (excluding train)	0.1	0.2	0.1	0.0
Other three methods	0.0	0.0	0.0	0.0
Worked at home	6.8	7.4	7.0	4.4
Did not go to work	7.3	8.9	7.9	7.8
Method of travel not stated	0.6	0.8	0.7	0.9

Source: 2016 Census of Population and Housing, Australian Bureau of Statistics.

4.2.10 Worker population

ABS working population data provides information based on where a person goes to work. At the 2016 Census, there were about 101,607 people who worked within the study area, of which 75.3 per cent were employed within the Eastern Precinct. St Leonards-Naremburn had the highest worker population, comprising about 29.0 per cent of workers in the study area, followed by Chatswood (East)-Artarmon. This reflects major employment centres in these locations. Health care and social assistance; and professional, scientific and technical services are the main industries of employment for people working in the study area, employing 15.4 per cent and 13.8 per cent of the study area's worker population respectively. The other key industries of employment for people working in the study area include:

- Retail trade (11.0 per cent)
- Education and training (6.8 per cent)
- Information media and telecommunications (6.3 per cent).

At the 2016 Census, a lower proportion of people working in the study area travelled by car for all or part of their journey to work, compared to the Greater Sydney region.

4.3 Social infrastructure

4.3.1 Social infrastructure in the study area

The study area accommodates a wide range of community services and facilities that cater for the needs of both local and regional communities, including education facilities; health, medical and emergency services; sport, recreation, cultural and leisure facilities; and community facilities.

Education facilities

Education facilities in the study area comprise early childhood, primary, secondary and tertiary level education facilities. This includes higher education facilities of district and regional significance that are located near the project such as:

- TAFE NSW, which offers vocational training and tertiary education for about 42,300 students over six campuses across northern Sydney, including at St Leonards (St Leonards and Bradfield campuses) and Brookvale (Northern Beaches campus)
- Australian Catholic University North Sydney, which provides tertiary education services to more than 10,000 students across a number of campuses, including at Edward Street, North Sydney.

Health, medical and emergency services

Major hospitals and regional level health and emergency services facilities within the study area include:

- Royal North Shore Hospital, located on Reserve Road at St Leonards, which provides state-wide services including severe burns injury, neonatal intensive care, spinal cord injury, and interventional neuroradiology
- North Shore Private Hospital, located on Westbourne Street at St Leonards, which has 272 beds including 259 inpatient beds and provides teaching facilities to students at the University of Sydney
- Mater North Sydney Hospital, located on Rocklands Road at North Sydney, which provides 216 beds and includes intensive care, orthopaedic wards and a maternity unit
- Northern Beaches Hospital located on Frenchs Forest Road at Frenchs Forest, which provides 488 beds, a 50-space emergency department and other medical and surgical services.

In addition, health and medical services and facilities are located across the study area that service the needs of local communities. These include medical centres, such as Northbridge Medical Practice, Warringah Road Family Medical Centre and Balgowlah Community Health Centre, and emergency services, such as the Artarmon Ambulance Superstation at Reserve Road at Artarmon and Marine Rescue Middle Harbour at Spit Road.

Sport, recreation, cultural and leisure facilities

The study area includes formal and informal sport and recreation, and cultural and leisure facilities of regional importance. These include:

- Artarmon Reserve, located on Burra Road at Artarmon, which includes barbeque and picnic facilities, a sports area, play equipment, an off-leash dog area, bicycle and walking tracks and areas of vegetation
- Gore Hill Park, located on the corner of Reserve Road and the Pacific Highway at Artarmon, providing barbeque and picnic facilities, an exercise station and a sports area
- Naremburn Park, located on Park Road at Naremburn, which includes barbeque and picnic facilities, play equipment, a sports area, basketball and netball courts, a water play pump and sand pit and an off-leash dog area

- Flat Rock Reserve at Willoughby, which covers an area of about 22.3 hectares inclusive of a portion of Bicentennial Reserve, and comprises areas of remnant bushland, regenerated bushland, cultural heritage sites, bush walking tracks and shared paths, barbeque facilities and amenities
- Bicentennial Reserve, located on Willoughby Road at Willoughby, which provides opportunities for formal and informal recreational activities, and includes Hallstrom Park, two baseball diamonds (including Flat Rock Baseball Diamond), netball courts, sports oval, children's playground, barbeque facilities and picnic tables
- Golf courses including Cammeray Golf Club, Wakehurst Golf Club, Northbridge Golf Club and Balgowlah Golf Club.

Middle Harbour supports a wide range of water-based formal and informal sporting, recreation and leisure activities such as boating, fishing, sailing, rowing and kayaking as well as a range of community groups and clubs. Key community groups and clubs using Middle Harbour include paddle craft clubs; fishing clubs; sailing clubs, including Northbridge Sailing Club, Mosman Rowing Club, Middle Harbour Yacht Club and Seaforth Moth Sailing Club; scout and guide clubs; and Marine Rescue NSW – Middle Harbour Unit.

Boat storage and boat launching facilities are located in Middle Harbour that provide storage for recreational vessels. In addition to marinas and boat ramps, numerous mooring fields are located throughout Middle Harbour including commercially and privately leased moorings.

Various foreshore reserves and sandy beaches are located downstream of the Spit Bridge that offer public recreation for swimming and bathing. Foreshore recreation uses upstream of the Spit Bridge are limited due to the majority of foreshore areas being either steep and rocky, or privately owned. Locations that offer public recreation along the foreshore include Clive Park rock pool in Northbridge and Spit West Reserve for walking and cycling.

Further information on sport and recreation facilities located near the project is provided in Section 4.3.2.

4.3.2 Social infrastructure near the project

This section provides an overview of social infrastructure located near the project that may be potentially affected by the project's construction and/or operation.

St Leonards Park is located at Miller Street in North Sydney. The park includes children's play equipment, two sports ovals (including North Sydney Oval and Bon Andrews Oval), junior synthetic cricket wickets and two practice nets, and two netball courts. A childcare facility, function centre and retail outlets are located at North Sydney Oval. St Leonards Park provides for informal recreational opportunities. The park is not used for organised sport or training, apart from North Sydney Oval which hosts a number of rugby league, rugby union and amateur and professional cricket matches. North Sydney Oval is also used for the sunset cinema during the summer months (North Sydney Council, 2017). St Leonards Park contains a Music Shell that hosts live music events as well as the North Sydney War Memorial that is used for annual ANZAC Day Dawn Service. St Leonards Park is important for its local heritage values and is listed as a local heritage item in the North Sydney Local Environmental Plan 2013. The park also includes a number of native trees and historic plantings (NSW Office of Environment and Heritage, undated).

Cammeray Golf Course is located at Park Avenue in Neutral Bay. The golf course was established in 1906 and is a private nine-hole golf course. Part of the golf course was acquired for the Warringah Freeway in the 1980s, including a considerable area of the old course and adjoining playing fields (Cammeray Golf Club Limited, undated). The golf course is available for visitors each day and holds weekday and weekend competitions for club members along with a number of major club events throughout the year. The golf course includes a clubhouse with a function room which caters for corporate activities, conferences, weddings and other private events. The golf club also hosts a number of social events throughout the year. As at 31 December 2019, the golf club had a total of 805 members, of which about 368 members were playing

members (including honorary members, life members, country members and corporate members). This was a decrease from 814 members in 2018 (434 playing members) (Cammeray Golf Club Limited, 2020).

Balgowlah Golf Course is located at Sydney Road in Balgowlah. The golf course is located on land owned by the State of NSW and leased by the golf club through Northern Beaches Council. The golf course includes a private nine-hole golf course, with a café, boardroom and function room within the associated clubhouse. The Balgowlah Golf Club hosts social golf daily and competitions for members and visitors at select times throughout the week and on Saturdays. The club also hosts other social events. In 2015, the golf club had about 311 members. The club has experienced a decline in membership over recent years, reducing from 576 members in 2006, an average of 6.6 per cent annually to 2015 (Golf Business Advisory Services, 2016). Concerns were raised during consultation for the project about potential impact of the project on the golf club.

Seaforth Oval is located at the Wakehurst Parkway in Seaforth. Community consultation for the project identified the importance of the oval to local communities, with the oval providing a number of formal sports facilities, such as for cricket, soccer and oztag, as well as a children's playground. A formal car park is provided at the oval off the Wakehurst Parkway, which also provides access to the Timber Getters Track and Engravings Track located within the Garigal National Park. An informal overflow parking area is also located at the oval. The oval is the home ground for Seaforth Football Club, which includes both junior and senior matches.

Flat Rock Reserve covers an area of about 22.3 hectares inclusive of a portion of Bicentennial Reserve. It includes areas of remnant bushland, regenerated bushland and Aboriginal and historic cultural heritage sites. Two main bushwalking tracks traverse the gully, including Wilksch's Walk along the northern face of the gully and Dawson Street track along the southern side. A shared pedestrian and cycle track also connects Flat Rock Reserve and Bicentennial Reserve to Naremburn, Northbridge, Artarmon and North Sydney. Flat Rock Reserve provides barbeque facilities and amenities and hosts a range of community-based activities such as tree-planting days, educational walks, school activities and bush poetry readings at the Henry Lawson Cave (Willoughby City Council, 2018a, Willoughby City Council, undated).

Spit West Reserve is located at Spit Road in Mosman. The reserve fronts Middle Harbour and includes a number of private and commercial moorings. The reserve provides the opportunity for formal and informal recreational activities, including cricket wickets, barbeque and picnic facilities, and fitness equipment. Water-based sporting clubs also operate from The Spit, including Mosman Rowing Club, Middle Harbour Yacht Club, Middle Harbour 16 ft Skiff Club and Middle Harbour Amateur Sailing Club, as well as marine safety services such as Marine Rescue Middle Harbour. Spit West Reserve is also near the starting point for a 10-kilometre coastal walk (Spit to Manly Walk) and includes the Lucinda Federation Memorial, which commemorates the Centenary of Federation.

Social infrastructure located near surface works and construction activities are described in Table 4-10 and shown on Figure 4-10a to Figure 4-10h. These facilities have potential to experience direct and indirect impacts due to the siting of project infrastructure, construction activities or operation. Social infrastructure is also located within the broader study area that may experience impacts associated with access changes from the project's construction and operation. These are also shown in Figure 4-10a to Figure 4-10h and listed in Annexure C.

Table 4-10 Social infrastructure near the project

Facility	Location	Description
Western Precinct		
Places of worship		
Naremburn Cammeray Anglican Church	Willoughby Road, Naremburn	The church provides regular services on Sunday morning.
St Leonard's Catholic Church	Donnelly Road, Naremburn	The church provides regular services on Saturday, Tuesday and Thursday mornings, and Sunday morning and evening. The church also holds regular monthly services for various language groups.
Education and childcare facilities		
Guardian Early Learning (Arthur Street)	Arthur Street, North Sydney	The centre includes nursery, toddler, kindergarten and preschool programs and is open 8am to 6pm Monday to Friday.
Walker Street Early Learning Centre	Walker Street, North Sydney	The centre provides childcare for children aged between six weeks and six years of age. The centre operates between 7am and 6pm, Monday to Friday.
Wenona School	Walker Street, North Sydney	The private girls school offers primary and secondary education to students in Kindergarten to Year 12. In 2019, the school had an enrolment of 1138 students. The school also provides accommodation for up to 50 boarders. In 2019, the school had 191 staff members, including teaching and non-teaching staff (My School, 2020b). The school also offers an after-school care service for students in Kindergarten to Year 6, which operates from 2.50pm to 6pm on school days.
ANZAC Park Public School	Corner of Ernest Street and ANZAC Avenue, Cammeray	Provides primary school education to students in Kindergarten to Year 6. The school opened in January 2016 and in 2019 had an enrolment of 619 students, with 40 staff members, including teaching and non-teaching staff (My School, 2020a).
KU Cammeray Preschool	Warwick Avenue, Cammeray	The centre is open from 8:15am to 3:45pm Monday to Friday.
Only About Children Cammeray Campus	Miller Street, Cammeray	The centre is open from 7am to 6pm Monday to Friday.
Happy Kids Family Day Care Cammeray	Massey Street, Cammeray	The centre provides day care services and is open Monday to Thursday 8am to 6pm.
Naremburn Early Learning Centre	Donnelly Road, Naremburn	The centre provides day care services for children aged from six weeks to five years.
White Rabbit Childcare Centre	Merrenburn Avenue at Naremburn	The centre provides long day care services and is open Monday to Friday 7:30am to 6pm.
Innovative Early Learning	George Place Artarmon	The facility provides childcare services for children up to six years old. The facility is open Monday to Friday (7.30am to 6pm).

Facility	Location	Description
Artarmon Public School	McMillan Road, Artarmon	The school provides primary school education for students in Kindergarten to Year 6. In 2019, the school had an enrolment of 1248 students, with 58 teaching staff and seven non-teaching staff members (My School, 2020c).
Little Lion Early Learning Artarmon	Dickson Avenue, Artarmon	The centre provides childcare and early learning services for children up to six years old. The centre is open Monday to Friday (7am to 6.30pm) and includes outdoor learning and play areas.
Butterflies Early Learning Child Care Centre	Waltham Street, Artarmon	Provides early childhood and school readiness programs. The centre includes outdoor play spaces. The centre is open from 7am to 6pm, Monday to Friday.
Ella Bache College	Lambs Road, Artarmon	The site provides accredited training and diploma level courses for domestic and international students.
Health, medical and emergency services		
Miller Street Medical Practices	Walker Street, North Sydney	General medical practice.
Harbour Radiology	Walker Street, North Sydney	Medical practice specialising in radiology, women's health imaging and other sub-specialty examinations.
Artarmon Ambulance Superstation	Reserve Road, Artarmon	The Superstation supports the Artarmon Paramedic Response Network cluster and is where paramedics start and end their shifts. The facility includes parking for 20 ambulances, administration facilities, logistics and storage areas, and staff facilities.
Cammeray Medical Practice	Miller Street, Cammeray	General medical practice open Monday to Friday (8am to 5.30pm) and Saturdays (8am to 12.30pm).
Sport, recreation and leisure facilities		
Doris Fitton Park	Little Walker Street, North Sydney	Provides an area of open space.
Merlin Street Reserve	Merlin Street, North Sydney	A small area of open space near residential properties
Rose Avenue Reserve	Rose Avenue, North Sydney	A small area of open space near residential properties
St Leonards Park (including North Sydney Oval and Bon Andrews Oval)	Corner of Falcon Street and Miller Street, North Sydney	St Leonards Park provides informal and formal recreation opportunities, including a children's playground. North Sydney Oval is located within the park, which provides sports facilities, such as netball courts, cricket nets and wicket, and Bon Andrews Oval. The oval hosts a range of amateur and professional matches during the cricket season as well as an outdoor cinema during the summer months. The North Sydney Oval also contains a function centre and childcare facility. The North

Facility	Location	Description
		Sydney War Memorial is located at St Leonards Park.
North Sydney Bowling Club	Ridge Street, North Sydney	Provides social and club bowls for the local community. The venue also hosts functions and other social events.
Jeaffreson Jackson Reserve	Moodie Lane, Cammeray	Provides an area of open space.
Cammeray Park	Park Avenue, Cammeray	The park provides for formal recreational opportunities, including synthetic turf for soccer and football.
Cammeray Tennis Club	Corner of Ernest Street and Park Avenue, Cammeray	The club includes four tennis courts and hosts club tennis, competitions, coaching and other social activities.
Cammeray Croquet Club	Corner of Ernest Street and Park Avenue, Cammeray	Provides croquet facilities, including a number of playing sessions on the weekend and during the week. Friday morning hosts handicap croquet games.
Cammeray-Neutral Bay Skate Park	Ernest Street, Neutral Bay	Provides skate park facilities for the local community.
Cammeray Golf Course and Cammeray Golf Club	Corner of Ernest Street and Park Avenue, Neutral Bay	The golf course is a private nine-hole golf course. The facility also includes a function room which caters for corporate activities, conferences, weddings and other private events.
ANZAC Park	Corner of Ernest Street and ANZAC Avenue, Cammeray	The park consists of open space and provides for informal recreational opportunities. A community garden was opened in March 2019, which covers an area of 600 square metres.
St Thomas Rest Park	West Street, Crows Nest	The park has social and historical significance and is the site of the first European cemetery on the North Shore (North Sydney Council, 2014).
Grand Slam Tennis – Wheatleigh Street	Wheatleigh Street, St Leonards	Comprises five tennis courts available for hire by the public. The courts are also used for coaching and school holiday tennis clinics. Opening hours vary but are generally between 6am and 10pm on weekdays, 8am and 8pm on Saturday, and 12pm and 7pm on Sunday.
Bicentennial Reserve	Willoughby Road, Willoughby	The park provides the opportunity for formal and informal recreational activities. The park, which includes Hallstrom Park, provides a baseball diamond, netball courts, sports oval, children's playground, barbeque facilities and picnic tables. A shared bike/pedestrian path links the reserve to Artarmon Reserve and Flat Rock Reserve.
Willoughby Leisure Centre	Small Street, Willoughby	The centre includes a swimming pool, and sports hall which provides basketball, volleyball, netball and badminton facilities.

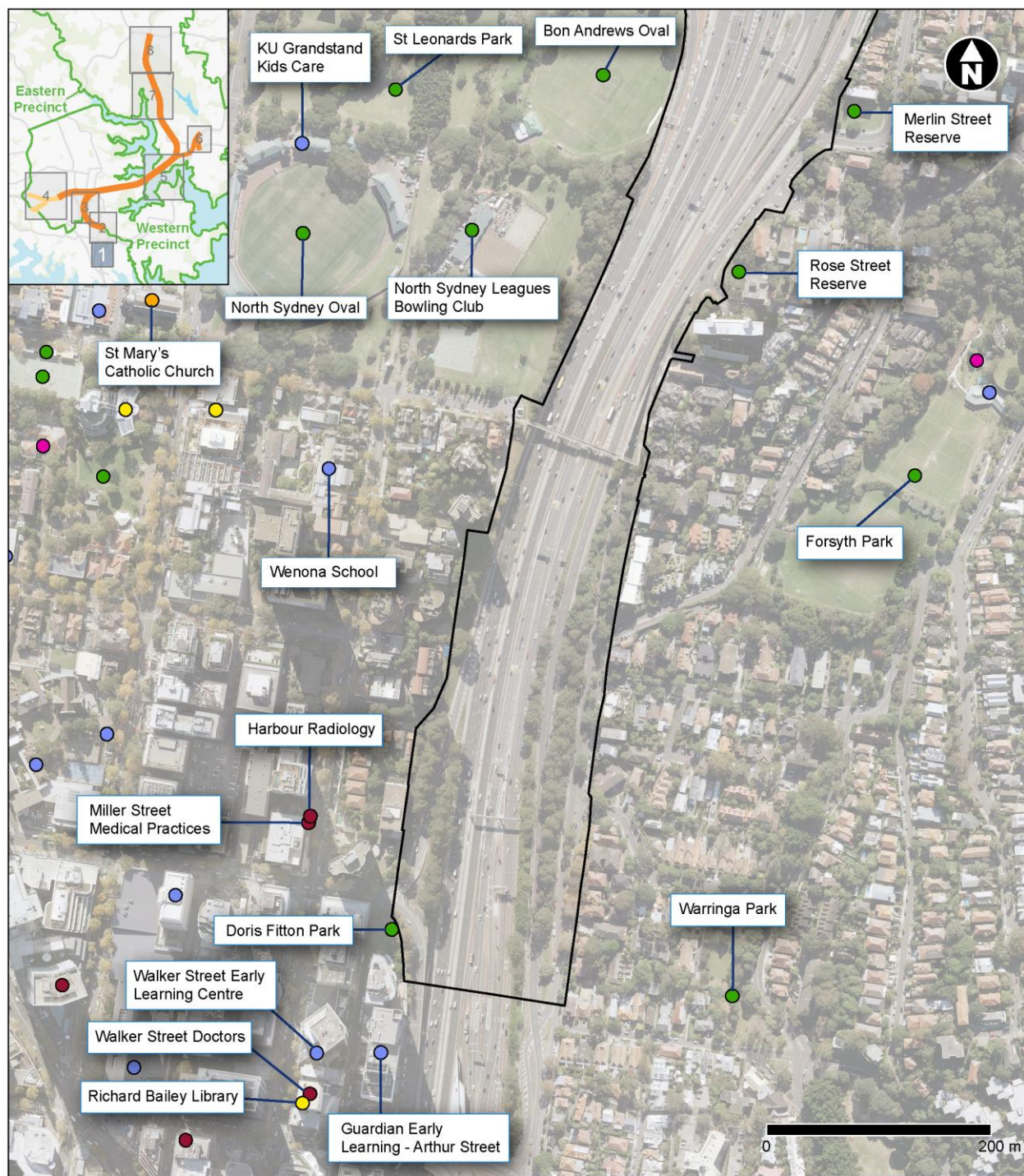
Facility	Location	Description
Northern Suburbs Netball Association	Small Street, Willoughby	A number of netball courts are located near Willoughby Leisure Centre. The courts host coaching and competition netball matches.
Flat Rock baseball diamond	Small Street, Willoughby	Flat Rock baseball diamond hosts club baseball matches and State competitions and is home ground to North Sydney Leagues Baseball Club.
Flat Rock Reserve	Flat Rock Drive, Willoughby	The reserve covers an area of about 22.3 hectares inclusive of a portion of Bicentennial Reserve, and comprises areas of remnant bushland, cultural heritage sites, bush walking tracks and shared paths, barbeque facilities and amenities.
Jersey Road Reserve	Broughton Road, Artarmon	The park includes an area of open space, children's playground, barbeque facilities, and picnic tables. The park is located next to Artarmon Kids Cottage Community Centre.
Thomson Park	Reserve Road, Artarmon	The park provides for formal and informal recreation activities. The park includes a children's playground and sandpit, basketball court and soccer field.
Artarmon Park	Parkes Road, Artarmon	An area of vegetated open space adjacent to the Gore Hill Freeway, which provides seating and off-leash dog areas.
Artarmon Reserve	Burra Road, Artarmon	The reserve provides the opportunity for informal and formal recreation opportunities. The reserve includes walking and cyclist tracks around the perimeter, barbeque facilities and picnic tables, off-leash dog areas, a children's playground and a sports field.
Duck and Dive Baby Swim School	Lambs Road, Artarmon	Swim school offering classes for babies up to three years and children aged three years to nine years. Classes are held daily.
Clive Park	Sailors Bay Road, Willoughby	The park is a 5.4-hectare foreshore bushland reserve located on Middle Harbour. The park contains the only easily accessible sandy beach within the Willoughby local government area. It includes picnic areas with tables and barbeque facilities, playground equipment, toilet, parking, views of Middle Harbour and walking tracks. The park is also the location of Northbridge Sailing Club, Sea Scouts and a commercial boat shed (Willoughby City Council, 2016).
Northbridge Sailing Club	Clive Park	The sailing club is a local club located at Middle Harbour. The club races dinghy classes during the sailing season from September to April. The club also hosts regular social events for members, junior and adult sailing schools, and a five-day live-in camp each January for about 70 participants aged

Facility	Location	Description
		between eight and 17 years (Northbridge Sailing Club, undated).
Seaforth Moth Sailing Club	Seaforth	The sailing club is located at Seaforth in Middle Harbour. The Seaforth Moth Sailing Club forms part of the Northbridge Sailing Club following their merger in 2000, with club races held during the sailing season from September to April. The Seaforth Moth Sailing Club has retained a clubhouse at Sangrado Park, Seaforth.
Mosman Rowing Club	Spit West Reserve	Provides a club for competition rowers, as well as adults learning to row and rowing for fitness. The club services the rowing needs of members and five Sydney schools, with facilities including two sheds, twin pontoons, gymnasium and storage areas. The main course routes used by rowers extend from the rowing club along Middle Harbour to beyond Roseville Bridge, and also into Long Bay (Mosman Rowing Club, undated).
Spit West Reserve	Spit Road, Mosman	The reserve provides the opportunity for formal and informal recreational activities, such as running, swimming, sailing and kayaking. The reserve offers views of Middle Harbour and comprises a range of facilities such as a bushland walking track, cycleway, playground, cricket facilities, fitness equipment, boat storage and picnic and barbeque facilities. The Mosman Rowing Club is located at the reserve (Mosman Council, undated). The reserve includes the Pearl Bay Reserve.
Middle Harbour Yacht Club	Lower Parriwi Road, Mosman	The yacht club is located at The Spit and has a membership of more than 1700 people. The club offers restaurant, bar, function and boardroom facilities. The yacht club provides school holiday sailing camps, learn to sail and training programs, weekly racing competitions and other annual events, including regattas and national championships (Middle Harbour Yacht Club, undated).
Middle Harbour 16 ft Skiff Club	Spit Road, Mosman	The sailing club operates from The Spit and provides junior and skiff sailing. The club hosts club competitions between August and April. The club also includes bistro, bar and function facilities.
Ellery Park	Spit Road, Mosman	Small area of open space located on the southern side of Spit Bridge. The park is used by fishers.
Community centre		
Artarmon Kids Cottage Community Centre and Noah's Ark Toy Library	Broughton Road, Artarmon	The community centre is available for hire by community groups and cultural organisations for children's activities such as playgroup. The centre hosts weekly family day care and play sessions open to the community on Wednesday mornings. The

Facility	Location	Description
		centre also includes the Noah's Ark Toy Library, which provides services for children with special needs. The community centre is available on Saturday's for activities related to children with additional needs.
Eastern Precinct		
Places of worship		
St Cecilia's Church	Wanganella Street and White Street, Balgowlah	The church provides regular Sunday and weekday services, as well as other services throughout the year.
Frenchs Forest Anglican Church	Bantry Bay Road, Frenchs Forest	The church provides regular services on Sunday morning and evening.
Education and childcare facilities		
Seaforth Public School	Kempbridge Avenue, Seaforth	The school offers primary education for students in Kindergarten to Year 6. In 2019, the school had an enrolment of 520 students, with 31 staff members, including teaching and non-teaching staff (My School, 2020g).
Northern Beaches Secondary College Balgowlah Boys	Maretimo Street, Balgowlah	The school provides secondary education to students in Year 7 to Year 12. In 2019, the school had 1039 enrolments, with 57 teaching staff and 12 non-teaching staff members (My School, 2020e).
Balgowlah Kinder Haven Childcare and Early Learning Centre	Sydney Road, Balgowlah	The centre provides childcare and early learning services for children aged from birth to five years. The centre operates between 7.30am and 6pm, Monday to Friday, and includes outdoor play and learning areas.
St Cecilia's Catholic Primary School	Seaview Street, Balgowlah	The school provides primary education for students in Kindergarten to Year 6. In 2019, the school had an enrolment of 281 students, with 25 staff members (My School, 2020f).
Little Bloomers Early Learning Centre	Gratten Crescent, Frenchs Forest	This centre provides care and early learning programs for children aged 3 to 4 years. The centre operates 7.30am to 6pm, Monday to Friday. This centre is located next to Ararat Reserve.
Kindalin Early Childhood Learning Centre	Aquatic Drive, Frenchs Forest	The centre provides childcare, early learning and preschool programs for up to 100 children aged up to five years. The centre operates from 7am to 6.30pm on Monday to Friday and includes outdoor play and learning areas.
The Forest High School	Frenchs Forest Road, Frenchs Forest	The school provides secondary education to students in Year 7 to Year 12. In 2019, the school had 775 enrolments, with 69 staff members, including teaching and non-teaching staff (My School, 2020d).

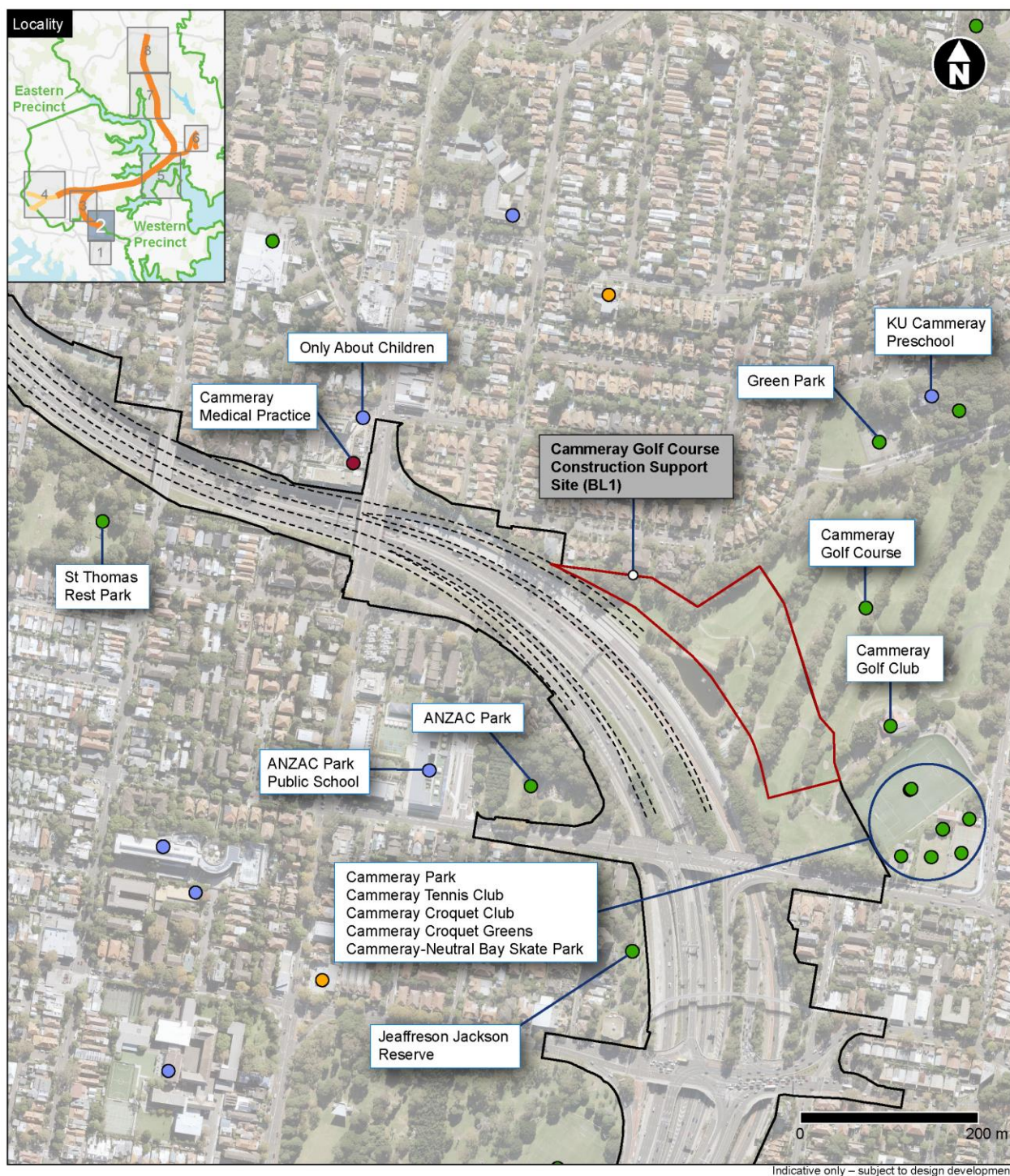
Facility	Location	Description
Health, medical and emergency services		
Occupational Therapy Helping Children	Wanganella Street, Balgowlah	The practice offers occupational therapy for children and adolescents with developmental challenges, including one-on-one consultations and group sessions.
Warringah Road Family Medical centre	Hilmer Street, Frenchs Forest	General medical practice which is open Monday-Friday (8am to 5pm), Saturday (9am to 5pm) and Sunday (8am to 12pm).
Northern Beaches Hospital	Frenchs Forest	The hospital opened in October 2018 and provides 488 beds, a 50-space emergency department and other medical and surgical services.
Sport, recreation and leisure facilities		
Clontarf Beach and Reserve	Sandy Bay Road, Clontarf	Clontarf Beach and Reserve is located on Middle Harbour. The reserve includes the beach, netted swimming area, playground, and picnic and barbeque facilities. The beach and reserve form part of the Spit to Manly coastal walk. The reserve is also used for wedding ceremonies (Northern Beaches Council, undated).
Balgowlah Golf Course and Balgowlah Golf Club	Sydney Road, Balgowlah	The course provides a nine-hole course for both competition and social golf. The club offers membership for golfers and social members and includes clubhouse and function facilities.
Balgowlah Oval	Sydney Road, Balgowlah	The oval provides a sports field, including cricket pitch and synthetic practice wickets.
1st Balgowlah Scout Hall	Pickworth Avenue, Balgowlah	Hosts scout activities, including meetings on Monday, Tuesday and Thursday evenings, and can be hired for use by the public.
Seaforth Oval	Wakehurst Parkway, Seaforth	The oval provides a number of formal sports facilities, such as for cricket, soccer and oztag, as well as a children's playground. A formal car park is provided at the oval off Wakehurst Parkway, which also provides access to the Timber Getters Track and Engravings Track located within the Garigal National Park.
Garigal National Park	Wakehurst Parkway, Frenchs Forest	The national park covers over 2000 hectares and offers a range of recreation and leisure activities including bike riding, horse riding, boating, canoeing and fishing. The park also includes picnic and barbeque facilities and boat ramps. The park has Aboriginal and non-Aboriginal heritage sites and is an important wildlife corridor between Sydney Harbour and the Blue Mountains (National Parks and Wildlife Service, 2013).
Wakehurst Golf Club and Wakehurst Golf Club	Upper Clontarf Street, Seaforth	The club provides an 18-hole course for both competition and social golf for members and visitors and individual and group lessons. The club

Facility	Location	Description
		offers membership for playing and non-playing members and includes bistro, bar and function facilities.
Ararat Reserve	Bantry Bay Road, Frenchs Forest	Ararat Reserve includes formal playing fields and sporting areas. A small area of bushland is located south of the playing fields, which forms part of the Bantry Bay Bushland Reserves. This provides important habitat for local native fauna and major wildlife corridor connecting to Manly Dam and Forestville Park. The reserve is also used for community festivals and events.
Frenchs Forest Scout Hall	Utyana Place, Frenchs Forest	Hosts scout activities and can be hired for use by the public.
Manly Warringah War Memorial State Park (Manly Dam)	King Street, Allambie Heights	Manly Dam covers an area of about 375 hectares, the majority of which is covered by bushland. The park offers a range of recreation and leisure activities including mountain biking, water skiing, swimming, fishing, kayaking and bush walking. The park also includes Aboriginal and historic heritage sites. Remembrance Day and ANZAC Day ceremonies are also held at the Cenotaph within the park (Warringah Council, 2014).
Warringah Aquatic Centre	Aquatic Drive, Frenchs Forest	The centre includes indoor swimming pools, including a 50-metre Olympic pool and diving pool, and outdoor lap pool and splash pool, with barbeque and picnic facilities. The centre runs swim programs, swim clubs and school holiday programs and also hosts children’s parties. The centre is open 5.30am to 9pm weekdays, and 7am to 6pm on weekends (Northern Beaches Council, undated).
Aquatic Reserve	Aquatic Drive, Frenchs Forest	Located near the aquatic centre, the reserve includes two baseball fields.
Brick Pit Reserve	Bantry Bay Road, Frenchs Forest	The reserve provides for informal recreation opportunities and includes a children’s playground and picnic area.



Indicative only – subject to design development

Figure 4-10a Social infrastructure near the project



Legend

Construction features

- Tunnel section
- ▭ Construction footprint
- ▭ Construction support site

Social infrastructure

- Community centre
- Education and child care
- Health, medical and emergency services
- Places of worship
- Sport, recreation and leisure facilities

Figure 4-10b Social infrastructure near the project

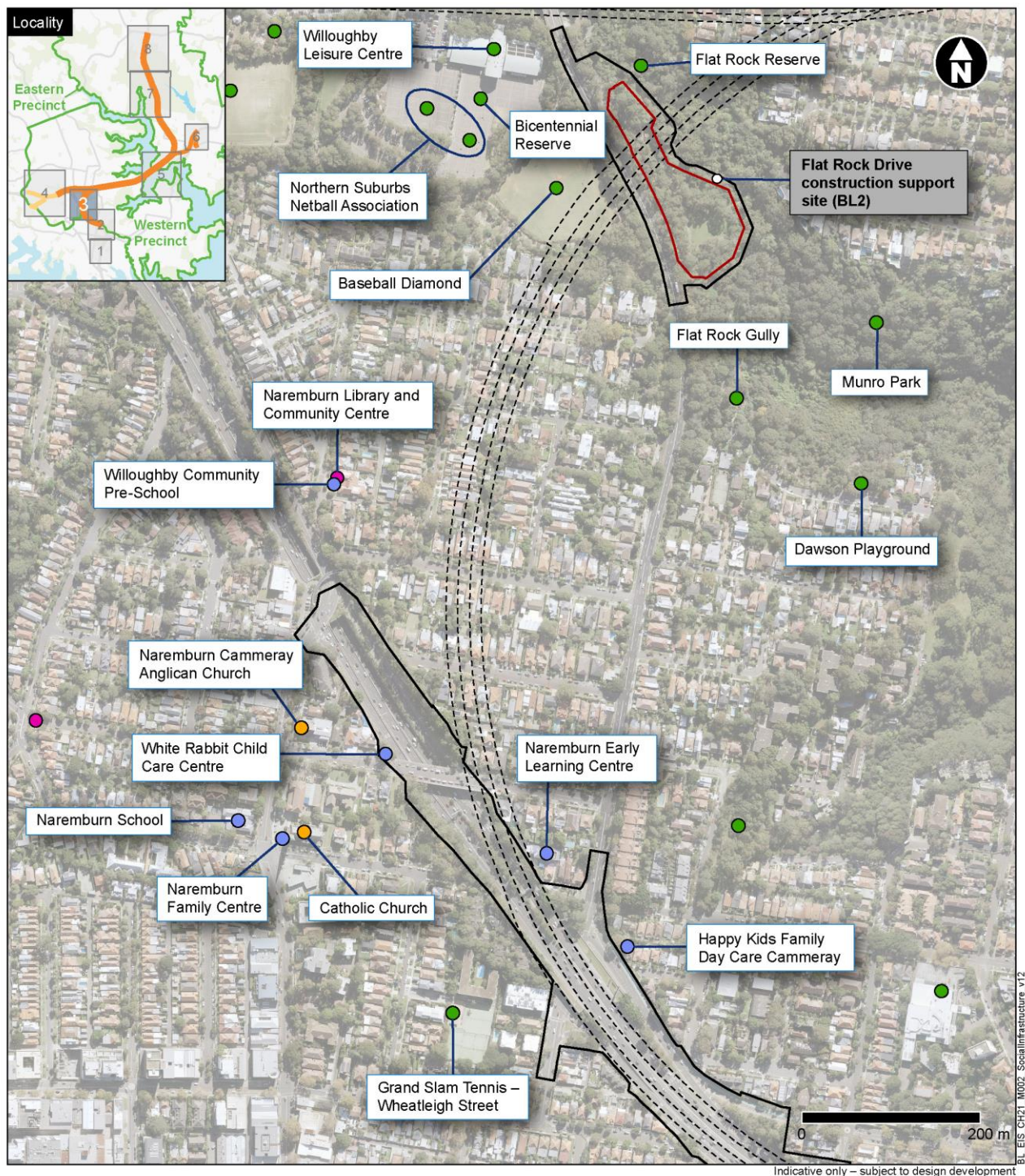


Figure 4-10c Social infrastructure near the project

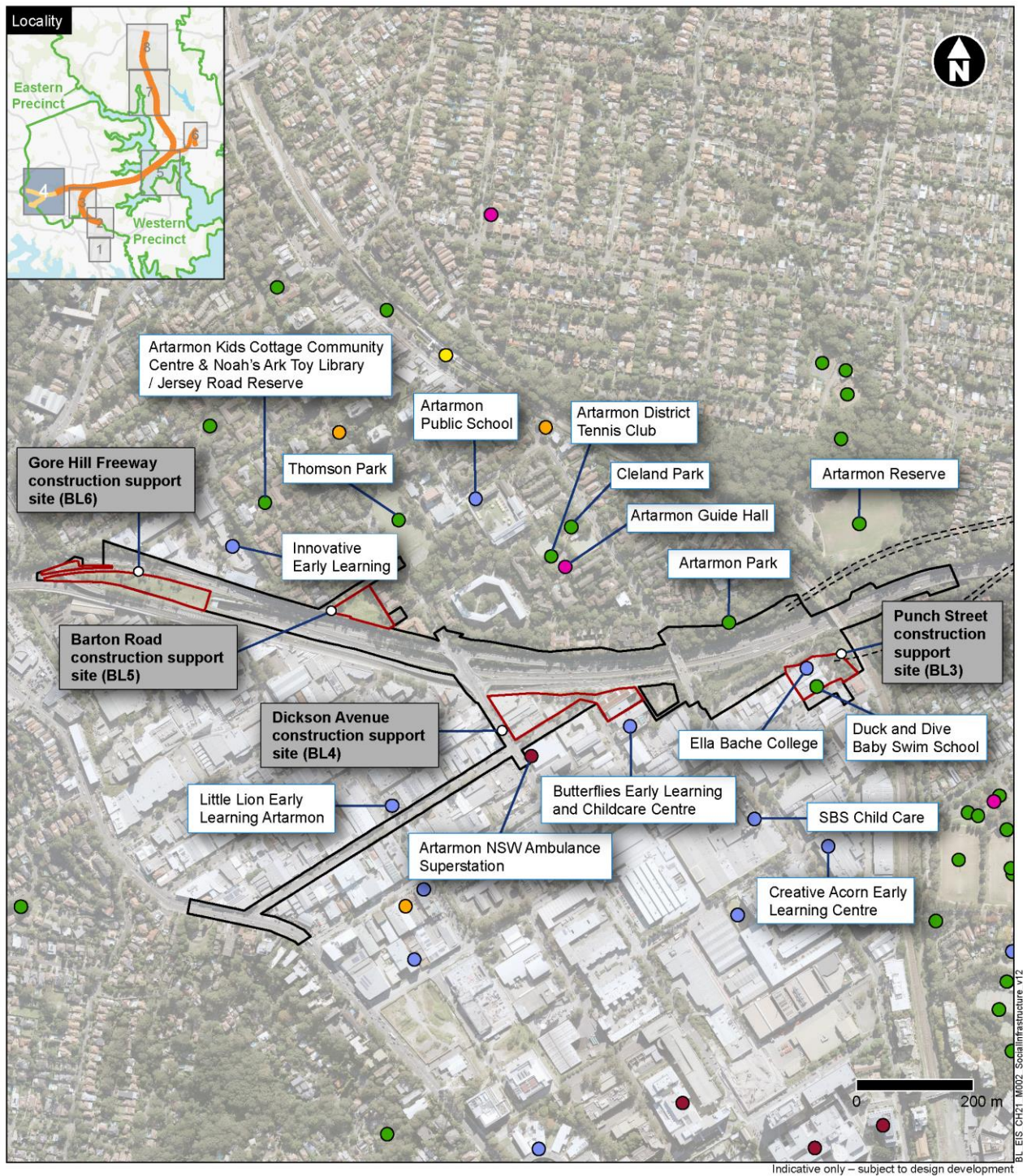
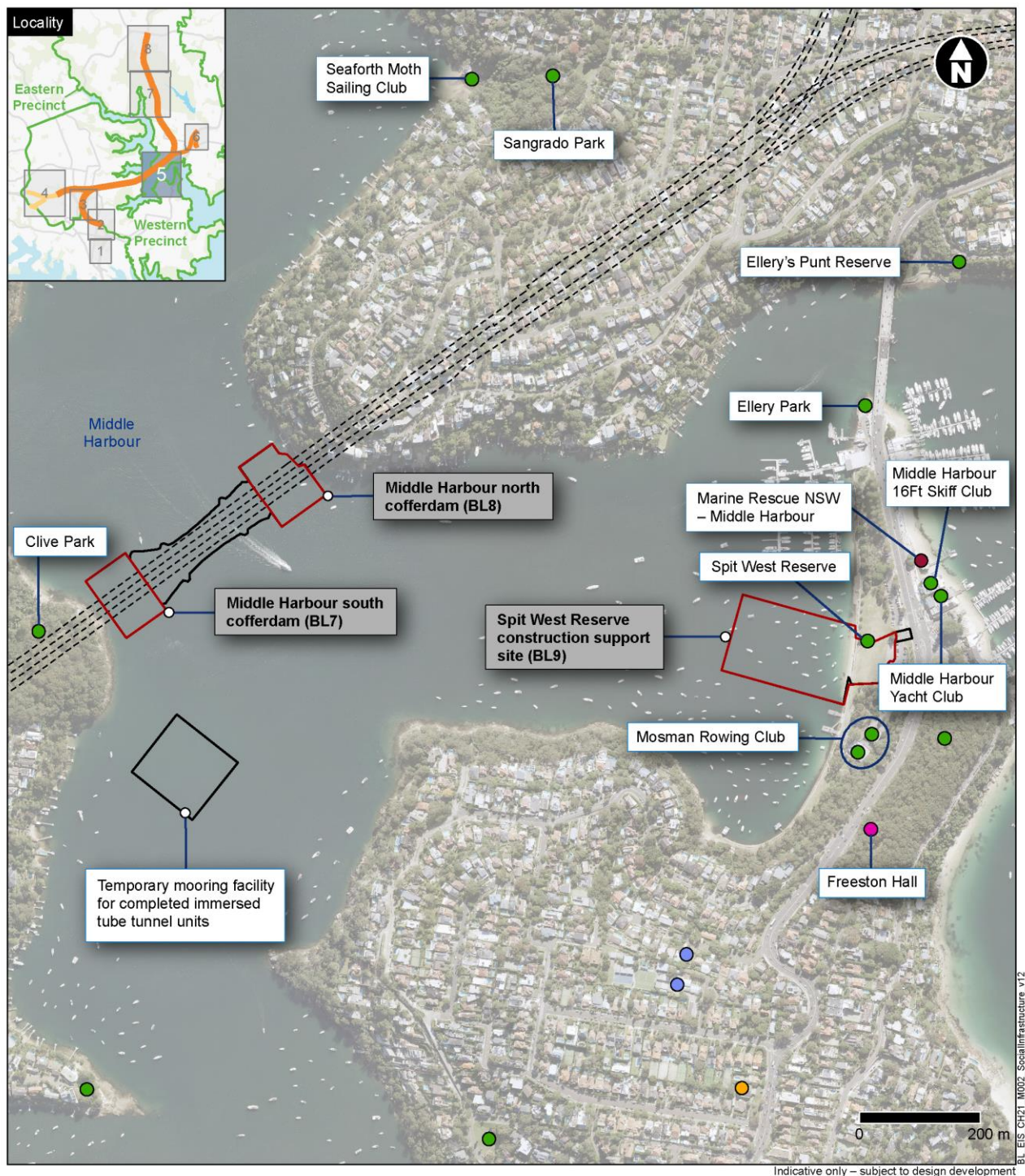


Figure 4-10d Social infrastructure near the project



Legend

Construction features

- Tunnel section
- ▭ Construction footprint
- ▭ Construction support site

Social infrastructure

- Community centre
- Sport, recreation and leisure facilities
- Education and child care
- Places of worship
- Health, medical and emergency services

Figure 4-10e Social infrastructure near the project

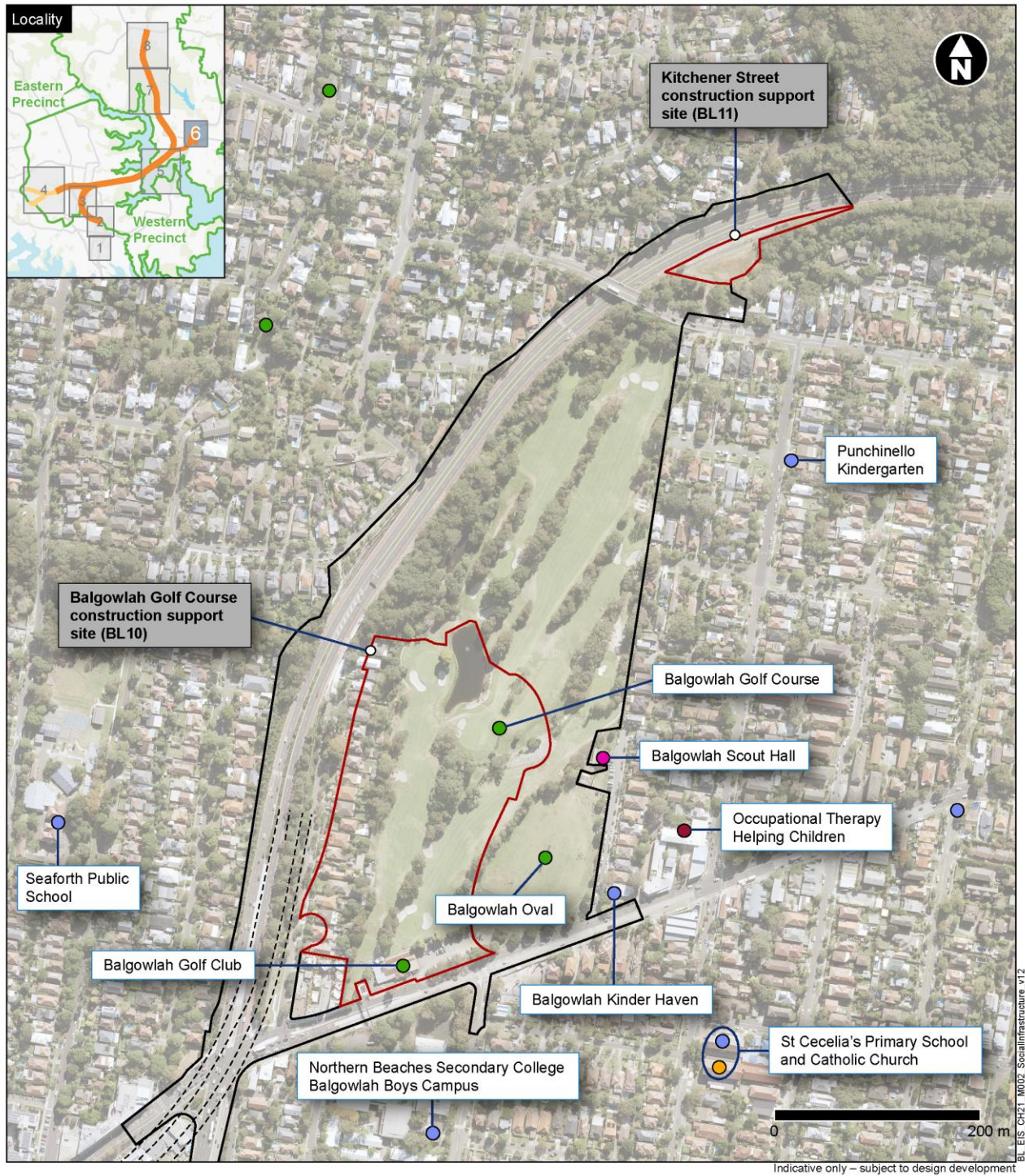


Figure 4-10f Social infrastructure near the project

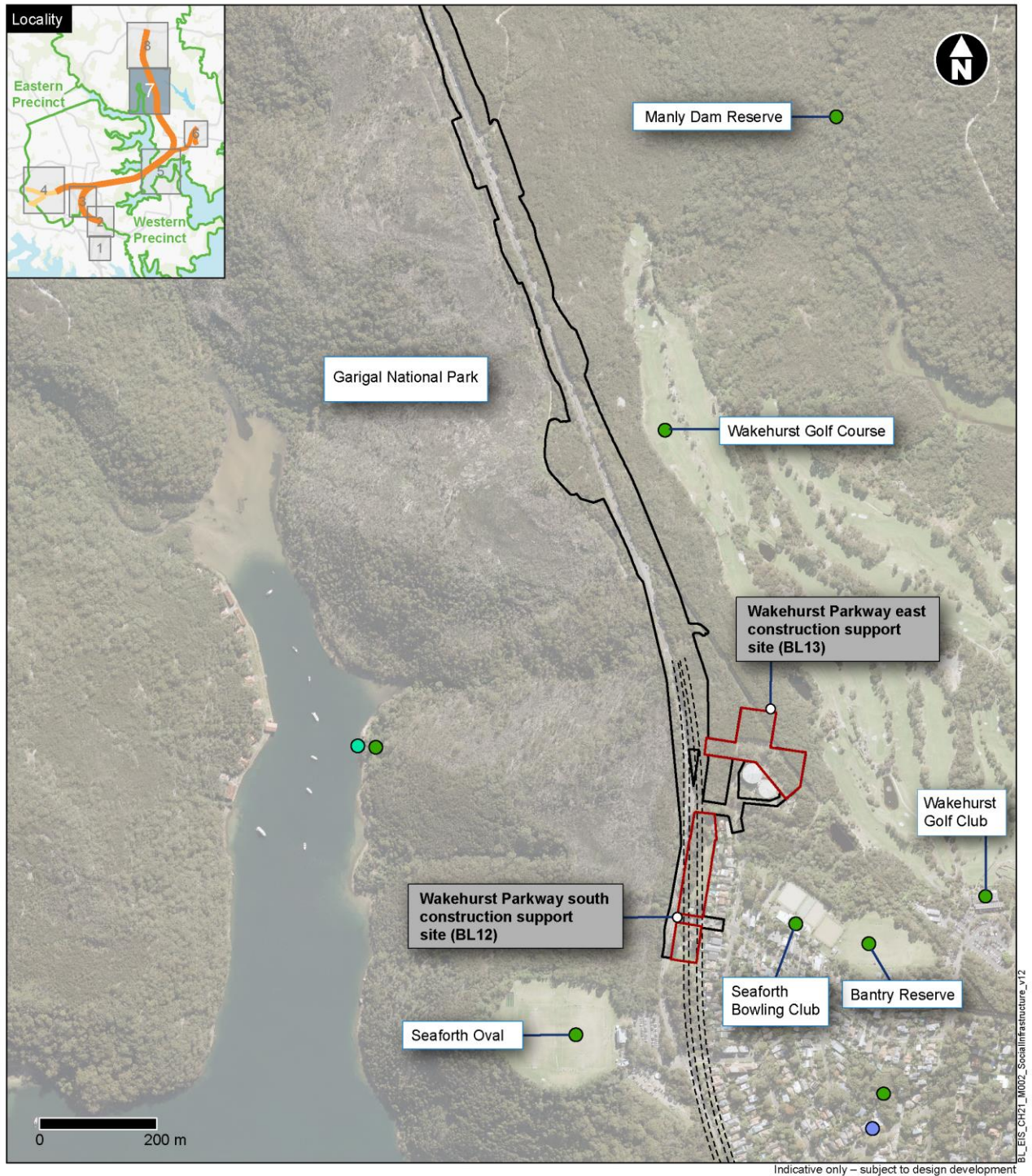
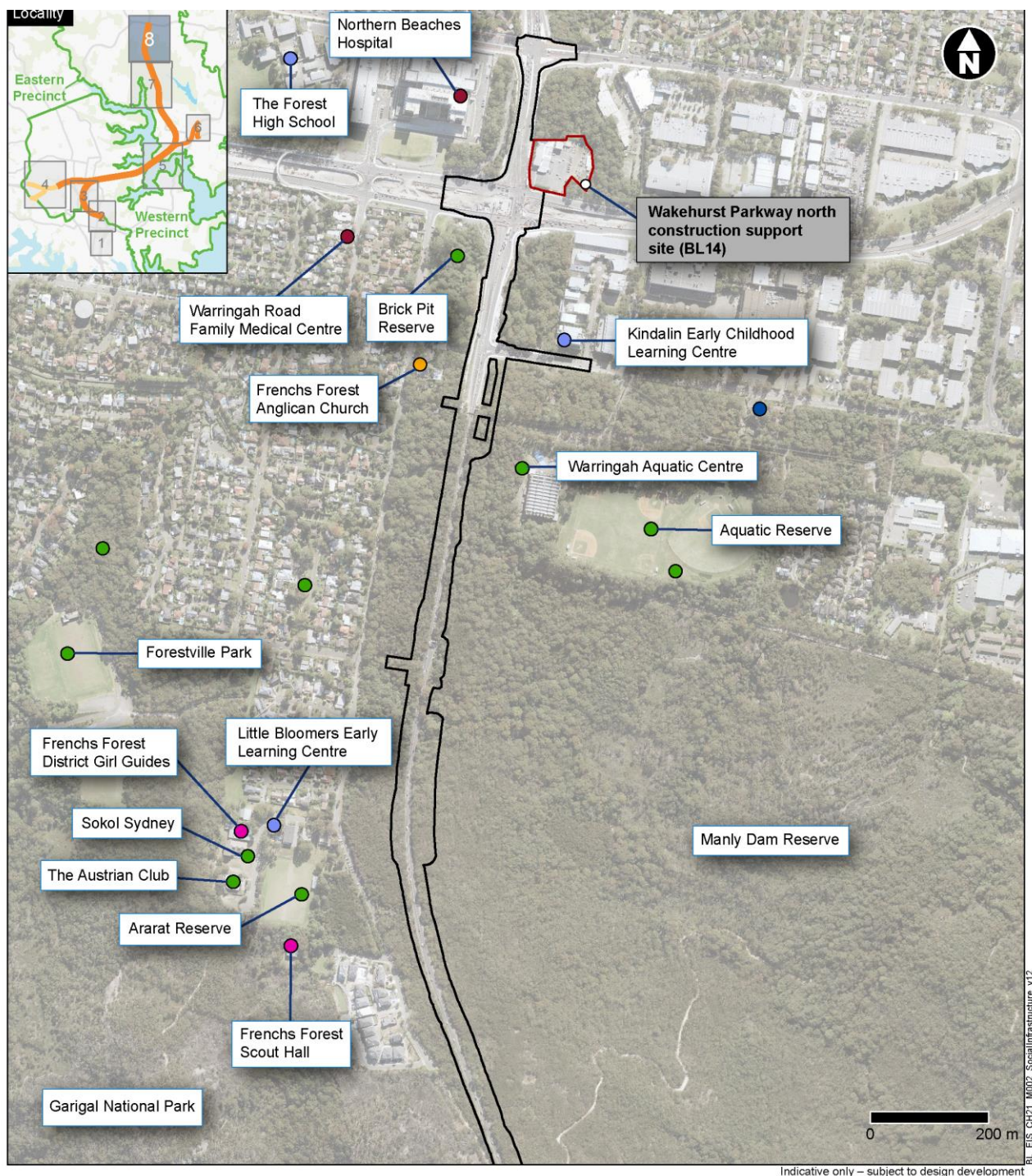


Figure 4-10g Social infrastructure near the project



Legend

Construction features

- Tunnel section
- ▭ Construction footprint
- ▭ Construction support site

Social infrastructure

- Aged care
- Community centre
- Education and child care
- Health, medical and emergency services
- Places of worship
- Sport, recreation and leisure facilities

Figure 4-10h Social infrastructure near the project

4.4 Business profile

This section provides a profile of businesses in the study area. This has been informed by the business impact assessment prepared by HillPDA (2020), provided in Annexure A.

4.4.1 Local centres

The study area contains a diversity of centres ranging from local centres to larger strategic centres. Local centres are the focal point of neighbourhoods and generally meet the needs of local residents in relation to shopping and social interaction. They vary in size from a cluster of local shops to large-box format retail centres. Strategic centres generally offer a mix of activities, size and location that enable the community access to a wide range of goods, services and jobs.

In the Western Precinct, local centres generally comprise smaller retail and commercial centres such as Military Road Cremorne Centre, Military Road Mosman Centre, Neutral Bay Junction and Spit Junction Centre. An industrial related centre is also located at Artarmon Industrial area, which comprises automotive businesses, construction, film, health and fitness related businesses. The centre also provides warehouse and storage facilities. In the Eastern Precinct, Frenchs Forest Business Hub is a large strategic centre, which provides a mix of commercial, health and bulky goods retailers. The Eastern Precinct also contains a number of local centres, including Warringah Mall, Forestway Shopping Centre, Seaforth Centre and Balgowlah Centre. An industrial centre is located at Manly Vale Industrial, which comprises a mix of retail, commercial, personal and professional service businesses.

In 2016, the study area contained 25,871 businesses distributed across various centres. The local centres contributing to businesses within each SA2 vary in size and scale, with Chatswood (East)-Artarmon containing the greatest number of businesses. Some business centres are within the precinct areas for the Western Harbour Tunnel and Warringah Freeway Upgrade project (HillPDA, 2020).

Table 4-11 provides a summary of business centres in the study area that may be impacted by the project. The study area also contains a wide variety of businesses located outside of business centres, which may also be impacted by the project’s construction or operation. Further description of these businesses is provided in Annexure A Annexure A: Business Impact Assessment.

Table 4-11 Summary of business centres in the study area

Centre	General description
Western Precinct	
Miller Street, Cammeray	Commercial offices, food and beverage retailers, sports clubs and accommodation services, serving local residents as well as commuters and those visiting for work. Commercial businesses are not likely to rely on passing trade however retail businesses would have some reliance on passing trade.
Military Road Cremorne centre	Businesses in this area include commercial offices, food and drink retailers, sports clubs and accommodation services, serving local residents as well as commuters and those visiting for work. A car dealership, medical centre and mixed-use building with ground floor retail space are located at the junction of Military Road, Glover Street and Macpherson Street. The commercial businesses are not likely to rely on passing trade however retail businesses would have some reliance on passing trade. The car dealership is a destination business, while the medical centre services a neighbourhood catchment. The mixed-use spaces service a local neighbourhood and further afield, depending on the businesses using the space.

Centre	General description
Military Road Mosman centre	The centre comprises a wide variety of businesses including retail and commercial uses. Retail businesses include a number of cafes and restaurants as well as boutique clothing stores and commercial businesses include interior design and personal services businesses. There are also a number of 'neighbourhood shops' such as convenience stores and pharmacies. The cluster caters primarily to a neighbourhood catchment. Commercial businesses are not likely to rely on passing trade however retail businesses would have some reliance on passing trade.
Artarmon industrial	This centre is characterised by a large number of automotive businesses (such as vehicle sales, rental and repair) and film related businesses as well as construction related commercial businesses (for example equipment sale and hire). It includes a gym and fitness facilities, warehouse/storage facilities and commercial businesses. Businesses located in the cluster are destination stores as many customers would drive specifically to the businesses and they are unlikely to be dependent on passing trade.
Spit Junction centre	The centre comprises a wide variety of businesses spanning retail and commercial uses as well as Mosman Council buildings. Retail businesses include cafes and restaurants as well as clothing stores and commercial businesses include medical and gym/fitness businesses. Some businesses in the area, such as speciality retailers, service both a neighbourhood and wider catchment and are unlikely to be dependent on passing trade. These businesses are destination services as many customers would drive specifically to the businesses. Others, such as cafes, restaurants and medical businesses, cater primarily to a neighbourhood catchment and would have some reliance on passing trade. Large format retailers are also located at Spit Junction including a car dealership and furniture shops and smaller commercial premises (for example, allied health services, professional suites, car wash and cafes).
The Spit centre	The centre accommodates a number of boating related businesses and a small number of commercial businesses. Boating related businesses include three marinas, cafes and restaurants serving visitors and users of the facilities. The range of businesses includes boat rental/sales and insurance businesses and a commercial diving operation. There is also Middle Harbour Yacht Club, which is used as a wedding venue as well as by members and a small commercial element comprising an office space on the eastern shore of The Spit. These businesses are primarily destination services as many customers would drive specifically to the businesses. They also service local residents and visitors who visit to enjoy the amenity of the area.
Eastern Precinct	
Balgowlah centre	This centre comprises a large shopping centre including retail and commercial businesses. The centre includes clothing, homeware and retail businesses as well as a large supermarket and other food retailers along with commercial businesses such as travel agents, a gym/fitness centre and personal services businesses. There is also a car wash located in the underground carpark. Along Sydney Road, there are cafes and restaurants as well as some commercial offices and retail stores. The centre caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Seaforth centre	Retail businesses include cafes and restaurants, and commercial businesses comprise estate agents, a veterinary hospital and personal services businesses. There are a number of 'neighbourhood shops' such as a post office. Bupa aged care facility

Centre	General description
	and Balgowlah RSL Club are also in this cluster. The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Manly Vale business centre	This centre comprises a variety of retail businesses (such as cafes, takeaways and restaurants, clothing stores, a pharmacy and homewares stores) and commercial businesses (such as interior designers, professional services businesses, personal services businesses, a doctor’s surgery and a cluster of surfboard manufacturers). Some businesses, such as the pharmacy, doctor’s surgery and cafes, serve a neighbourhood catchment while those such as interior designers and surfboard manufacturers are destination services as many customers would drive specifically to the businesses. The centre also includes commercial and retail businesses that are largely characterised by having large floorplates, for example supermarkets, furniture stores, wholesalers, hardware stores, construction businesses and specialist retailers. Most businesses in this centre are destination services as customers would drive specifically to the business. Businesses would have some reliance on passing trade.
Warringah Mall Shopping centre	A large shopping centre consisting of retail (such as clothing, homewares, and food retailers) and commercial businesses (such as travel agents, banks, insurance companies and personal services businesses). There are a number of cafes and restaurants located within a food court and throughout the shopping centre and a car wash located within the carpark. The cluster caters primarily to a neighbourhood catchment with some customers travelling from further away, including from the wider Northern Beaches.
Forestway Shopping Centre	A large shopping centre comprising retail and commercial businesses. Within the shopping centre, there are clothing and homeware retail businesses as well as a large supermarket and food retailers and a number of cafes and restaurants. The centre also includes commercial businesses such as banks, travel agents, a gym/fitness centre and personal services businesses. There is also a car wash located next to the main building. The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Frenchs Forest business hub	Commercial businesses in this area include corporate offices, gym/fitness centres, sports facilities, storage facilities/warehouses, medical laboratories, and distribution centres. The centre also includes bulky goods retailers such as homeware and furniture stores. Many businesses in the cluster, such as commercial offices and distribution centres, would not receive customers visiting their premises. Those that do are destination services as many customers would drive specifically to the businesses. The gym/fitness centres cater mostly to employees working within the cluster.
Austlink Business Park	Austlink Business Park is located at the junction of Forest Way and Mona Vale Road. The centre includes a diverse range of uses including retail businesses, food court, corporate offices, gym/fitness centres, storage facilities/warehouses and distribution centres. There are also numerous bulky goods retailers such as hardware, homeware and furniture stores. Many businesses such as commercial offices and distribution centres would not receive customers and those that do are destination services with customers driving specifically to the businesses. The gym/fitness centres cater mostly to local workers.

Source: Based on *Beaches Link and Gore Hill Freeway Connection, Business Impact Assessment (HillPDA, 2020)*. Refer to Annexure A for further details.

4.4.2 Maritime businesses

A range of businesses are located within or near to the study area that are reliant on Middle Harbour for their operation. These include:

- Maritime businesses, such as boat moorings, boat licensing, marine rescue, boat maintenance and repairs, tow boats, marina facilities and fuel services
- Tourism related businesses, such as harbour cruises, outdoor recreation and sporting activity operators and hire facilities and recreational boat hire
- Commercial activities, such as fishing movements, charter boats, science and research, refuelling and water taxis.

Due to the existing shallow sand bar and draft restrictions at the entrance to Middle Harbour, this waterway does not accommodate any major commercial shipping operations, with the majority of maritime traffic associated with recreational and sporting activities. Business operations near the study area are more oriented around maritime, navy bases, tourism and commercial functions. The area is highly popular for recreation users with a number of on-land businesses, such as kayak hire, boat chartering and restaurants, benefiting from being close to the harbour.

4.4.3 Business perceptions

Business surveys were conducted by HillPDA for the business impact assessment to understand how businesses near the project currently operate and issues, perceptions and concerns of businesses relating to the project's construction and operation. The following provides a summary of key findings from the business surveys (HillPDA, 2020).

The business survey highlighted a high dependency on motor vehicle, pedestrian and cyclists passing trade. Sixty-nine per cent of businesses surveyed reported a perceived dependency on motor vehicle passing trade, including 43 per cent that indicating they were 'highly dependent'. The business centres of Manly Vale and Warringah Mall recorded the highest level of dependence on motor vehicle passing trade. Sixty-six per cent of businesses surveyed reported a dependency on passing pedestrians and cyclist trade, with 44 per cent indicating they were 'majorly dependent'. The business centres of Military Road and Warringah Road reported the highest levels of dependence on pedestrian and cyclist passing trade. Businesses reporting to be most dependent on passing trade included accommodation and food services, and retail trade.

Changes in access to a centre, for example through congestion and changes in travel times (increases or decreases), may result in long-term changes to consumer and worker behaviour. The business survey found that 83 per cent of businesses perceived that they were sensitive to travel time delays, with 39 per cent of survey respondents believing they are 'majorly sensitive'. Those centres reporting the highest levels of sensitivity to travel time delays included Frenchs Forest and Seaforth/Spit Bridge. Businesses surveyed indicated the majority of their customers and employees use private vehicles as their primary transport mode. Convenient customer parking was considered a dependency for 65 per cent businesses with 39 per cent of respondents indicating a 'major dependency' on convenient customer parking. The majority of businesses (65 per cent) reported they were dependent on on-street parking, with 39 per cent recording a 'major dependency'. Centres at Military Road, Seaforth/Spit Bridge and Spit Junction reported the highest levels of dependency on on-street parking. A change in pedestrian or vehicle routes and traffic volumes may affect the exposure of businesses to potential clients. Seventy per cent of businesses reported that they were dependent on business exposure and visibility and 47 per cent majorly dependent. The centres of Warringah Mall, Spit Junction and Frenchs Forest recorded the highest levels of dependency.

Changes to local character and amenity can affect the enjoyment and desirability of the environment, visitor numbers and trends, and consequently the economic activity of a commercial centre and the businesses located there. Overall, 82 per cent of businesses identified that they were dependent on the identity and character of the commercial centre they were located in, with 53 per cent majorly dependent. Fifty-three per

cent identified that they were dependent on a pleasant visual amenity, 11 per cent had a high sensitivity to noise, 16 per cent had a high sensitivity to air quality and 18 per cent had a high sensitivity to odour.

Further detail on businesses in the study area is provided in Annexure A.

4.5 Community values

This section provides an overview of those values or features within the study area that are likely to be important to local and regional communities. This has been informed by the review of existing literature such as council planning and strategy documents; assessment of places likely to be important to community members such as open space, heritage places and recreation facilities; review of community and stakeholder engagement outcomes; and observations of the study area.

4.5.1 Local amenity and character

Community values relating to local amenity and character refer to natural and physical qualities and characteristics that contribute to a person's appreciation of their surroundings. They relate to such things as built form and landscape, environmental conditions (that is, noise levels and existing air quality), and heritage and cultural features.

Local amenity and character in the study area is generally characterised by a diversity of land uses including:

- Pockets of high-density residential areas within the Western Precinct, such as at Chatswood and Artarmon, and pockets of medium-density residential at Cremorne and Cammeray
- Predominantly low-density residential areas within the Eastern Precinct, such as at Killarney Heights, Forestville, Allambie Heights, Balgowlah and Frenchs Forest
- Industrial uses at Artarmon near the Gore Hill Freeway and Pacific Highway
- Local centres and shopping precincts within both precincts, including major shopping centres at Chatswood
- Major tourist attractions, such as Taronga Zoo at Bradleys Head Road in Mosman
- Parks and recreational uses such as Northbridge Oval, Bicentennial Reserve, Northbridge Golf Course, Balgowlah Golf Course, Wakehurst Golf Course, Waverton Park, Seaforth Oval and Clive Park
- Major social infrastructure including hospitals such as the Royal North Shore Hospital, North Shore Private Hospital and Northern Beaches Hospital.

The study area includes open spaces, reserves and parkland areas that are valued by local and regional communities for their landscape, visual amenity, heritage and recreational values. These include:

- Sydney Harbour National Park, Bradleys Head, Middle Head, Artarmon Park, Flat Rock Reserve, Clive Park and Spit West Reserve within the Western Precinct
- Clontarf Beach and Reserve, Garigal National Park, Manly Dam and Dobroyd Head within the Eastern Precinct.

Protection of parks, recreational facilities and open space areas was identified as an important issue during consultation for the project. This included protection of the Northbridge peninsula (including Northbridge Golf Course and Clive Park), Flat Rock Reserve, Seaforth Oval and Balgowlah Golf Course.

Protection and conservation of the environment, including biodiversity, bushland areas and heritage values, is important to communities in the study area. The Northern Beaches Community Strategic Plan (Northern Beaches Council, 2018) recognises that the natural environment provides a "*distinctive sense of place and belonging*" and contributes to the identity and culture of the local government area and includes strategies to protect natural environmental values. The Willoughby Community Strategic Plan (Willoughby City Council,

2018) also includes priorities to *'enhance, protect and respect waterways, bushland, nature, wildlife and ecological systems'*.

Consultation with the community for the project identified the need to protect and preserve flora and fauna at the Wakehurst Parkway, including consideration of fauna crossings at the Wakehurst Parkway, and the need to protect Aboriginal heritage items near the project. Consultation for the project also identified the need to protect bushland habitat and wildlife at Flat Rock Reserve and concerns about potential impacts on water quality in Flat Rock Creek. This area was a former landfill site which has been restored and revegetated.

Middle Harbour also contributes to local amenity and character. Middle Harbour extends west of The Spit to Warringah Road in the upper reaches and is fronted by bushland at the Garigal National Park and Explosives Reserve. The harbour is used by local and regional communities for informal and formal recreational opportunities, such as boating, fishing, sailing, rowing and kayaking. Local sporting clubs operate within Middle Harbour, including Northbridge Sailing Club, Mosman Rowing Club and Middle Harbour Yacht Club. The Northern Beaches Community Strategic Plan highlights the importance of Middle Harbour to the community, and includes a strategy to protect and manage the condition of and safe access to Middle Harbour. The Willoughby Community Strategic Plan also identifies the Middle Harbour estuary and Lane Cove River as being highly valued features of the local government area.

4.5.2 Community cohesion

Community cohesion refers to the connections and relationships between individuals, groups and neighbourhoods, and is encouraged by the existence of local social infrastructure, a sense of local identity and opportunities for community participation. Overall, levels of community cohesion and sense of belonging in the study area are expected to be good, with communities having access to a diverse range of local and regional level social infrastructure, strong support networks and a variety of meeting places such as sporting clubs, cafes and local centres that foster and support social interaction.

Community and social networks in the study area are associated with social infrastructure, such as schools, churches, and community, environmental, heritage and resident groups. Sporting clubs such as Cammeray Golf Club, Balgowlah Golf Club, baseball clubs at Flat Rock Reserve, Seaforth Oval and water-based clubs which are located at Middle Harbour (for example Mosman Rowing Club, Northbridge Sailing Club and Middle Harbour Yacht Club) are also likely to foster important community and social networks. Many of these community and social networks are long-standing and are supported by contributions from volunteers, which further strengthen community cohesion.

Communities in the study area also host a variety of local events, including festivals, exhibitions and markets, which provide opportunities to involve local communities and help to foster a sense of community and local identity. These events attract visitors from the study area and the wider region. These include:

- Local festivals, such as the North Sydney Children's Festival, Emerge Festival at Chatswood and the Festival of Mosman
- Cultural and sporting events such as the Twilight Food Festival, Spring into Jazz at North Sydney, Sydney Harbour Regatta, Eurofest at Frenchs Forest and Mini-Mos Community Fun Run and Fair

- New Years' Eve, Chinese New Year and Australia Day celebrations
- Weekly and monthly farmer's markets and arts markets, including at North Sydney, Chatswood, Cammeray, Mosman and Frenchs Forest.

Road corridors and arterial roads within the study area create barriers, both real and perceived, to local movement and connectivity within the study area and form boundaries to neighbourhoods, pedestrian and cycle movements and to some local centres. This may influence some people's ability or desire to move through the study area, impacting on their access to services, meeting places and participation in social networks.

4.5.3 Community health and safety

Maintaining a high level of community safety and ensuring people feel safe in public places is likely to be important to communities in the study area, with both community safety and road safety raised as priority issues during the community engagement process for the North Sydney Community Strategic Plan. As indicated in Section 3.2.4, the Northern Beaches Community Strategic Plan also identifies traffic congestion and lack of alternative transport options as affecting the wellbeing of the community, restricting mobility, increasing the risk of social isolation and adding to the general stresses of life.

During community and stakeholder engagement for the project, concerns were raised regarding road safety, safety impacts associated with locating construction works or operational infrastructure near local streets and social infrastructure. Concerns were also raised regarding air quality impacts from operation of the project on residents, as well as users of social infrastructure including Artarmon Public School, Artarmon Park and Balgowlah Golf Course.

4.6 Access and connectivity

The study area is serviced by several major transport facilities that provide a high level of access and connectivity within the study area, to the Greater Sydney region and regional NSW. These include roads, rail services, bus services, ferry and maritime services and active transport.

The following provides a summary of key transport networks, services and facilities in the study area. Further information is provided in Technical working paper: Traffic and transport (refer to Appendix F of the environmental impact statement).

4.6.1 Roads

The study area includes a number of major arterial roads that provide access to communities, employment and destinations within the study area and access for communities to the Greater Sydney region. Major arterial roads near the project include:

- Warringah Freeway, which passes through the study area at Naremburn, Cammeray, St Leonards and North Sydney and provides access to the Sydney CBD
- Pacific Highway, which passes through the study area at Artarmon, St Leonards, Crows Nest and North Sydney
- Gore Hill Freeway, which passes through the Western Precinct at Artarmon, Naremburn and Willoughby and provides a connection to the Sydney CBD
- Lane Cove Tunnel, which passes through the Western Precinct at Artarmon and provides connectivity to the Sydney CBD and employment centres to the north-west such as Macquarie Park
- Willoughby Road, which passes through the Western Precinct at Naremburn and Willoughby and connects St Leonards, Crows Nest and Chatswood (via Mowbray Road)
- Eastern Valley Way/Flat Rock Drive/Brook Street, which passes through the Western Precinct at Naremburn and connects St Leonards, Willoughby and the Northern Beaches via Warringah Road

Beaches Link and Gore Hill Freeway Connection

- Spit Road, which passes through Mosman and provides access to the Northern Beaches
- Military Road, which provides access from North Sydney to Spit Road in Mosman
- Manly Road, which passes through Seaforth and provides connections to Mosman, Manly, the Northern Beaches (via Condamine Street/Pittwater Road) and Forest District (via Frenchs Forest Road/the Wakehurst Parkway)
- Burnt Bridge Creek Deviation, which passes through Balgowlah and North Balgowlah and provides connections to Mosman, Manly, the Northern Beaches (via Condamine Street/Pittwater Road) and the Forest District (via Condamine Street/Allambie Road)
- Sydney Road, which passes through Balgowlah and Seaforth and provides connections to Seaforth and Manly
- The Wakehurst Parkway, which passes through Frenchs Forest and Killarney Heights and provides access to Seaforth, the Northern Beaches, the Northern Beaches Hospital precinct, and the Forest District
- Warringah Road, which passes through Frenchs Forest and provides access to Chatswood, the Northern Beaches, the Northern Beaches Hospital precinct and the Forest District.

The Spit Bridge is also located within the study area. The bridge provides vehicle access between the Eastern and Western Precincts.

4.6.2 Public transport

Rail services

Passenger rail services located within the Western Precinct include both metropolitan services operated by Sydney Trains, as well as regional and interstate services operated by NSW Trains. Passenger rail services within the study area include the T1 North Shore and Western Line and T9 Northern Line. These provide access for metropolitan services from the Sydney CBD as well as inter-city services, with train stations located at Chatswood, Artarmon and St Leonards in the Western Precinct. The Eastern Precinct is not serviced by a rail line.

Sydney Metro is a standalone rail network, comprising Sydney Metro Northwest and Sydney Metro City & Southwest. Construction has begun on the Chatswood to Sydenham component of Sydney Metro City & Southwest project. Metro stations located near the project would include stations at Victoria Cross in North Sydney, Crows Nest and Chatswood.

Bus services

The study area is serviced by a number of bus corridors and bus routes, including on major roads. Major bus corridors include:

- Pacific Highway, for services to Chatswood, Epping, Gladesville and the Hills District
- Military Road, for services to Mosman and the Northern Beaches
- Miller Street, for services to and from North Sydney CBD
- Warringah Freeway, for services to the Sydney CBD, Northern Beaches, North Shore and the Hills District
- Gore Hill Freeway/Lane Cove Tunnel, for services to Sydney CBD, Lane Cove, Marsfield and the Hills District
- Spit Road/Manly Road, for services to Sydney CBD, Neutral Bay, Mosman, Manly, Dee Why, Seaforth and Frenchs Forest
- Sydney Road, for services to Sydney CBD, Manly, Warringah and Mona Vale
- Burnt Bridge Creek Deviation, for services to Sydney CBD, Mona Vale, Dee Why and Avalon

- Eastern Valley Way, for services to Sydney CBD, Frenchs Forest, Mona Vale, Dee Why and Avalon
- Warringah Road and Forest Way, for services to Sydney CBD, Chatswood, Terrey Hills and Belrose.

A number of bus stops are located near the project. The main bus stops located near surface works include:

- Bus stops located on roads near the Cammeray Golf Course, including along Falcon Street, Ernest Street and Miller Street
- Bus stops located along Willoughby Road, Spit Road, Sydney Road, the Wakehurst Parkway and Warringah Road.

The Northern Beaches B-Line bus service also operates within the study area and provides services between Mona Vale and Wynyard. B-Line bus stops within the study area are located at Manly Vale, Spit Junction Mosman and Neutral Bay. Planning is underway for a new rapid bus service between Dee Why and Chatswood.

4.6.3 Maritime

The majority of maritime traffic at Middle Harbour is associated with recreational and sporting activities, such as kayaking, sailing and boating. Facilities providing access to Middle Harbour are located near the project at:

- Cammeray – Cammeray Marina, Tunks Park boat ramp
- Mosman – Balmoral Boatshed, Middle Harbour Yacht Club, Smith's Spit Boatshed, Ferguson's Boatshed Marina, d'Albora Marinas at The Spit, Mosman Rowing Club
- Clontarf Marina
- Roseville Chase – Roseville Bridge Marina
- Killarney Heights – Garigal National Park boat ramp
- Fairlight – Manly Boatshed
- Manly – Little Manly Cove boat ramp.

In addition, there are private moorings located in Middle Harbour and Pearl Bay, directly west of the Spit West Reserve foreshore, which provide access for recreational users. Consultation with marine stakeholders is discussed in Chapter 7 (Stakeholder and community engagement) of the environmental impact statement.

4.6.4 Active transport

Walking and cycling are important modes of transport for residents, workers and visitors in the study area. The pedestrian and cycle network is varied within the study area. Pedestrian and cycle paths comprise separated off-road, dedicated cycleways and dedicated, on-road cycling lanes.

Within the Western Precinct, off-road shared pedestrian and cyclist paths are located:

- Along the southern side of the Gore Hill Freeway
- Near Flat Rock Creek between Weedon Road and Flat Rock Drive
- Around Artarmon Reserve, Naremburn Park, Bicentennial Reserve and the Willoughby Leisure Centre
- Within Spit West Reserve and across Spit Bridge, connecting to the Spit Bridge to Manly Walk.

Within the Eastern Precinct off-road shared pedestrian and cyclist paths are located:

- Along Burnt Bridge Creek, between Baringa Avenue and Condamine Street on the eastern side of Burnt Bridge Creek Deviation
- White Street, Lauderdale Avenue, The Crescent, Commonwealth Parade and Fairlight Walk, between Balgowlah and Manly

Beaches Link and Gore Hill Freeway Connection

- Within Karingal Crescent Reserve and connecting across Warringah Road to Forest Way
- Between the Wakehurst Parkway, north of Warringah Road, and Frenchs Forest Road East, west of Inverness Avenue
- At Warringah Aquatic Centre, connecting to Bantry Bay Road
- Allambie Road, between Aquatic Drive and Eaton Square
- Within Garigal National Park, including Manly Dam Bike Track.

5. Issues raised during engagement

This assessment has been informed by the outcomes of community and stakeholder engagement for the project. This section provides a summary of the key socio-economic issues raised by the community and stakeholders.

Information from community and stakeholder engagement for the project identified a range of views relating to the socio-economic effects of the project’s construction and operation, including both positive and negative impacts. More detailed information on the engagement process, including stakeholders consulted and key issues raised, is provided in Chapter 7 (Stakeholder and community engagement) of the environmental impact statement.

Table 5-1 summarises the topics for which feedback was received from government agencies, local government and the community.

Table 5-1 Summary of feedback from stakeholders and the community

Issue	Summary of feedback
Air quality	<ul style="list-style-type: none"> Perceived air quality impacts, location and operation of tunnel ventilation system, perceived impacts on health.
Visual amenity	<ul style="list-style-type: none"> Impacts to visual amenity, visual impacts of temporary/permanent structures and overshadowing.
Socio-economic	<ul style="list-style-type: none"> Impact on community amenity during construction/operation and neighbourhood character.
Aboriginal heritage	<ul style="list-style-type: none"> Impacts to Aboriginal heritage.
Noise and vibration	<ul style="list-style-type: none"> Noise impacts, including construction noise, cumulative noise impacts, road traffic noise changes and noise walls.
Design	<ul style="list-style-type: none"> Tunnel entry and exit portals, alignment, road connections and suggested design changes such as moving portals.
Traffic and transport	<ul style="list-style-type: none"> Transport mode, including public transport alternatives, network integration, and integration with other key projects Congestion, road network performance, local road connections, increased traffic, and cumulative impacts Integration with other approved and proposed infrastructure (for example, Northern Beaches B-Line, Sydney Metro City & Southwest) Potential impact on local streets, including rat running, local road safety, construction traffic and on parking spaces Cycling, cycleway facilities, active transport.
Property impacts	<ul style="list-style-type: none"> Potential property impacts on directly and indirectly impacted properties, including property value.
Biodiversity	<ul style="list-style-type: none"> Impacts on fauna, flora and vegetation Need for land bridges.
Construction	<ul style="list-style-type: none"> Construction impacts, including location of construction support sites, temporary impacts to support construction, hours of work and night works.
Other project information	<ul style="list-style-type: none"> Project cost and tolling Project timing.

6. Impact assessments

This section assesses potential impacts on socio-economic values in the study area from the construction and operation of the project.

6.1 Property impacts

This section describes impacts on property from the construction and operation of the project. Further detail regarding property acquisition is provided in Chapter 20 (Land use and property) of the environmental impact statement.

6.1.1 Property acquisition and temporary leases

Based on the current project design, an estimated 46 properties would be acquired and seven temporarily leased for the project. Land owned by Transport for NSW would also be used for construction and operation of the project, including eight residential properties previously acquired by Transport for NSW for the project.

Forty-one properties would be fully acquired for the project including 12 private commercial properties, 28 residential lots and one property owned by Sydney Water. A further five properties would be partially acquired for the project, including land owned by the State of NSW. The tunnel alignment would also pass under numerous properties, including residential, commercial and social infrastructure uses.

The project would also require substratum acquisition of privately-owned residential lots. Substratum acquisition involves the below ground acquisition of an 'envelope' around the tunnels. Further details regarding substratum acquisition is provided in Chapter 20 (Land use and property) of the environmental impact statement.

Properties required for the project would be acquired by Transport for NSW in accordance with the provisions of the *Property Acquisition (Just Terms Compensation) Act 1991* and the Land Acquisition Reform 2016 process. Among other things, the *Property Acquisition (Just Terms Compensation) Act 1991* provides the basis for assessing compensation. Transport for NSW has carried out consultation with affected property owners about the acquisition process and potential adjustments required to properties. Consultation would continue through the project development.

Temporary leases of land would be required during construction for use as construction support sites. This includes:

- Five properties accommodating social infrastructure, including open space and recreation land at Artarmon Park, Flat Rock Reserve, Manly Dam, Spit West Reserve and Balgowlah Golf Course
- Land owned by Sydney Water at Killarney Heights
- A vacant lot owned by Willoughby Council.

Land owned by Transport for NSW accommodating social infrastructure would also be permanently or temporarily impacted by the project, including at Cammeray Golf Course and along Burnt Bridge Creek. Potential impacts on social infrastructure from property acquisition are described in Section 6.6.

After construction, leased land used for construction works but not required for the ongoing operation of the project, would be rehabilitated and reinstated to its existing use and/or returned to the landowner. Refer to Chapter 20 (Land use and property) of the environmental impact statement for how residual land from the project would be managed.

Construction of the project would require the temporary relocation of about 10 moorings near the Middle Harbour north cofferdam (BL8) and about 45 moorings near the Spit West Reserve construction support site (BL9). Relocations would be required for about 48 months. Further discussion regarding the temporary

relocation of moorings is provided in Chapter 8 (Construction traffic and transport) and Chapter 20 (Land use and property) of the environmental impact statement.

6.1.2 Impact of property acquisition

Property acquisition for the project would involve both partial and full acquisition of properties, impacting residential uses, commercial uses and social infrastructure.

A total of 28 residential lots would be impacted by the project's construction and operation and would be totally acquired. Occupants of these properties would need to permanently relocate prior to construction. As indicated in Section 6.1.1, eight residential lots have also previously been acquired by Transport for NSW. Residents of these lots would also need to permanently relocate prior to construction.

The need for occupants of residential properties to relocate has potential to disrupt personal networks and local social connections associated with residents of these properties. Residents of Dudley Street at Balgowlah are likely to experience the greatest disruption to local social connections with 28 residential lots in the street to be acquired for the project. The affected dwellings include established dwellings, such as detached and semi-detached houses of varying ages. Elsewhere, while any impact is likely to be important to affected individuals and their local networks, the impact in the context of the project as a whole is expected to be minor given the number of residential properties impacted relatively to the number of dwellings in communities surrounding affected lots and the wider study area. Further discussion about potential impacts of the project on community cohesion is provided in Section 6.7.

A number of commercial properties used for industrial purposes would be fully acquired for the project. These businesses would be required to relocate or permanently close before construction. Further discussion about potential impacts of the project on local businesses is provided in Section 6.5 and Annexure A.

Some residents and communities near the project or owners or employees of affected businesses may experience a level of stress and anxiety due to uncertainty about potential property impacts (both surface and substratum), property acquisition and proposed changes from the project, potentially impacting the health and wellbeing of some individuals. Some individuals impacted by acquisition of residential properties may also experience impacts on health and wellbeing associated with disruptions to social networks and personal relationships associated with their permanent or temporary relocation or relocation of neighbours. These impacts are likely to have the greatest effect on groups such as elderly, people with a disability, longer term residents and people on lower incomes, who are often more reliant on personal and community networks. Further discussion about potential impacts on community health and wellbeing is provided in Section 6.7.

Concerns about potential property impacts and property acquisition were raised by community members during consultation for the project. Transport for NSW has carried out consultation with affected property owners and will continue to engage with property owners and other affected stakeholders about specific property impacts, including the acquisition and compensation process. Further discussion about the property acquisition process is provided in Chapter 20 (Land use and property) of the environmental impact statement.

The sensitivity of affected individuals and households is considered to be high, while the magnitude of the change is considered to be moderate given the number of affected residential properties relative to residential properties in the vicinity of the project. As a result, the overall significance of potential impacts from the acquisition of residential properties is considered moderate-high (refer to Table 6-6).

6.1.3 Other property impacts

The mainline and ramp tunnels would pass beneath numerous properties, including residential uses, commercial and industrial uses, and social infrastructure. Potential impacts of tunnels on the use of properties and future development potential was raised during community engagement for the project.

Under the *Property Acquisition (Just Terms Compensation) Act 1991*, compensation is generally not payable for acquisition of land under the surface unless the surface of the overlying soil is disturbed, or the support of that surface is destroyed or affected by construction of the tunnel.

Potential impacts on future development above tunnels generally only occur in locations where the tunnel depth is shallow, for example close to portals. The location of the portals and tunnels beneath properties is not expected to impact on the future use or development of properties at the surface, and subject to council regulations and approvals, landowners would generally be able to:

- Carry out improvements, such as installing a swimming pool
- Dig deeper foundations for a new building or second storey additions.

The overall significance of potential impacts on future development of properties directly above the tunnel is considered negligible. While the sensitivity of affected properties would be considered moderate, the magnitude of the change is considered to be negligible (refer to Table 6-6).

Concerns were raised during community and stakeholder engagement about potential for property damage, including to basement car parks, unit developments and pools, due to vibration from tunnelling activities. During construction, some properties located near construction worksites or above or near the tunnel alignment may experience short-term vibration and ground-borne noise impacts due to the use of equipment such as rock hammers and roadheaders. For most properties, vibration levels are predicted to be below levels that may cause potential risk to buildings or structures, including minor cracking. However, there is potential for cosmetic damage to a small number of properties, particularly more sensitive heritage buildings, closest to vibration intensive construction activities (for example, activities using large rock hammers).

The excavation of tunnels may also result in settlement of the ground surface at some locations. This may cause very slight cosmetic damage to some buildings above or near the project (for example, fine cracks that are easily treated during normal decoration), although is not expected to impact on the stability of buildings. It is noted that potential for settlement has been assessed without design measures such as tunnel linings, which would help to reduce settlement associated with groundwater drawdown. Building condition surveys and monitoring would be conducted to help manage potential vibration and settlement impacts. Further discussion about potential vibration and settlement impacts on buildings and structures, along with further recommended measures to manage potential impacts, is provided in Appendix G (Technical working paper: Noise and vibration) and Appendix N (Technical working paper: Groundwater) of the environmental impact statement. Potential amenity impacts of construction are discussed in Section 6.7. The overall significance of potential damage to properties above the tunnel is considered moderate-low, with the sensitivity of affected properties being moderate and the magnitude of change (that is, fine cracks that are easily treated during normal decoration) considered to be low (refer to Table 6-5).

The assessment of air quality impacts on elevated receivers (refer to Appendix H (Technical working paper: Air quality)) due to the operation of the ventilation outlets found that:

- There are no adverse impacts predicted at any existing or future buildings up to a height of 30 metres
- There are predicted impacts for potential future buildings above 30 metres in height within 300 metres of the Gore Hill Freeway ventilation outlet. This would not necessarily preclude such development, although consideration of the ventilation outlet would be required during the rezoning or development application stage for proposed future development

- Within 300 metres of the Warringah Freeway outlet, current planning controls for permissible habitable structures restrict buildings to below 20 metres, although land use considerations would be required to manage any interaction between the project and future development for buildings with habitable structures above 20 metres and within 300 metres of the ventilation outlet
- Transport for NSW would assist North Sydney Council, Willoughby City Council, Northern Beaches Council and the Department of Planning, Industry and Environment (as appropriate) in determining relevant land use considerations, which may include requirements for consultation with Transport for NSW at the rezoning or development application stage.

Other issues relating to property impacts of the project raised during community and stakeholder engagement for the project included concerns about potential impacts on property values for communities near the project. Changes to property values, both positive and negative, are driven by a range of economic, social and amenity factors, for example housing supply and demand, interest rates, economic growth, local amenity and accessibility to such things as employment and social infrastructure. It is likely that broader external factors would influence property values more than perceived or actual impacts resulting from a road upgrade, including the project.

Ongoing consultation and communication about proposed changes before and during construction would help to reduce uncertainty and raise awareness of the project's benefits. Environmental management measures would be implemented during the construction phase to assist in managing potential property impacts for near construction works.

6.2 Equity

Equity refers to a fair distribution of the resources that allow residents full participation in their community. Equity requires that the wellbeing of people with fewer resources is protected. Changes to conditions which may affect equity in the study area include impacts to amenity and liveability, and access and connectivity.

6.2.1 Construction impacts

During construction, many of the impacts such as changes to amenity and perceived impacts on liveability are expected to be experienced by those communities closest to surface works and construction support sites, or occupants of properties above the tunnel alignment. Potential impacts would mainly relate to construction noise, dust, vibration and changes in local access and connectivity. These would be relatively short term in the context of the project's design life and localised to discrete locations. After construction, many of these communities would experience benefits relating to improved access and connectivity to destinations across the Greater Sydney region.

The overall significance of potential impacts on equity during construction is considered moderate, with the sensitivity of affected residents and the magnitude of change considered to be moderate (refer to Table 6-5).

6.2.2 Operational impacts

Once operational, improved access and connectivity provided by the project would benefit the wider community and people living and working in or near the study area. Reduced traffic congestion and improved journey times provided by the project would help to reduce travel time for individuals, families and the wider community, increase time available to individuals and families for leisure pursuits, and increase access to employment opportunities within convenient commuting times. Reduced traffic congestion, upgrades to bus infrastructure and opportunities for new express bus services delivered by the project would also have benefits that would be shared by local and regional communities.

In conjunction with the Western Harbour Tunnel and Warringah Freeway Upgrade project, the project would also help to reduce traffic congestion on major roads in the study area, including Military Road/Spit Road/Manly Road, Warringah Road, Eastern Valley Way, Pacific Highway and Western Distributor and other roads such as Brook Street, Naremburn. This would support local environment and amenity improvements in the study area and surrounding region, and improve access and connectivity for residents, business and industry in the study area, northern suburbs, north-western suburbs, and south-western suburbs, and the Greater Sydney region.

Infrastructure would be installed as part of the project to provide the NSW Government with the option to apply tolls to traffic using the Beaches Link tunnel. The decision to apply a toll to a road is a NSW Government decision and is not made at the project level. While no decision on toll costs has been made, if tolls were introduced, it would add expense for motorists using the new infrastructure, increasing travel costs related to work and leisure activities for some households. This is most likely to affect households on fixed or low incomes who are likely to have the least capacity to pay. Alternate untolled routes would be available for motorists using existing surface roads.

6.3 Population and demography

6.3.1 Construction impacts

During construction, the construction workforce would generally be sourced from across the Greater Sydney region, although some specialist technical services or consultants may also be sourced from interstate or internationally as and when required. This is not expected to result in an influx of workers at a scale that would impact on population and demography in the study area, for example changes to existing gender and age profiles.

As indicated in Section 6.1.2, a total of 28 private residential properties would be fully impacted by the project's construction and/or operation and occupants of these houses would need to permanently relocate prior to construction. The relocation of residents associated with the acquisition of residential properties have potential to result in changes to population and demography at a local neighbourhood level, although potential changes in population and demography would represent a very small proportion of the study area's population and are not expected to impact on the population and demography of the study area as a whole. They are also likely to be very minor in the context of expected population and demography changes associated with planned development within the study area. The sensitivity of communities to changes in population is low and the magnitude of change is considered negligible given the existing population of the study area. As a result, the overall significance of potential impacts of the project's construction on population and demography is considered negligible (refer to Table 6-5).

6.3.2 Operational impacts

Travel time savings and improved accessibility provided by the project are likely to make some locations within or near to the study area more attractive for people looking to relocate. While this change is expected to occur over time with ongoing development, the project is likely to contribute to the acceleration of development locally and regionally, particularly when considered in conjunction with the Western Harbour Tunnel and Warringah Freeway Upgrade project.

6.4 Employment impacts

6.4.1 Construction impacts

During construction, the project would impact positively on employment through direct employment opportunities on the project and indirect employment opportunities in businesses and industries that support the project's construction.

The project would be expected to support up to 7500 full time equivalent jobs (direct employment) during the five to six years of construction, including construction workers and professional and administration staff. About 2350 full time equivalent jobs (2000 for Beaches Link and 350 for the Gore Hill Freeway Connection) would be expected to be supported during peak construction.

As indicated in Section 6.3, it is expected that construction workers would generally be sourced from across the Greater Sydney region. The level of benefit for the study area from residents accessing employment would be dependent on the availability of workers. As indicated in Section 4.2.8, unemployment within the study area and wider region at the 2016 Census was generally below the average for the Greater Sydney region. At the 2016 Census, there were 186,332 people in the Greater Sydney region who worked in the construction industry, of which about 3800 people did not work any hours during the week prior to Census night and about 9865 people worked between one hour and 15 hours. Unemployment levels for the Greater Sydney region at the 2016 Census were about six per cent, which was marginally below NSW at 6.3 per cent.

The project's construction phase is likely to provide benefits for groups such as Aboriginal people, women, young people and the unemployed. This would support the NSW Government's Infrastructure Skills Legacy Program, which seeks to increase the representation of young people, Aboriginal people and women in the construction industry.

In particular, construction would provide opportunities to boost the number of skilled women construction workers and the number of women in trade-related work as outlined in the *NSW Women's Strategy 2018-2022, Advancing economic and social equality in NSW* (NSW Government, 2018) and the Infrastructure Skills Legacy Program. To meet the targets within the Infrastructure Skills Legacy Program, the contractor would be required to employ women in two per cent or more of trade-related roles, doubling the number of women in trade related work. The implementation of the NSW Government's Aboriginal Participation in Construction policy would also provide employment and training opportunities for Aboriginal people.

Training opportunities and apprenticeships provided by construction of the project would support skills development and enhance opportunities for future employment for individuals. Income from employment on the project would also support improved social and economic outcomes for individuals. Development and implementation of a workforce strategy for the project that includes strategies to increase employment and training opportunities for the groups discussed above would help to maximise the employment benefits of the project.

6.4.2 Operational impacts

During operation, the project would support improved access and connectivity to employment areas in the study area and the Greater Sydney region. Some loss of local employment may be associated with changes to the business environment or the acquisition of properties accommodating businesses. This is most likely to affect those businesses that would experience changes to business operations or that would be required to relocate or cease operations. This may result in loss of income for affected employees and business owners. Potential impacts on employment due to the relocation of businesses to alternate sites are likely to be dependent on the businesses' new location (that is whether alternate premises are found locally) and individual circumstances of employees, for example increased commuting distances and times and ability of individual employees to travel to the new business location. While this would be a concern for employees and owners of affected businesses, given the small number of commercial properties affected, this is not expected to impact on the overall levels of employment in the study area.

6.5 Business and industry

The business impact assessment for the project was prepared by HillPDA. A copy of the business impact assessment report is provided in Annexure A and a summary is provided in the following sections.

6.5.1 Directly affected businesses

Based on the current project design, a total of 12 privately owned properties used for business/industrial purposes would be permanently affected by full acquisition for the project. Businesses to be fully acquired would need to cease operation, to either relocate to another location or permanently close. In addition, the Balgowlah Golf Course would be permanently affected by operational facilities for the project and new and improved open space and recreation facilities (refer to Section 6.1). As indicated in Section 4.3.2, the golf course is located on land owned by the State of NSW, which is leased to the Balgowlah Golf Club through Northern Beaches Council. The design of permanent operational infrastructure at this location has been optimised to maximise residual space, however due to the size and configuration of the residual land, the continued operation of Balgowlah Golf Club at this site would be unfeasible. Residual land associated with Balgowlah Golf Course and properties acquired in Dudley Street would be re-purposed as new and improved open space and recreation facilities for the community.

Businesses have specific and individual needs, relating to things as the location of the business premises; access to the business by employees and customers and the ability to deliver and receive goods and services. Relocation or closure of businesses affected by acquisition, including cessation of leases, has the potential to result in:

- Disruptions to business operation
- Loss of revenue
- Relocation and re-establishment costs
- Employee training expenses for new employees
- Trade catchment alterations
- Business closure.

As indicated in Section 6.4.2, the acquisition of businesses also has potential to impact on the businesses' employees, including through the loss of local employment. Overall, the number of acquisitions and businesses required to cease operation to facilitate the project is relatively low for an infrastructure project of this scale. Impacts on these businesses would be somewhat mitigated by the implementation of the acquisition and compensation process in line with *Determination of compensation following the acquisition of a business* (NSW Government, date unknown), which provides direction in determining compensation for a business conducted on land that is acquired in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* (NSW).

Overall, the significance of property acquisitions on businesses is expected to be moderate, with the sensitivity of affected businesses and magnitude of impacts considered to be moderate (refer to Table 6-6 and Annexure A). Table 6-1 provides a summary of potential impacts on businesses within the study area due to property acquisition for the project.

Table 6-1 Summary of directly affected businesses

Location	Summary of impacts
Artarmon Industrial	<p>Businesses required to close or relocate due to the project are mainly commercial, light industrial or speciality services, including media and production companies, a swim school and beauty college. These businesses would service a wider area and would likely employ a small number of workers. Due to the orientation of these businesses and the fixed supply of alternative industrial zoned land in the surrounding area, these businesses may need to relocate to another trade catchment. This would result in relocation and establishment costs with potential loss in trade and revenue during this time for individual businesses.</p> <p>The relocation or closure of businesses due to property acquisition or lease cessation would have the potential to disrupt the character of business areas and in particular, affect the productivity of the Artarmon Industrial area.</p>
Balgowlah Golf Club	<p>The project would introduce permanent land use impacts at Balgowlah Golf Club. The design of permanent operational infrastructure at this location has been optimised to maximise residual space, however due to the size and configuration of residual land, the continued operation of Balgowlah Golf Club at this site would be unfeasible. The closure of the course would result in a loss of employment. Engagement with Northern Beaches Council has identified potential for the residual land to be developed for new public open space and recreation facilities. Further discussion about impacts on community values associated with the golf club is provided in Section 6.6.1.</p>

Source: Based on Beaches Link and Gore Hill Freeway Connection, Business Impact Assessment (HillPDA, 2020). Refer to Annexure A for further details.

6.5.2 Construction impacts

During construction, potential impacts on local businesses near the project may result from:

- Increased passing trade and demand for services, resulting in positive impacts for local businesses
- Changes in access and connectivity to businesses, resulting in both positive and negative impacts for employee and customer access, as well as servicing and delivery, to local businesses
- Increased business visibility due to increased traffic volumes
- Increased noise, dust and construction traffic, impacting on business amenity at businesses near the project.

The business survey indicated that the majority of businesses perceived the project would have a neutral effect on demand for goods and services (HillPDA, 2020). Table 6-2 provides a summary of business centres and potential impacts identified in the business impact assessment of the project’s construction.

Table 6-2 Summary of construction impacts on business centres

Centre	Summary of impacts
Eastern Precinct	
Frenchs Forest business hub	<p>The project construction phase would temporarily reduce the efficiency of movement to the centre, having minor effects on employee and customer access and servicing and delivery.</p> <p>Some businesses may benefit from an increase in demand for services. While businesses would have minor sensitivity to changes, generally they would retain a high ability to adapt to the alterations and would be able to continue operating.</p> <p>Construction of the project would generate short-term, localised impacts on access and connectivity. Some retail and service businesses may benefit from an increase in</p>

Centre	Summary of impacts
	demand for services. Overall, construction is not anticipated to effect ongoing centre or business performance.
Manly Vale business centre	<p>Temporary delays and speed restrictions for through traffic due to construction activities and construction vehicle access may affect the efficiency of access for employees, customers and for servicing and deliveries for numerous businesses within the centre. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the centre. Effects on character and amenity, business visibility and employee productivity and communication are not anticipated at this centre. Construction in the area may increase demand for some specialised retail, food, beverage, and convenience businesses.</p> <p>The area has a strong trade catchment supporting local residents and workers and the wider Northern Beaches and North Shore. While construction would alter access arrangement and potentially marginally increase demand for services, businesses would be able to adapt to any positive or negative changes. Overall, construction is not anticipated to affect ongoing centre or business performance.</p>
Balgowlah centre	<p>Temporary delays and speed restrictions for through traffic due to construction activities and construction vehicle access may affect the efficiency of access for employees, customers and for servicing and deliveries. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the Balgowlah centre or neighbourhood centre. The area has a strong local catchment, primarily serving residents, workers and occasional visitors. Construction in the area may benefit food, beverage and convenience retailers.</p> <p>Businesses have a strong local catchment, and while construction would alter access arrangement and potentially marginally increase demand for services, any positive or negative changes would be minor. Overall, construction is not anticipated to effect ongoing centre or business performance.</p>
Seaforth centre	<p>Any effects would be experienced at an individual business level, with limited discernible changes to overall performance of the business centre. Temporary delays for through traffic due to construction activities and construction vehicle access may affect the efficiency of access for employees, customers and for servicing and deliveries. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the centre. Effects on character and amenity would be slightly altered due to extended traffic movement periods. Effects on employee productivity are not anticipated.</p> <p>The area has strong local catchment, primarily serving residents, workers and the occasional visitor. Construction in the area may benefit food, beverage and convenience retailers as well as personal service businesses such as hairdressers and allied health services.</p> <p>Businesses have a strong local catchment, and while construction would alter the traffic environment and potentially marginally increase demand for services, any positive or negative changes would be minor. Overall, construction is not anticipated to effect ongoing centre or business performance.</p>
Western Precinct	
Artarmon industrial area	Localised negative construction effects would be explicitly felt by businesses in close proximity to the construction footprint, particularly those more reliant on efficient servicing and delivery, quiet environments and a pleasant amenity. Although the visual landscape of the centre would be temporarily altered during construction, industrial land use generally has a lower sensitivity to changes in landscape character and amenity and is unlikely to impact on the industrial areas role and

Centre	Summary of impacts
	<p>function. Overall, construction would have a discernible negative impact on the centre, but the centre would have minimal vulnerabilities to the change and the change would be short term.</p> <p>The project would have short-term, localised potential impacts during construction that would affect businesses. Some businesses may benefit from an increase in demand for services, passing trade and business visibility during construction. Overall, construction is not anticipated to affect ongoing centre or business performance.</p>
<p>Miller Street Camberay centre</p>	<p>While some employees and customers may be slightly affected by changes in the traffic environment, the impact on the overall function of the business centre would not be discernible. Effects on passing trade, servicing and delivery, character and amenity and employee productivity and communication are not anticipated at this centre.</p> <p>Businesses have a strong local catchment, and while construction would slightly alter the traffic environment and potentially marginally increase demand for services, business visibility and passing trade, any positive or negative changes would be minor. Overall, construction is not anticipated to effect ongoing centre or business performance.</p>
<p>The Spit</p>	<p>Businesses at The Spit are destination-services as many customers would drive specifically to the businesses. They also service local residents who visit to enjoy the foreshore and amenity of the area. During construction, The Spit is likely to be negatively impacted due to alterations in local amenity and slight reductions in accessibility. Increases in noise levels and construction dust would result in a discernible change from the existing environment. The effect of the obstruction to view corridors businesses would generally be less perceptible. Local businesses, particularly local cafes may benefit from an increase in demand for services. Effects on servicing and delivery and employee productivity and communication are not anticipated at this centre.</p> <p>Construction would alter the character and amenity of the Spit West Reserve and change accessibility for some maritime users, however the change would be minor. Any positive effects generated from demand for services or passing trade would be at an individual business level. Overall, construction is not anticipated to effect ongoing centre or business performance.</p>

Source: Based on Beaches Link and Gore Hill Freeway Connection, Business Impact Assessment (HillPDA, 2020). Refer to Annexure A for further details.

Maritime businesses

During construction, maritime businesses and waterway users would experience temporary alterations in access and amenity. Businesses and users will be able to adapt to the change with minimal disruptions to the way they operate or use the waterway. The following summarises potential impacts of construction activities on maritime businesses near the project. Further information is also provided in the business impact assessment included in Annexure A.

- Construction vessels travelling from the outer Sydney Harbour to Middle Harbour would complete their journey when the Spit Bridge is open. This may require additional bridge opening times, although this would have limited impact on maritime businesses. The project would also require some commercial moorings to be temporarily relocated during the construction phase. Overall, the sensitivity of businesses to impacts is consider negligible, and the magnitude of impacts is expected to be low, resulting in the significance of impacts on employee and customer access being assessed as negligible.
- The project would require up to six temporary closures of Middle Harbour. These closures would occur on weekdays to limit the disturbance to harbour recreational users, community groups and clubs. During temporary closure of Middle Harbour, navigational restrictions would prohibit larger vessels from

crossing the harbour between Northbridge and Seaforth Bluff. Smaller vessels passing through may require escort vessels to be provided. This would result in periods of traffic disruptions, potentially affecting recreational movements and resulting in access and connectivity impacts for Mosman Rowing Club, Northbridge Sailing Club, Middle Harbour Yacht Club, and businesses located at The Spit local centre. The sensitivity of businesses to impacts is considered low, and the magnitude of impacts is expected to be low, resulting in the significance of impacts being assessed as low.

- Business harbour users such as boat hire businesses and commercial boats would experience a minor increase in travel time resulting from imposed maritime speed restrictions that would be required during construction of the project in Middle Harbour. Exclusion zones would be set up around the temporary cofferdams in Middle Harbour, while there would also be some restrictions to vessel movements during dredging and piling activities. Additional travel times and impacts on vessel movements may increase travel costs and reduce efficiencies. Overall, the sensitivity to business users to travel time delays are considered negligible and magnitude of impacts is considered low, resulting in the significance of impacts being assessed as negligible.
- Interference with training routes used by members of the Mosman Rowing Club and course layouts for Northbridge Sailing Club or interference with kayak routes have the potential to result in existing members joining an alternative club. Any impacts on the clubs may also have indirect impacts on cafes in the Spit which are often visited by club members after training. Increased wash from barge and construction vessel movements between Spit West Reserve and the cofferdams and dredging works may also disrupt boat and kayak users. The sensitivity of businesses to impacts on operation are considered low and the magnitude of impacts are considered low, resulting in the significance of impacts being assessed as low (HillPDA, 2020).

While there may be temporary impacts on some maritime businesses during construction, there is not expected to be a lasting impact on businesses. Overall, construction of the project would have short term negative effects at an individual business level, with no discernible changes to the broader maritime business environment. Chapter 8 (Construction traffic and transport) of the environmental impact statement provides information on safeguards to manage business impacts from maritime construction activities.

6.5.3 Operational impacts

During operation, potential impacts on local businesses near the project may result from:

- Increased passing trade, resulting in positive impacts for local businesses
- Changes in access and connectivity, resulting in both positive and negative impacts for employee and customer access, demand for services, trade catchments, and servicing and delivery, for local businesses
- Increased business visibility due to additional traffic passing businesses at some locations.

Operation of the project would result in a reduction in traffic demand on the Spit Road and Military Road corridor with improved travel times and reduced congestion. This would have beneficial impacts for customers and employees accessing the centres of Military Road Mosman, Military Road Cremorne, Spit Junction and Neutral Bay.

Table 6-3 provides a summary of business centres and potential impacts identified in the business impact assessment of the project’s operation.

Table 6-3 Summary of operational impacts on businesses centres

Centre	Summary of impacts
Eastern Precinct	
Frenchs Forest business hub	The Frenchs Forest area is anticipated to experience an increase in traffic demand and accessibility with the establishment of the Beaches Link tunnel. Although the Frenchs Forest business hub does not directly adjoin the tunnel entry, it is positioned

Centre	Summary of impacts
	<p>on a main feeder road with the capacity to benefit from increased transport network accessibility. The additional connections to North Sydney and other centres increase trade catchment for service industries. Effects on passing trade, character and amenity, employee productivity and communication and business visibility are not anticipated at this centre. For businesses that are dependent on servicing, delivery and distribution, the new road infrastructure would provide noticeable benefits.</p> <p>The project would have long term strategic benefits, with few discernible localised impacts. Businesses would retain a high ability to absorb and adapt to any localised impacts. Overall, the project would have a positive outcome for businesses in the Frenchs Forest business hub.</p>
Balgowlah centre	<p>The Balgowlah centre does not directly adjoin the project, however it is positioned on a main feeder road with the capacity to benefit from increased vehicle movements past the centre. The additional connection across Middle Harbour to the Warringah Freeway, Gore Hill Freeway and further via Western Harbour Tunnel also has the capacity to increase the trade area of some businesses, with the area more accessible to a broader customer catchment. Overall, the project would improve connectivity to the centre from surrounding areas, including expanding the trade catchment of some public serving businesses.</p> <p>Overall, the project would have long term positive effects on the business environment.</p>
Western Precinct	
Artarmon industrial area	<p>The majority of businesses within the area are generally destination services that customers specifically visit. The industrial area would substantially benefit from improved connectivity with the capacity for trade catchments to be increased. Where there are potential negative impacts, they are generally at a local level, effecting a small number of receivers that would be able to easily adapt to the change. The industrial area has a low level of sensitivity to passing trade, character and amenity changes and effect on employee productivity and communication. It is more sensitive to customer and employee access. The project would not result in a noticeable difference on the performance for the industrial area.</p> <p>Overall, the project would improve connectivity to the industrial area from surrounding areas, including expanding the trade catchment of some population-serving businesses. This would have long term, discernible benefits to businesses.</p>

Source: Based on Beaches Link and Gore Hill Freeway Connection, Business Impact Assessment (HillPDA, 2020). Refer to Annexure A for further details.

Maritime businesses

Once operational, the project would have negligible impacts on businesses reliant on the harbour for operation. At the centre of the Middle Harbour crossing, the immersed tube tunnel units sit virtually on the bed of the harbour. There would be a reduction in navigable water depth of about 10 metres, however this is not considered an impact as the passage of vessels in this part of the harbour is already constrained by shallow water depths downstream. Commercial moorings relocated during construction would be restored at or near their original position upon operation of the project (refer to Appendix F (Technical working paper: Traffic and transport)).

Freight and efficiency costs

The project would deliver significant long term improvements to the efficiency of freight movements and reduce transport costs for a large number of businesses and business centres within the region. Operation of the project would result in the majority of heavy vehicle trips on the existing roads, travelling through the Northern Beaches peninsula, transferring to the project, with substantial reductions in traffic volumes on the

Mona Vale Road and Warringah Road corridors. While the project would not generally increase the volumes of heavy vehicles travelling into and out of the Northern Beaches peninsula, it would substantially reduce the travel times of these trips and increase their productivity. Businesses and business centres across the Northern Beaches would benefit from reduced travel times for light commercial and freight trips, which would in turn reduce transportation costs and increase efficiency. The movement of freight and commercial trips from surface arterial corridors to motorways would also increase the amenity of businesses and business centres located along the main arterial corridors into and out of the Northern Beaches peninsula. Amenity improvements are most likely to be experienced at The Spit, Spit Junction, Forestville, Seaforth and Cremorne (HillPDA, 2020).

Employee and customer access

Overall, the project would have long term positive effects on the business environment through improved connectivity and road network efficiency, reduced passenger travel time and improved safety, and active transport network infrastructure.

The ease of access to a place of employment is a factor in attracting or deterring existing or potential employees from remaining in a job or applying for a job. If a place of work becomes too difficult to access, it begins to jeopardise the time an individual has to spend with family and friends or carrying out non-work related activities and may cause individuals to seek alternative employment options as their 'travel time budget' is exceeded. A 'travel time budget' is a theoretical idea that commuters have a time threshold in which they are willing to spend travelling to work. As commute times increase, worker productivity and employee work-life balance deteriorates, resulting in people seeking alternate employment closer to home or moving closer to work to reduce time spent travelling.

Improved efficiencies in journey-to-work time expands employment opportunities and increases worker productivity and work-life balance as more time is spent in the office or at home relative to commuting. Additional capacity in the road, bus and active transport networks enhances the accessibility of a region and subsequently employment options. The project would deliver long-term improvements for a large number of businesses and business centres within the region relative to the existing conditions.

Existing local and B-Line bus services would benefit from reduced congestion on surface routes resulting in efficiency improvements in journey-to-work time. Substantial improvements would also result from the addition of new express bus routes using the tunnel to access employment centres and connecting to transport hubs like North Sydney and new transport services such as Victoria Cross Metro Station at North Sydney.

Travel time savings mean that business catchment areas based on travel time would expand, as customers further afield would now be able to bypass pinch points and access these businesses. Although not all centres would experience the expanded trade catchment benefits, those businesses offering speciality services or products, or destination centres (such as Frenchs Forest business hub) may benefit from the expanded catchments. The project would result in substantial reductions in traffic volumes on the existing crossings into and out of the Northern Beaches peninsula, with the largest reductions in traffic volumes being on the Military Road/Spit Road corridor. This redistribution of traffic flow may result in a reduction in passing trade for businesses along these major road corridors, including the centres of Neutral Bay, Military Road Cremorne, Spit Junction, and Military Road at Mosman. These centres generally have a strong local catchment, with the opportunity that the trade catchments would increase due to the reduction in congestion, improved accessibility and enhanced amenity. Considering this, any potential reduction in passing trade with likely be offset by an increase to the trade catchment and improved amenity potentially encouraging further patrons (HillPDA, 2020).

Tolling

The decision to apply a toll to a road is a NSW Government decision and is not made at the project level. Tolling infrastructure has been included as part of this environmental assessment to provide the NSW

Government with the option to apply tolls to traffic using the Beaches Link tunnel. Should it occur, the introduction of tolling for the project where it currently does not exist, may add additional expense to businesses, employees and customers crossing the harbour. Although customer behaviour may alter, the trade catchments of businesses would generally remain consistent as customer expenditure is redistributed equally on either side of the connection. The direct cost to businesses as a result of paying the additional road toll charge would be negligible as time travel savings would be gained from the additional road capacity. Similarly, employees who drive to work may incur an additional individual cost, but this would also be offset by reductions in congestion, vehicle running costs and travel time savings.

Although the introduction of tolling would be a direct cost to businesses and individuals (should it occur), the travel time savings would offset some of the negative impacts and overall negative effects would be minimal. The significance of impacts associated with tolling are expected to be low, with the sensitivity of affected businesses to tolling changes expected to be low and the magnitude of impacts considered to be low (refer to Table 6-6 and Annexure A) (HillPDA, 2020).

6.6 Social infrastructure

This section assesses potential impacts of the project on social infrastructure in the study area. It describes potential impacts on social infrastructure directly affected by property acquisition as well as other community services and facilities in the study area that may experience changes due to such things as changes in local access or local amenity.

6.6.1 Directly affected social infrastructure

Social infrastructure would be directly impacted through property acquisition for surface or subsurface infrastructure or the temporary lease of land for use as construction support sites. This includes open space, parks and sport and recreation facilities. Impacts would include:

- Permanent impact on educational facilities and swim school at Lambs Road, Artarmon
- Permanent loss of portions of land used for recreational uses, including a portion of land within Cammeray Golf Course and Artarmon Park (located next to the Gore Hill Freeway).

Permanent closure of Balgowlah Golf Course, with portions of the golf course being modified through the construction of new and improved open space and recreation facilities, temporary construction support site and permanent road and operational infrastructure. However the project would return an area, equivalent to around 90 per cent of the current open space, to the community as new and improved public open space and recreation facilities. Residual land, primarily to the east and north of the new access road, would progressively become available through the construction period, which would allow it to be handed over progressively for use by the community. The new open space and recreation facilities to the west of the proposed access road, between the access road and the widened Burnt Bridge Creek Deviation, would be constructed and handed over to Northern Beaches Council after completion of the project.

The project would directly impact on land accommodating the Ella Bache College and Duck and Dive Swim School at Artarmon. This would cause disruption to users of these facilities, although it is likely that users of these facilities would be able to access similar services elsewhere. Further discussion about potential impacts on the businesses associated with these facilities is provided in Section 6.5.

Table 6-4 provides a summary of potential impacts on social infrastructure directly impacted by the construction and operation of the project. Potential impacts on social infrastructure in the broader study area, including above the tunnel alignment are described in Section 6.6.2.

Table 6-4 Impacts on directly affected social infrastructure

Social infrastructure	Summary of potential impacts
<p>Cammeray Golf Course</p>	<p>Construction</p> <p>Impact on land within Cammeray Golf Course would result from the establishment of infrastructure required to support the Western Harbour Tunnel and Warringah Freeway Upgrade project. Part of the site would be later adjusted to support the project. The construction support site for the project would occupy part of Cammeray Golf Course for a period of three to four years. Construction and longer-term operation of the motorway facilities and project support infrastructure would require reconfiguration of the golf course before construction, including changes to some holes on the golf course (for example, reducing the length of fairways) and relocation of maintenance and water storage facilities. These works would be undertaken as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project and would allow the course to remain operational during construction, although changes to the golf course may impact on the use and enjoyment of the golf course for some members, potentially resulting in some members and golfers accessing alternate golf courses.</p> <p>During construction, increased noise, dust and construction traffic may impact on the amenity of the golf course for some users and may also deter some people from using the golf course during the construction phase. Construction of the Western Harbour Tunnel and Warringah Freeway Upgrade project would require the clearing of established trees within the golf course, including along the boundary with the Warringah Freeway. The loss of these trees may be a concern for some community members and may impact on the visual and landscape amenity of the surrounding area.</p> <p>Partial acquisition of Cammeray Golf Course for the Western Harbour Tunnel and Warringah Freeway Upgrade and the Beaches Link and Gore Hill Freeway Connection projects may also increase demand for golf membership of other clubs in the northern Sydney region.</p> <p>Following construction, areas of the golf course not required for permanent project infrastructure would be reinstated and rehabilitated, including replacement of trees and landscaping. Further discussion about the project’s impacts on landscape and visual amenity are provided in Technical working paper: Urban design, landscape character and visual impact assessment (refer to Appendix V of the environmental impact statement).</p> <p>The sensitivity of the golf course to change is considered moderate and the magnitude of the impact considered high given that the project’s construction would result in a dominant change to the existing golf course. As a result, the overall significance of potential impacts to Cammeray Golf Course during construction of the project have been assessed as moderate-high (refer to Table 6-5).</p> <p>Operation</p> <p>The golf course would continue to operate in its reconfigured layout during operation of the project. The establishment of the operational support facilities would change the visual setting of this location when viewed from within the golf course, adjoining sporting facilities and surrounding locations, including the Warringah Freeway and Ernest Street. Landscaping would be provided to reduce the visual impacts of these facilities when viewed from some locations. Further discussion about the project’s impacts on landscape and visual amenity are provided in Technical working paper: Urban design, landscape character and visual impact assessment (refer to Appendix V of the environmental impact statement).</p>

Social infrastructure	Summary of potential impacts
	<p>The sensitivity of the golf course to change is considered moderate and the magnitude of the impact considered high given that the project would result in a permanent change to the existing golf course. As a result, the overall significance of potential impacts to Cammeray Golf Course during operation of the project are assessed as moderate-high (refer to Table 6-6).</p>
<p>Balgowlah Golf Course, Balgowlah Golf Club and Balgowlah Oval</p>	<p>Construction</p> <p>State of NSW owned land currently occupied by the Balgowlah Golf Course would be leased for the Balgowlah construction support site (BL10) and construction of an access road and an operational motorway facility. The construction support site would occupy about one third of the land for a period of five years. A large portion of the site would be progressively made available as new and improved open space and recreation facilities, subject to completion of a dedicated consultation process. Positive impacts associated with the provision of the open space and recreation facilities are described below.</p> <p>The golf course would be permanently closed to golfers at the start of construction, requiring members and visitors of the golf club to use alternative facilities. Potential impacts associated with the closure of the golf course are described below.</p> <p>Construction of the project would also require the select clearing of established trees within the golf course, including a small area of previously modified Burnt Bridge Creek riparian corridor. The loss of these trees may be a concern for some community members and impact on the visual and landscape amenity of the surrounding area. The extent of tree clearing would be determined once the types of open space and recreation facilities to be established at Balgowlah are confirmed, following consultation with Northern Beaches Council and the community. Further discussion about potential impacts on community values is provided in Section 6.7.1.</p> <p>Operation</p> <p>The permanent closure of the golf course would require members and visitors of the golf club to access golf courses elsewhere, impacting on social networks associated with the club. Potential impacts on individual members are likely to depend on individual circumstances such as the length of membership and the ability to access membership at an alternative club. It is likely that some members would use the closure of the club as a reason to stop playing golf. This is most likely to be long-term members or older golfers, potentially impacting individuals' general levels of physical activity and overall wellbeing associated with the possible loss of social networks and personal relationships.</p> <p>Demand for membership of other golf clubs may have positive benefits for clubs in surrounding areas through increased membership base. This may impact positively on the future viability of clubs experiencing declining membership. The sensitivity of the golf club to change is considered high and the magnitude of the impact considered high given the permanent closure of the golf course. As a result, the overall significance of potential impacts on members of the Balgowlah Golf Club during operation have been assessed as high (refer to Table 6-6).</p> <p>The project has been designed to optimise opportunities for the re-purposing of the land at Balgowlah as new and improved public open space and recreation facilities for the community. A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council will take place to give the community an opportunity to provide input on the final layout of the new and improved open space and recreation facilities. This consultation will be separate to the consultation for the environmental impact statement. This process will start after the environmental impact statement public exhibition period and well in advance of construction starting. Residual land, primarily to the east and north of the new access road, would</p>

Social infrastructure	Summary of potential impacts
	<p>progressively become available through the construction period, which would allow it to be handed over progressively for use by the community. The new open space and recreation facilities to the west of the proposed access road, between the access road and the widened Burnt Bridge Creek Deviation, would be constructed and handed over to Northern Beaches Council after completion of the project.</p> <p>Increased availability of public open space and passive and active recreation facilities would impact positively on surrounding communities, local schools and local sporting clubs, and would help to address current and growing shortfall in recreational facilities with the Northern Beaches Council area.</p> <p>The existing clubhouse building is proposed to be removed for public open space and recreation facilities, although consideration would be given to the opportunity for re-purposing the building for wider community usage subject to further consultation during further design development. The clubhouse is currently available for hire by community members for private events and functions. The removal of the clubhouse would result in the loss of this venue as a meeting space for community organisations and local communities. Further information regarding future opportunities for the re-purposing of land at Balgowlah is provided in Chapter 20 (Land use and property) of the environmental impact statement. Further discussion about potential impacts on community values is included in Section 6.7.</p>
<p>Artarmon Park</p>	<p>Construction</p> <p>Artarmon Park comprises an area of vegetated open space next to the Gore Hill Freeway, which provides seating and off-leash dog areas. Construction of the project would require the temporary occupation of a portion of land within Artarmon Park to allow for construction activities for the eastbound on-ramp from Lane Cove Tunnel/Longueville Road. Clearing of mature trees would be required for construction and operation of the on-ramp. The loss of these trees would temporarily impact on the landscape and visual amenity of the park until new trees or landscaping become established. Clearing of these trees is also likely to be a concern for the local community. Public access to the park from Parkes Road and Hampden Road would be maintained during construction. Works are unlikely to impact the recreational use of Artarmon Park, as the impacted area is steeply sloped and vegetated with dense scrub. The adjoining Artarmon Reserve (containing a playground, sports facilities and oval) would not be impacted.</p> <p>At the completion of construction, part of the land zoned for public recreation would be converted to permanent project infrastructure. The remainder of the land affected by construction would be reinstated after construction and is not expected to impact on the long-term use of Artarmon Park. Potential impacts of the construction of the project on community values are described in Section 6.7.</p> <p>Overall, the significance of potential impacts to Artarmon Park during construction of the project are assessed as moderate-low, given the sensitivity of the park to impacts is expected to be moderate and the magnitude of the impact is considered low (refer to Table 6-5).</p> <p>Operation</p> <p>The project would require the permanent acquisition of a portion of land at Artarmon Park to accommodate road infrastructure associated with the Gore Hill Freeway Connection. This is not expected to impact on the overall use or functioning of the park and facilities within the park, which mainly include seating and an off-leash dog area within a vegetated open space. Potential impacts of the operation of the project on community values are described in Section 6.7.</p>

Social infrastructure	Summary of potential impacts
	<p>Overall, the significance of potential impacts on the permanent acquisition of a small area of Artarmon Park during operation of the project have been assessed as moderate-low, with the sensitivity of the park to impacts considered moderate and the magnitude of the impact low (refer to Table 6-6).</p>
Spit West Reserve	<p>Construction</p> <p>During construction, a portion of waterfront open space at Spit West Reserve would be temporarily occupied for use as Spit West Reserve construction support site (BL9). As discussed in Section 4.3, Spit West Reserve provides the opportunity for formal and informal recreational activities and is likely to attract tourists and weekend visitors. During construction, part of the reserve would be unavailable for public use for a period of up to 48 months. The existing shared user path along the foreshore of Middle Harbour and Spit West Reserve would be temporary diverted around the construction support site.</p> <p>The amenity of Spit West Reserve would also be diminished during construction and may detract from the enjoyment of people visiting accessible parts of the reserve or nearby facilities. These impacts would be temporary, with the affected areas of the reserve rehabilitated and landscaped following construction. Further detail regarding potential impacts on community values during construction of the project are described in Section 6.7.</p> <p>The sensitivity of the area affected by the project’s construction and the magnitude of the impact are considered moderate, resulting in the overall significance of potential impacts to Spit West Reserve during construction being assessed as moderate (refer to Table 6-5).</p> <p>Operation</p> <p>After construction, land affected by the project at Spit West Reserve would be rehabilitated and reinstated. No operational impacts would be expected.</p>
Flat Rock Reserve	<p>Construction</p> <p>Construction of the project would require the temporary occupation of a small portion of land within Flat Rock Reserve to allow for construction activities. This area would be leased from Willoughby City Council and is the location of a former landfill site. It mainly comprises re-vegetated land located next to Flat Rock Drive. Public access to areas of the reserve outside of the Flat Rock Drive construction support site (BL2) would be maintained during construction although increased noise, dust and construction traffic would diminish the amenity of these areas potentially detracting from the enjoyment of people visiting the reserve or nearby facilities.</p> <p>Clearing of trees would be required for establishment of the Flat Rock Drive construction support site (BL2). These trees mainly comprise re-generated growth, with clearing of older, more established trees avoided where possible. The loss of these trees would temporarily impact on the landscape and visual amenity of the reserve until new trees or landscaping becomes established or other recreation facilities are established. Clearing of these trees is also likely to be a concern for the local community. Land affected by construction would be reinstated after construction and is not expected to impact on the long-term use of Flat Rock Reserve.</p> <p>Potential impacts of the construction of the project on community values are described in Section 6.7.</p> <p>Overall, the significance of potential impacts on Flat Rock Reserve during construction are assessed as moderate, with the sensitivity of the park and magnitude of the impact considered moderate (refer to Table 6-5).</p> <p>Operation</p>

Social infrastructure	Summary of potential impacts
	After construction, the impacted portion of the reserve would be rehabilitated as determined in consultation with Willoughby City Council and the community and returned to the landowner. No operational impacts would be expected.

6.6.2 Impacts on social infrastructure in the wider study area

This section provides an overview of potential impacts of the project’s construction and operation on social infrastructure in the wider study area.

Construction impacts

During construction, potential impacts on social infrastructure in the study area may result from:

- Reduced visual amenity and increased construction noise, dust and traffic, impacting on amenity for users of some social infrastructure
- Ground-borne noise and vibration from construction of the project tunnels, impacting on amenity for users of social infrastructure above the tunnel alignment
- Changes in local access and traffic disruptions and delays due to construction activities and increased construction traffic
- Access restrictions to sections of Middle Harbour near construction works (refer to Section 6.8).

Social infrastructure located near the project is discussed in Section 4.3. During construction, impacts on amenity may be experienced by some users of social infrastructure near the project due to the presence of construction infrastructure, construction noise and dust, and increased traffic, including heavy vehicles. This may detract from people’s use and enjoyment of these facilities and discourage some users from using these facilities.

The presence of construction activities and associated noise, dust and construction traffic impacts are likely to be a particular concern for facilities used by children, such as childcare centres, preschools and recreation facilities, potentially impacting perceptions of safety for children.

As indicated in Section 4.3.2, a number of schools and childcare facilities are located near the project construction support sites that would potentially experience temporary impacts from construction activities. These include Northern Beaches Secondary College Balgowlah Boys Campus, Seaforth Public School, Northside Preschool, St Cecelia’s Primary School and The Forest High School and KU Cammeray Preschool, Sue’s Childcare Castlevale, Beauty Point out-of-school-hours care, Seaforth Childcare Centre, Punchinello Kindergarten, Jacaranda Preschool and Kindalin Early Childhood Learning Centre. Students, teachers and visitors of these schools and childcare facilities would potentially experience temporary amenity impacts due to increased noise and dust impacts from construction activities at construction support sites and surface road upgrades. In particular, noise, dust and construction traffic have potential to disrupt the use and learning environment of outdoor teaching areas. Education and childcare facilities (such as the Northern Beaches Secondary College and Balgowlah Kinder Haven Childcare and Early Learning Centre) may also experience increased construction traffic and dust impacts due to the use of Sydney Road by construction vehicles and associated works within the golf course area. Amenity impacts on educational and childcare facilities would be manageable with the implementation of safeguards and management measures identified in Section 7.

Construction at Artarmon associated with the Gore Hill Freeway Connection component of the project, including the Dickson Avenue construction support site (BL4), would be near the Artarmon NSW Ambulance Superstation on Reserve Road. Access for emergency services near to construction works including to/from facilities such as the Artarmon Ambulance Superstation, would be maintained during construction.

Consultation would be carried out with emergency services prior to and during construction of the project regarding potential impacts.

As discussed in Section 4.3.1, Spit Road provides access to a number of recreation and leisure facilities and is the starting point for the Spit to Manly Walk. During construction, Spit Road would be used for heavy vehicle access to Spit West Reserve construction support site (BL9). Increased construction traffic along Spit Road may impact on perceptions of safety for people accessing nearby social infrastructure.

Middle Harbour also provides for informal and formal recreational opportunities, such as boating, fishing, sailing, rowing and kayaking. During construction of the project, there would be a requirement for four partial closures and two full closures of up to 48 hours in each instance of Middle Harbour between Northbridge and Seaforth Bluff to facilitate immersion of the immersed tube tunnel units (ie a total of up to 12 days). These closures would occur on weekdays to limit the disturbance to harbour recreational users, community groups and clubs. During full closure of Middle Harbour, no boating traffic would be able to pass the location of the Middle Harbour crossing. During partial closure of Middle Harbour, navigational restrictions would prohibit larger vessels from crossing the harbour between Northbridge and Seaforth Bluff. Smaller vessels passing through may require escort vessels to be provided. This would result in periods of traffic disruptions, potentially affecting recreational movements and access and connectivity sporting clubs associated with Middle Harbour. During all other days of the construction, partial restrictions of Middle Harbour with controlled access through the site would be required. Recreational users, such as boating, sailing, rowing and kayaking would be allowed to travel through the site in a controlled manner ensuring the safety of both the waterway user and the project team. Ongoing engagement and communication with users of Middle Harbour, such as with the local community, Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club Middle Harbour Yacht Club and users of D'Albora Marinas The Spit, would assist in managing potential impacts. Further information is provided within the Navigation impact assessment prepared for Technical working paper: Traffic and transport (refer to Appendix F of the environmental impact statement).

The Wakehurst Parkway north construction support site (BL14) would be located on the corner of Warringah Road and the Wakehurst Parkway, near the Northern Beaches Hospital. Noise, dust and construction traffic has potential to impact on the amenity for patients and workers of the hospital, although any potential impacts would be for a very short period only and are generally expected to be negligible.

Users of other social infrastructure near construction activities, including recreational facilities (such as Balgowlah Scout Hall, Balgowlah Oval and basketball and netball courts at Willoughby) and places of worship (such as St Paul's Seaforth Anglican Church, Seaforth Baptist Church, St Cecelia's Catholic Church, and Frenches Forest Anglican Church), may also experience impacts on amenity due to the presence of construction infrastructure and construction noise.

The sensitivity of social infrastructure to amenity impacts is considered moderate with some ability of social infrastructure to adapt to change. The magnitude of the impact is also considered moderate given the duration of potential construction impacts, resulting in the overall significance of amenity impacts at social infrastructure being assessed as moderate (refer to Table 6-5).

During construction, short-term impacts on amenity may also be experienced for users of some social infrastructure located above or near the tunnel alignment due to vibration and ground-borne noise impacts from tunnelling. Social infrastructure near the tunnel alignment are shown in Figure 4-10. Facilities that may be more sensitive to the effects of ground-borne noise and vibration include:

- Places of worship, such as Armenian Evangelical Brethren Church at Sailors Bay Road at Northbridge and St Mark's Anglican Church at Tunks Street at Northbridge
- Childcare facilities such as Sue's Childcare Castlevale at Artarmon Road at Willoughby; Naremburn Early Learning Centre at Donnelly Road at Naremburn; Northside Baptist Preschool at Sailors Bay Road at Northbridge; St Mark's Northbridge Preschool at Malacoota Road at Northbridge; and Jacaranda Preschool at Fromelles Avenue at Seaforth
- Educational facilities such as Seaforth Public School at Kempbridge Avenue at Seaforth.

Some users of these facilities may notice ground-borne noise and vibration for a short period as works occur beneath or near the property. Potential impacts would be managed through ongoing consultation with managers and users of these facilities. Further information about potential noise and vibration impacts are discussed in Technical working paper: Noise and vibration (refer to Appendix G of the environmental impact statement). Overall, the sensitivity of social infrastructure located along the tunnel and magnitude of potential amenity impacts from tunnelling are considered low, resulting in the significance of potential impacts from tunnelling on the amenity of social infrastructure being assessed as low (refer to Table 6-5).

Temporary changes to local access and connectivity near construction works, including for motorists, pedestrians, cyclists and public transport users, may impact on access to social infrastructure near the project. As shown in Figure 4-10, a number of schools are located near surface works and construction support sites at Cammeray and Balgowlah. Increased construction traffic could impact on the perceptions of safety for children and students, particularly at school drop-off and pick-up times.

Increased marine construction traffic and activities could impact on the perceptions of safety for watercraft and other recreational users of Middle Harbour.

Measures would be implemented to manage potential safety risks associated with road and marine construction traffic. Further details are provided in Technical working paper: Traffic and transport, included as Appendix F of the environmental impact statement. Further discussion about potential impacts on access and connectivity from construction works is provided in Section 6.8.

The implementation of safeguards and management measures, in conjunction with ongoing consultation and communication with local communities, would appropriately manage potential impacts on social infrastructure within and near the study area during construction (refer to Section 7).

Operational impacts

During operation, the project would contribute to improved access and connectivity to social infrastructure within and near the study area through improved travel time and travel time reliability. This would include:

- Major hospitals such as the Mater Hospital at North Sydney, Royal North Shore Hospital and North Shore Private Hospital at St Leonards; and Northern Beaches Hospital at Frenchs Forest
- Tertiary education facilities, including the North Sydney and Northern Beaches TAFE campus and the Australian Catholic University North Sydney Campus
- Regional and state sport and recreation facilities, such as Garigal National Park, which includes numerous bush walking tracks, Artarmon Reserve, Flat Rock Reserve, Wakehurst Golf Course, Northbridge Golf Course and new and improved open space and recreation facilities at Balgowlah
- Middle Harbour, which provides the local and regional community with informal and formal recreational opportunities, such as kayaking, boating and swimming
- Major retail, commercial uses, cultural and community support facilities.

Decreased traffic noise impacts may be experienced by users of some social infrastructure near the Balgowlah connection and Gore Hill Freeway Connection due to the forecast reduction in traffic volumes along existing surface roads. However, increased traffic demand on some surface roads, such as along Ernest Street, West Street and Miller Street at North Sydney, Wanganella Street and Woodbine Street at Balgowlah and Judith Street at Seaforth, may result in increased traffic noise for nearby social infrastructure. Users of social infrastructure along these streets may experience noticeable noise impacts, in particular ANZAC Park Public School at Ernest Street, Jacaranda Cottage and St Mary's Catholic Church at Miller Street and Punchinello Kindergarten at Wanganella Street. Mitigation for affected receivers may include the use of low noise pavement, installation of noise barriers and, in some instances, at property treatment. Further information about potential noise and vibration impacts are discussed in Appendix G (Technical working paper: Noise and vibration).

As indicated in Section 6.6.1, the project would include the development of new and improved open space and recreation facilities at Balgowlah. This would help to address current and growing shortfall in recreational facilities in the Northern Beaches Council area.

Overall, the significance of impacts on social infrastructure from the project's operation is considered low, with the sensitivity of social infrastructure to changes and the magnitude of potential impacts considered low (refer to Table 6-6).

6.7 Community values

6.7.1 Construction impacts

Potential impacts on community values during construction may be experienced by communities within the study area due to:

- Temporary adverse changes in local amenity for residents, businesses, facilities and public open space areas near construction support sites and surface works due to noise and dust generated from construction activities
- Temporary adverse changes in local amenity for occupants of properties located above the tunnel alignment due to ground-borne noise and vibration from construction activities
- Light spill from night time construction activities at construction support sites and construction works in road reserve areas at Warringah Freeway, Gore Hill Freeway and Burnt Bridge Creek Deviation/Sydney Road
- Temporary changes in local access and connectivity, including for motorists, public transport users, pedestrians and cyclists, resulting in potential delays and disruptions
- Adverse changes in visual amenity and local character due to the presence of construction support sites and surface works, infrastructure and clearing of vegetation within the construction footprint.

These changes may impact on people's use and enjoyment of their homes, work places and public spaces. Any delays and disruptions caused by changes to local access and connectivity may inconvenience or cause frustration for some motorists and public transport users.

Local amenity and character

During construction, some land accommodating social infrastructure would be used for construction support sites and activities. This is likely to be a concern for some community members, with consultation for the project indicating strong community support to protect public open space. The presence of construction infrastructure and works may adversely affect community values relating to the amenity and character of these areas and influence people's use of open space areas.

Noise, dust, vibration, traffic and visual impacts from construction activities have the potential to temporarily impact amenity for some residents and users of social infrastructure closest to surface works, impacting on their use and enjoyment of properties. Impacts on night time amenity due to construction noise, vibration and light spill may also be experienced where construction works or construction deliveries or haulage are carried out outside of normal hours of work. Amenity impacts are most likely at properties near construction support sites used for tunnelling work and along surface connections at the Warringah Freeway, Gore Hill Freeway Connection and Balgowlah connection. Impacts on night time amenity may also occur for occupants of properties located directly above the tunnel alignment. Amenity impacts from construction activities have potential to disturb some people's use of their homes, businesses and other facilities, cause inconvenience or annoyance for some people, or disrupt sleeping patterns for some residents.

Further discussion about potential amenity related impacts such as construction traffic, noise and air quality are discussed in Appendix F (Technical working paper: Traffic and transport), Appendix G (Technical working paper: Noise and vibration), Appendix H (Technical working paper: Air quality) and Appendix V (Technical

working paper: Urban design, landscape character and visual impact assessment) of the environmental impact statement.

As discussed in Section 4.5.1, Middle Harbour provides a range of formal and informal recreational opportunities to both local and regional communities. During construction, cofferdams would be located in Middle Harbour and used as construction support sites. Visual and noise impacts during construction have potential to impact negatively on the use and enjoyment of Middle Harbour and its surrounds for some people, including both formal and informal recreational users of land and water-based facilities.

As indicated in Section 4.5.1, consultation with the community for the project identified the need to protect and preserve natural values such as flora and fauna, bushland habitat and water quality. The project would require the clearing of vegetation in road reserve areas along the Wakehurst Parkway, as well as within Artarmon Park and Balgowlah Golf Course. Areas of re-generated growth would also be cleared within Flat Rock Reserve. Loss of vegetation may impact on community values relating to landscape and visual amenity of these areas and the natural environment. Following construction, areas affected by construction and not required for the ongoing operation of the project would be rehabilitated and/or re-purposed, including with replacement trees and landscaping, with potential landscape and visual amenity impacts diminishing as the new trees or landscaping becomes established. As indicated in Section 6.6.1, the rehabilitation of Flat Rock Reserve would be carried out in consultation with Willoughby City Council and the community, and returned to the land owner.

Overall, the sensitivity of communities near the project and magnitude of potential amenity impacts is considered moderate, resulting in the significance of potential impacts on local amenity assessed as moderate (refer to Table 6-5). The implementation of safeguards and management measures, in conjunction with ongoing consultation and communication with local communities, would assist in managing potential impacts on local character and amenity (refer to Section 7).

Community cohesion

Construction of the project has the potential to result in impacts on community cohesion by restricting access to some existing social infrastructure and meeting places, such as Cammeray Golf Club and Balgowlah Golf Club. This may reduce opportunities for social and community interaction, temporarily impacting on community cohesion. As indicated in Section 4.5.1, increased construction noise, dust and traffic may impact on the amenity of the Cammeray golf course for some users and may deter some people from using the golf course during the construction phase. This has potential to disrupt some social networks associated with the club. The amenity of other social infrastructure and meeting places near the project may also be disturbed, such as Balgowlah Scout Hall, Mosman Rowing Club and public facilities at Spit West Reserve. This may impact on people's use and enjoyment of these facilities.

As discussed in Section 4.5.2, communities in the study area host a number of events which help to foster a sense of community and local identity that attract visitors from the study area and the wider region. During construction, reduced amenity, temporary changes to road conditions and increased construction traffic may result in delays for some residents, tourists and visitors accessing festivals and events. Further discussion about potential impacts on access and connectivity is provided in Section 6.8.

Overall, potential impacts to community cohesion as a result of construction of the project have been assessed to have a moderate significance, with the sensitivity of meeting places to changes and the magnitude of impacts considered moderate (refer to Table 6-5).

The implementation of safeguards and management measures, in conjunction with ongoing consultation and communication with local communities, would assist in managing potential impacts on community cohesion (refer to Section 7).

Community health and wellbeing

Some areas near construction sites and construction support sites along the Warringah Freeway and surface connections such as to Gore Hill Freeway have potential to experience impacts from construction activities that create extended periods of noise above assessment thresholds, including for sleep disturbance. This has the potential to disturb sleeping patterns for residents and occupants of buildings nearest to these works, potentially impacting health and wellbeing for some individuals. Further information on potential noise and vibration impacts, including proposed management measures for managing impacts, is provided in the Appendix G (Technical working paper: Noise and vibration). Underwater noise and vibration from some construction activities within Middle Harbour (for example, installation of piles and dredging) has potential to cause sound pressure levels that may affect people diving or swimming in areas near the project. Further information on potential impacts and management measures is provided in Appendix I (Technical working paper: Health impact assessment).

The potential for construction dust to adversely impact on the health and wellbeing of groups in the community who may be more sensitive to changes in air quality (such as children, elderly or people who suffer asthma or similar conditions) is likely to be of concern for some community members near construction activities. Potential risks to human health from construction dust are expected to be appropriately managed with the implementation of dust management measures. Further information on construction air quality is provided in Appendix H (Technical working paper: Air quality).

Increased construction traffic along roads within the study area may impact on perceptions of road safety. This would be particularly relevant in areas that attract higher numbers of pedestrians, such as near local centres or social infrastructure. Concerns about perceptions of safety are likely to be highest for groups such as the elderly, children and people with disability. For example, increased construction traffic and the presence of construction works along Sydney Road may impact on perceptions of safety for children and students at Northern Beaches Secondary College and Northside Preschool, as well as for elderly residents at Bupa Aged Care Seaforth.

The sensitivity of the general community to perceived health and safety impacts is moderate and the magnitude of possible impacts was considered low, resulting in the overall significance of potential impacts to community health and safety as a result of the project's construction being assessed as moderate-low (refer to Table 6-5).

The presence of a large construction workforce has potential to disrupt amenity and impact on perceptions of safety for surrounding neighbours and users of nearby social infrastructure. Workers on the project would be subject to the Transport for NSW *Code of Conduct* which covers all permanent, temporary and casual staff and contractors. It outlines expectations for the workplace and in certain circumstances, expectations of employees outside the workplace. The Code of Conduct can be found at: <https://www.rms.nsw.gov.au/documents/about/careers/code-of-conduct-transport.pdf>. The expectations within the Code of Conduct would be reinforced through construction worker inductions prior to commencement of construction and toolbox talks which focus on appropriate behaviours when working within the community. The sensitivity of the community to impacts from the presence of a large construction workforce is considered moderate and the magnitude of possible impacts was considered negligible, resulting in the overall significance of potential impacts being assessed as negligible (refer to Table 6-5). The implementation of safeguards and management measures, in conjunction with ongoing consultation and communication with local communities, would assist in managing potential impacts on health and wellbeing (refer to Section 7).

6.7.2 Operational impacts

Local amenity and character

Operation of the project may result in changes to local amenity and character of communities near the tunnel connections and Warringah Freeway. Increased traffic noise may be experienced by some receivers near surface connections at the Gore Hill Freeway, Balgowlah, and Wakehurst Parkway due to forecast increases in traffic volumes and realignment or widening of roads closer to receivers. This may impact on some people's use of homes, businesses and facilities, particularly of outdoor areas, and cause inconvenience or annoyance for some people. Conversely, reductions in traffic noise levels may be experienced by some communities near the surface connection at Balgowlah, Gore Hill Freeway and Warringah Freeway due to the forecast decrease in traffic volumes along existing surface roads with traffic being moved to tunnels. This may have beneficial impacts on local amenity at some properties. Further details regarding the operational noise impacts of the project are provided in Appendix G (Technical working paper: Noise and vibration).

The re-purposing of residual land and properties acquired in Dudley Street at Balgowlah for new and improved open space and recreation facilities would improve access to sport and recreation facilities for Balgowlah and surrounding communities. Increased availability of public open space and passive and active recreation facilities would impact positively on local amenity in this area.

The sensitivity of communities near the near the tunnel connections and Warringah Freeway to adverse changes in local amenity and character and the magnitude of potential changes are considered low. As such, the overall significance of potential impacts on local character and amenity from the project's operation are assessed as low (refer to Table 6-6).

Community cohesion

During operation, the project would support improved travel and access to work, business and leisure activities in the study area and the Greater Sydney region. Regionally, improved accessibility and connectivity is likely to provide long-term benefits for community cohesion. In particular, travel facilitates social interactions, and where access on major routes is constrained, some people may avoid making trips. As indicated in section 3.2.4, this was recognised in the Northern Beaches Community Strategic Plan, with existing traffic and transport issues identified as restricting mobility, increasing the risk of social isolation for communities in the Northern Beaches Council local government area. Reduced travel times and improved travel time reliability may also encourage some people to make trips they otherwise wouldn't, helping to facilitate community cohesion.

As discussed in Section 6.1, 28 residential lots would be wholly impacted by the project's construction and operation, requiring affected households to relocate before construction. This has potential to disrupt personal networks and local social connections associated with residents of these properties, particularly if the households are not able to find suitable alternative accommodation in the local area. Residents of Dudley Street at Balgowlah are likely to experience the greatest disruption to local social connections. Elsewhere, while any impact is likely to be important to affected individuals and their local networks, the impact in the context of the project as a whole is expected to be minor given the relatively small number of properties acquired.

Community cohesion is encouraged by connectivity or discouraged by barriers to movement. Increased traffic volumes on roads such as the Wakehurst Parkway leading to and from connections may reinforce existing perceived barriers to local movements for pedestrians and cyclists, potentially influencing some people's ability to access services and meeting places. Conversely, improvements to pedestrian and cycle facilities with upgraded infrastructure (for example, along and under the Wakehurst Parkway) would support increased connectivity and enhanced safety, helping to encourage greater pedestrian and cycle movements.

Changes to Cammeray Golf Course and the closure of Balgowlah Golf Course and associated golf club may also impact on community cohesion. Closure of Balgowlah Golf Course would require members and visitors to access golf courses elsewhere, impacting on social networks associated with the club, and potentially resulting in some members choosing to cease playing golf. Potential impacts on individual members are likely to depend on individual circumstances, but may affect some individuals' general levels of physical activity and overall wellbeing associated with the possible loss of social networks and personal relationships. The establishment of new and improved open space and recreation facilities at Balgowlah would create community recreation spaces that provide opportunities for community members to meet and connect, helping to support community interaction and cohesion within the broader local community. Subject to consultation, consideration would be given to re-purposing the clubhouse building which serves as a meeting space for community organisations and local communities. Changes to the Cammeray Golf Course may impact on the use of the golf course for some members. While the golf course would continue to operate, this may potentially result in some members and golfers accessing alternate golf courses, particularly following possible disruptions associated with changes to amenity during construction. These changes may impact on some social networks associated with the clubs.

The sensitivity of affected individuals and the magnitude of impact is considered moderate. As such, the overall significance of potential impacts on community cohesion due to the closure of Balgowlah Golf Course and permanent changes to Cammeray Golf Course are assessed as moderate (refer to Table 6-6).

Community health and wellbeing

Some residents and communities near the project may experience a level of stress and anxiety due to uncertainty about potential property impacts and proposed changes. This may impact on the health and wellbeing of some individuals. Some residents impacted by acquisition of residential properties may also experience impacts on health and wellbeing associated with disruptions to social networks and personal relationships associated with the relocation of residents.

The operation of motorway facilities and ventilation outlets at Gore Hill Freeway at Artarmon, Warringah Freeway at Cammeray, Burnt Bridge Creek Deviation at Balgowlah and the Wakehurst Parkway at Killarney Heights may influence people's perceptions of air quality in surrounding areas. This is likely to be of particular concern for surrounding residents and users of social infrastructure near ventilation outlets (for example, ANZAC Park Public School, ANZAC Park, Cammeray Park, Cammeray-Neutral Bay Skate Park, Cammeray Tennis Club, Seaforth Oval, Seaforth Public School and Northern Beaches Secondary College Balgowlah Boys Campus). Community concerns about potential impacts on the health of students at schools near ventilation outlets were raised during consultation for the project.

The ventilation outlets would be designed to effectively disperse emissions from the tunnels. The air quality assessment found the contribution of the operation support facilities to air pollutant concentrations would be negligible, and any predicted changes in air quality would be mainly due to changes in traffic volumes on surface roads. Particularly, noticeable decreases in pollutant concentrations are predicted along Military Road, Spit Road, Manly Road and Warringah Freeway, reflecting reductions in traffic on these roads. Increases in pollutant concentrations were predicted along the Wakehurst Parkway, although the section of the Wakehurst Parkway affected by changes in air quality is adjacent to bushland and no sensitive receivers are located close to the road. At a regional level, potential impacts on air quality would be negligible and generally undetectable. Further information on operational air quality is provided in Appendix H (Technical working paper: Air quality). The health impact assessment for the environmental impact assessment also found that potential health impacts associated with changes in air quality in the local community are considered to be acceptable. The overall significance of this impact is assessed as negligible, with the sensitivity of affected communities considered moderate and the magnitude of the impact considered negligible (refer to Table 6-6). Further information on health impacts associated with the project's operation is provided in Chapter 13 (Human health) of the environmental impact statement.

The project would support improvements in road safety, with reduced traffic demands along key surface road transport corridors, resulting in a forecast reduction in crashes across the network and consequent delays and disruptions during major incidents. Specifically, the project would result in substantial reductions in traffic volumes on the existing crossings into and out of the Northern Beaches peninsula, with the largest reductions in traffic volumes being on the Military Road/Spit Road corridor. Further discussion about road safety changes is provided in Chapter 9 (Operational traffic and transport) of the environmental impact assessment.

The establishment of new and improved open space and recreation facilities at Balgowlah would provide greater access to active and passive recreation facilities for surrounding communities, helping to encourage increased participation in recreation activities and overall levels of physical activity. The project would also include new and upgraded active transport infrastructure along the Burnt Bridge Creek Deviation and new access road at Balgowlah, and a new shared user path along the Wakehurst Parkway from Seaforth to Frenchs Forest. This would support safer and easier access for pedestrians and cyclists, further helping to encourage increased walking and cycling and overall levels of physical activity.

6.8 Access and connectivity

Construction and operation of the project has the potential to affect access and connectivity at a regional, local and property level. This section provides a summary of potential impacts of the project on access and connectivity at a local and regional level.

Further discussion regarding the project's impacts on traffic and transport is provided in Appendix F (Technical working paper: Traffic and transport).

6.8.1 Construction impacts

During construction, potential short-term impacts on access and connectivity would generally result from:

- Temporary changes to road conditions near construction activities, including several partial and full road closures, temporary diversions and access changes, removal of some on-street parking, and reductions in speed limits, resulting in delays and disruptions for motorists and other road users
- Increased construction traffic on roads within the study area, including heavy vehicles used to deliver materials and equipment and construction worker vehicles, potentially impacting on road safety for motorists, pedestrians and cyclists
- Potential disruptions to bus services, including from changes to road conditions and the temporary relocation of some bus stops near construction works for safety, resulting in possible delays and disruptions for bus users and changes in bus access for some people
- Changes to pedestrian and cycle access near construction works, resulting in possible disruptions or impacts on safety for users.

Road users

During construction, the project would result in an increase in construction traffic on roads near construction support sites, including light vehicles for construction workers and heavy vehicles associated with haulage of spoil, materials and equipment. Although most construction traffic would access the sites from the arterial road network, there is potential for localised impacts on the road network, including potential increased safety risks or impact on community perceptions of safety for road users, including pedestrians and cyclists.

Local roads which may be impacted during construction include:

- Rosalind Street at Cammeray
- Reserve Road, Dickson Avenue, Punch Street, Hampden Road, Barton Road, Butchers Lane and Lambs Road at Artarmon
- Frederick Street and Herbert Street at St Leonards

Beaches Link and Gore Hill Freeway Connection

- Allambie Road at Allambie Heights
- Maretimo Street and Dudley Street at Balgowlah
- Frenchs Forest Road East and Aquatic Drive at Frenchs Forest.

Access to other construction support sites would be provided from major roads such as Brook Street, Flat Rock Drive, Spit/Manly Road, Ernest Street, Sydney Road, the Wakehurst Parkway and Warringah Road.

As indicated in Section 4.3, a number of these roads accommodate social infrastructure, including schools, childcare centres, places of worship, and open space, sport and recreation facilities. An increase in construction traffic and heavy vehicles on these roads would impact the performance of some roads and road intersections, particularly during morning and evening peak hours.

The increased presence of heavy vehicles along haulage roads may impact community perceptions about safety for users of these facilities. The implementation of traffic management measures would assist in managing potential safety impacts. Possible measures would include limiting heavy vehicle access near schools and childcare centres during drop-off and pick-up times, or during community events that attract large numbers of visitors. Ongoing engagement and communication with managers and users of social infrastructure about haulage activities and potential safety risks would also assist in managing potential impacts. The implementation of education and awareness programs for construction workers and transport operators about potential road safety impacts would also help to ensure safety for local communities.

Car parking

Up to 10 parking spaces on Ernest Street would be removed as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project to provide suitable access to the Cammeray Golf Course construction support site (BL1), with access maintained while the construction support site is operational. Construction works in Artarmon would result in temporary removal of on-street parking spaces on other local roads such as Hampden Road, Cleg Street, Dickson Avenue and Barton Road to allow access to construction support sites in the Artarmon area (including Dickson Avenue (BL4), Barton Road (BL5) and Gore Hill Freeway median (BL6) construction support sites).

Some car parking for the construction workforce would be provided at these construction support sites. Where on-site parking is not provided or where provision of on-site parking cannot accommodate the full construction workforce, feasible and reasonable management measures that minimise parking impacts on the surrounding road network should be implemented. Construction worker parking would be, depending on the location, actively managed through measures such as encouraging the use of public transport and provision of workforce shuttle buses.

Overall, the significance of potential impacts to parking as a result of the project's construction have been assessed as moderate-low, with the sensitivity being moderate and magnitude of impacts considered low (refer to Table 6-5).

Public transport services

During construction, impacts on bus services in the study area may result from delays and disruptions on the wider road network. In addition, changes may be required to local bus services near construction works. This may include the temporary relocation of some bus stops located close to construction works along the Pacific Highway at Artarmon, Sydney Road and along the Wakehurst Parkway in Seaforth, Killarney Heights and Frenchs Forest. Delays or short-term changes in local routes and bus priority infrastructure may also be required due to temporary road adjustments. This may result in minor travel time increases. Early and ongoing engagement and communication with bus operators and bus users about upcoming changes to local bus routes and bus stops and proposed detours would be carried out prior to the start of works. This would assist in managing potential impacts on commuters.

The sensitivity of commuters to changes in public transport services are considered moderate, with the magnitude of impacts considered low. As such, potential impacts to public transport as a result of construction of the project have been assessed to have a moderate-low significance (refer to Table 6-5).

Maritime transport

As indicated in Section 6.6.2, construction of the project would require temporary closures of Middle Harbour between Northbridge and Seaforth Bluff. These closures would occur on weekdays to limit the disturbance to harbour recreational users, community groups and clubs. During temporary closures of Middle Harbour, navigational restrictions would prohibit larger vessels from crossing the harbour between Northbridge and Seaforth Bluff. Smaller vessels passing through may require escort vessels to be provided. This would result in periods of traffic disruptions, potentially affecting recreational movements and access and connectivity for businesses and sporting clubs associated with Middle Harbour, including Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club and Middle Harbour Yacht Club. Right of way for recreational craft over construction maritime vessels should be maintained where feasible. Ongoing engagement and communication with users of Middle Harbour, such as with the local community, Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club, Middle Harbour Yacht Club and users of D'Albora Marinas The Spit, would assist in managing potential impacts.

Navigation impacts downstream of the Spit Bridge and in the Outer Harbour are not expected to be substantial due to the lower frequency of construction vessel movements and the increased space the Outer Harbour provides for manoeuvrability.

The establishment and operation of the Spit West Reserve construction support site (BL9) would require temporary relocation of around 45 swing moorings. The establishment of the Middle Harbour north cofferdam (BL8) would require the temporary relocation of about 10 swing moorings below Seaforth Bluff and would prevent access to three private marina berths in Seaforth Bluff. Temporary alternative marina berths would be provided at D'Albora Marinas at The Spit or other marinas nearby. A small number of moorings may also require temporary relocation for a short period on the eastern side of the channel, west of Bradys Point, to allow safe passage of the immersed tube tunnel steel shell segments. These moorings would be relocated elsewhere in Middle Harbour in consultation with the lease holder(s) and would be restored to their original position on completion of the project. No impacts to ferry routes or wharves are anticipated.

Overall, the significance of potential impacts on maritime transport during construction have been assessed as low, with the sensitivity of maritime users considered moderate and the magnitude of potential impacts low (refer to Table 6-5).

Active transport

As discussed in Section 4.6, walking and cycling is an important mode of transport for residents, workers and visitors in the study area. During construction, temporary closures or changes to pedestrian and cycle paths would be required near construction works for the safety of pedestrians and cyclists. Temporary closures and adjustment of pedestrian and cycle paths would involve:

- Temporary detour of the Warringah Freeway shared user path and provision of signalised pedestrian and cyclist crossing at the access for the Cammeray Golf Course construction support site (BL1)
- Temporary detour of the shared user path within Flat Rock Reserve and provision of signalised pedestrian crossing at the access to the Flat Rock Drive construction support site (BL2)
- Temporary adjustments to Reserve Road, Dickson Avenue and Punch Road footpaths at Artarmon and to Hampden Road footpaths and cycle path near to works at Artarmon Park
- Temporary detour to the Gore Hill Freeway shared user path near to the Dickson Avenue construction support site (BL4)
- Closure of Lambs Road due to Punch Street construction support site (BL3)

- Temporary detour of the Figtree Lane shared user path near to the Spit West Reserve construction support site (BL9)
- Provision of signalised pedestrian crossing at the access for the Balgowlah Golf Course construction support site (BL10)
- Temporary adjustment to Manly Dam mountain bike track
- Demolition and replacement of the Wakehurst Parkway pedestrian bridge. The existing bridge would remain operational while the replacement works are carried out
- Temporary adjustments to the Wakehurst Parkway shared user path near to the Wakehurst Parkway north construction support site (BL14).

Existing connectivity for users of these facilities would be maintained and temporary access arrangements may result in a small increase in travel distances only. Temporary access arrangements (for example, diversion of shared user paths) would also consider the needs of all pedestrians and cyclists, including children, the elderly and people with disability. Where suitable alternative access is not available nearby, early notification (that is signage, newspaper notifications) would be provided about changes to allow users of the cycle path to plan their trips. This may impact on safety or community perceptions of safety for pedestrians and cyclists. Overall, the significance of potential impacts to active transport as a result of construction of the project have been assessed as low, with the sensitivity and magnitude of impacts considered low (refer to Table 6-5).

Property access

Access to private properties near proposed works is expected to be maintained during construction. Where temporary changes are required, suitable access arrangements should be implemented in consultation with affected property owners. The sensitivity of individuals to changes in private property access would be low and magnitude of impact are considered negligible, resulting in an overall significance of impacts on property access being assessed as negligible (refer to Table 6-5).

6.8.2 Operational impacts

The project would improve regional access and connectivity for freight services, public transport and other road users by providing a new alternate motorway standard crossing of Middle Harbour. The project would also relieve congestion and improve travel times for freight services, public transport and other road users on the Military Road/Spit Road and Warringah Road/Eastern Valley Way corridors, and enable faster, more reliable journeys times on all road corridors crossing Middle Harbour. The project would improve access to key commercial and employment centres including the Sydney CBD, North Sydney, Artarmon, St Leonards, Chatswood and Macquarie Park and other strategic centres. This would have positive long-term impacts for motorists, public transport users and businesses.

Locally, the project would provide an alternative to existing surface arterial connections, including Warringah Road, Military Road/Spit Road and the Spit Bridge, which currently experience high levels of traffic congestion and constrained freight access. The project would also enhance the resilience of the road network by providing additional road network capacity and alternate north–south and east–west linkages to reduce congestion and potential gridlock in the event of incidents on the road network.

The project would provide new opportunities for public transport. A new motorway tunnel would allow new public transport routes, including express buses, within the tunnel to be developed in response to diverse travel demands and support new social and economic development such as the Northern Beaches Hospital precinct in Frenchs Forest. In particular, the project would allow new express bus connections between major centres on the Northern Beaches and Frenchs Forest and those in the lower North Shore, Sydney CBD, Macquarie Park, St Leonards, other destinations in the north-west and beyond, and opportunity for efficient access and interchange with the new Victoria Cross Metro Station at North Sydney.

The new motorway tunnel would reduce congestion on key surface arterial routes such as Warringah Road, Eastern Valley Way and Military Road, thereby improving travel times and travel time reliability of buses in peak periods between the Northern Beaches and North Sydney, the Sydney CBD, Macquarie Park and St Leonards. These improvements would make buses a more attractive transport option, supporting future mode shift to public transport.

The majority of cycling and pedestrian infrastructure along the project corridor provides links to recreational areas such as parks and open space. Cycle routes on the road network within and surrounding the project corridor are mostly located within the road corridor. The project would improve cyclist and pedestrian connectivity along the project corridor through increased provision of dedicated pedestrian and cycle links. This would include the provision of new and upgraded pedestrian and cyclist infrastructure around surface connections and along the upgraded Wakehurst Parkway. It is anticipated that these improvements in connectivity would encourage greater use of existing infrastructure by pedestrians and cyclists.

The project has potential to change traffic movements on local roads near to the tunnel connections. Reduced traffic congestion on arterial roads would reduce 'rat running' through local neighbourhoods, impacting positively on local access and connectivity for motorists, pedestrians and cyclists. Surface connections at Balgowlah have potential to increase the incidence of 'rat running' on some local roads between Kitchener Street and Sydney Road. Traffic calming measures, if required, would be implemented in consultation with Northern Beaches Council to help to minimise potential for 'rat running' on local roads.

6.9 Cumulative impacts

Cumulative impacts comprise the successive, incremental or combined effects of an activity when added to other past, present or reasonably foreseeable future activities. In particular, cumulative impacts can occur when impacts from the project interact or overlap with impacts from other projects and can result from actions that, individually, may be minor, but collectively could result in substantial changes to the socio-economic environment.

A range of other transport infrastructure and urban development projects have commenced construction or are planned in or near the study area. This includes major transport infrastructure projects such as the Western Harbour Tunnel and Warringah Freeway Upgrade, Sydney Metro City & Southwest and Sydney Metro West. Interaction with these projects may change the social impacts or benefits of the project.

During construction, potential cumulative impacts may be associated with:

- Prolonged duration of construction impacts, resulting in:
 - Extended periods of traffic disruptions for motorists, public transport users, pedestrians and cyclists, and commercial vehicle movements
 - Extended periods of impacts on amenity for communities in the study area, associated with increased noise, dust and traffic
- Increased construction traffic, associated with haulage of materials, plant and equipment for the various construction projects, and increases in construction worker traffic, impacting on traffic congestion and community perceptions of safety
- Increased demand for construction workers, providing benefits for workers, and potentially impacting on the availability of workers for other construction related projects or other industries across Sydney and elsewhere.

Where construction timeframes for projects occur sequentially, there is potential for disturbance and disruptions due to construction noise, dust and construction traffic and access changes to occur over extended periods, potentially resulting in construction fatigue for some individuals. Extended periods of construction has potential to exacerbate inconvenience or nuisance for some individuals and communities, or impact on health and wellbeing due to extended periods of sleep disturbance, stress and anxiety about

potential impacts and changes from multiple projects, loss of access to formal and informal recreation areas, and possible loss of social connections due to extended periods of disruption to meeting places or access and connectivity. In relation to the project, this is likely to have the greatest impact on residents, businesses and communities closest to construction works at St Leonards and Cammeray due to the Western Harbour Tunnel and Warringah Freeway Upgrade project at Cammeray and Sydney Metro City & Southwest at North Sydney (expected to be operational in 2024).

In particular, concurrent construction activities from multiple projects or consecutive construction of various projects has potential to result in cumulative impacts for communities located at:

- Cammeray and North Sydney, including residential receivers near Cammeray Golf Course and the Warringah Freeway, commercial receivers in the North Sydney CBD and regular users of the Warringah Freeway
- Artarmon, including industrial receivers around Artarmon and regular users of the Warringah Freeway and the Gore Hill Freeway
- Willoughby and Naremburn, including residential receivers around Willoughby and Naremburn and regular users of the Warringah Freeway and the Gore Hill Freeway.

Overall, potential cumulative impacts associated with interaction of the project's construction with construction activities for other projects are expected to result in moderate-low impacts on community health and wellbeing and employment, and moderate impacts on local amenity and character and access and connectivity.

During operation, potential cumulative impacts would be associated with improved travel benefits for communities, business and industry, including freight across the Sydney transport network.

As indicated in Section 6.2, in conjunction with the Western Harbour Tunnel and Warringah Freeway Upgrade project, the project would also help to reduce traffic on major roads in the study area, including Military Road/Spit Road/Manly Road, Pacific Highway and Western Distributor, supporting local environment and amenity improvements in the study area and surrounding region, and improved access and connectivity for residents, business and industry in the study area, northern and south-western suburbs and the Greater Sydney region.

Safeguards and management measures would be implemented for each project to manage the impacts of the individual projects. Coordination between the various projects in the planning of major works and possible disruptions, where feasible and reasonable, would assist in minimising potential cumulative impacts. Further discussion about the cumulative impacts of the project is provided in Chapter 27 (Cumulative impacts) of the environmental impact statement.

6.10 Evaluation of significance

Construction and operation of the project would have a range of positive and negative impacts on local communities, business and industries. Potential positive impacts would generally be associated with:

- Direct and indirect employment associated with the project's construction
- Positive changes to the business environment during construction within Balgowlah centre, Seaforth centre, The Spit centre and Miller Street at Cammeray due to such things as increased passing trade, business visibility and demand for services
- Positive changes to the business environment during operation within local business centres due to such things as improved employee and customer access, servicing, delivery and distribution, character and amenity and business visibility
- Improved freight and efficiency costs for local business and industry, and improved road safety and travel delays due to heavy vehicles being transferred from the arterial network into the tunnel

- Improved access and connectivity, including to employment areas and local and regional social infrastructure, including opportunities for new express bus services within the tunnel
- Reduced congestion and improved travel time and reliability on local and arterial roads, impacting positively on community cohesion, public transport access and access for local and regional communities and businesses
- Improved community open space and recreation facilities that provide opportunities for community members to meet and connect, helping to support community interaction and cohesion within the broader local community.

Potential negative impacts of the project's construction on the socio-economic environment and communities within the study area are summarised in Table 6-5, while Table 6-6 summarises potential negative impacts of the project's operation. The significance of impacts was determined based on the methodology for assessing the sensitivity and magnitude of socio-economic impacts, provided in Section 2.1.2.

A summary of the impacts of the project on businesses is provided in the business impact assessment report (refer to Annexure A).

Table 6-5 Construction impacts

Element	Socio-economic impacts	Sensitivity	Magnitude	Significance
Property impacts	Potential damage to properties above or near the tunnel	Moderate	Low	Moderate-low
Equity	Possible changes to amenity for residents near surface works during construction	Moderate	Moderate	Moderate
Population and demography	Changes to population and demography from construction workforce and acquisition of residential properties	Low	Negligible	Negligible
Business impacts	Potential changes to the business environment within the Frenchs Forest business hub, Balgowlah centre, Seaforth centre, Miller Street Cammeray centre and The Spit centre	Low	Low	Low
	Potential changes to the business environment within the Artarmon industrial area	Low	Low	Low
	Access disruption to maritime related businesses from additional bridge opening times, increased travel time and relocation of commercial moorings	Negligible	Low	Negligible
	Potential impacts from temporary closures of Middle Harbour	Low	Low	Low
Social infrastructure	Use of a portion of land at Cammeray Golf Course as a construction support site, including reconfiguration of the nine-hole golf course	Moderate	High	Moderate-high
	Temporary impacts to a portion of land within Artarmon Park to allow for construction of the Gore Hill Freeway Connection, including the clearing of mature trees	Moderate	Low	Moderate-low
	Temporary lease of open space at Spit West Reserve for use as a construction support site	Moderate	Moderate	Moderate
	Temporary lease of open space at Flat Rock Reserve for use as a construction support site including clearing of trees.	Moderate	Moderate	Moderate
	Temporary impacts on the amenity at social infrastructure closest to surface works and construction support sites, including from noise, vibration and dust	Moderate	Moderate	Moderate
	Impacts to social infrastructure located directly above the project alignment, including short-term vibration and groundborne noise impacts	Low	Low	Low
Community values	Potential temporary impacts on the amenity for some uses closest to surface works and construction support sites due to construction noise, dust and vibration and construction traffic impacts	Moderate	Moderate	Moderate

Element	Socio-economic impacts	Sensitivity	Magnitude	Significance
	Removal of established trees for construction support sites and surface works	Moderate	Low	Moderate-low
	Possible disruption to people's use and enjoyment of meeting places such as parks and recreation facilities (for example, Flat Rock Reserve, Balgowlah Golf Course and Cammeray Golf Course)	Moderate	Moderate	Moderate
	Perceived impacts from increased dust on the health and wellbeing of groups within the community	Moderate	Low	Moderate-Low
	Increased construction traffic along roads may impact on perceptions of road safety	Moderate	Low	Moderate-low
	Disruptions to amenity and perceived impacts on safety due to the presence of a large construction workforce	Moderate	Negligible	Negligible
Access and connectivity	Possible access changes to properties near the project.	Low	Negligible	Negligible
	Removal of parking spaces to allow for access to construction support sites and other construction activities and parking of the construction workforce	Moderate	Low	Moderate-Low
	Temporary changes to road conditions and increased construction traffic on roads near construction activities resulting in delays and disruptions for motorists and other road users.	Moderate	Moderate	Moderate
	Potential delays and disruptions for bus services and changes to local bus services near construction works, including temporary relocation of some bus stops located close to construction support sites	Moderate	Low	Moderate-low
	Alterations in access and connectivity, and potential travel time delays and route alterations	Moderate	Low	Moderate-low
	Temporary closures, detours or other changes to pedestrian and cycle paths.	Low	Low	Low

Table 6-6 Operation impacts

Element	Socio-economic impacts	Sensitivity	Magnitude	Significance
Property impacts	Acquisition of residential properties	High	Moderate	Moderate-high
	Potential impact on future development above the tunnel	Moderate	Negligible	Negligible
Business impacts	Full acquisition of properties accommodating business/industrial uses, resulting in the need for businesses to either relocate to another location or permanently close	Moderate	Moderate	Moderate
	Potential changes to the business environment of Artarmon industrial area.	Low	Low	Low

Element	Socio-economic impacts	Sensitivity	Magnitude	Significance
	Increased business costs associated with additional tolling expense	Moderate	Low	Moderate-low
Social infrastructure	Permanent acquisition of a portion of land within Artarmon Park	Moderate	Low	Moderate-low
	Permanent closure of Balgowlah Golf Course resulting in the permanent closure of the golf club and impact on golf club members	High	High	High
	Reconfiguration of Cammeray Golf Course	Moderate	High	Moderate-high
	Possible adverse noise and vibration impacts on users of social infrastructure closest to the project	Low	Low	Low
Community values	Potential changes to traffic noise levels for communities near roads connecting to tunnel interchanges	Low	Low	Low
	Potential impacts to community cohesion due to acquisition of Balgowlah Golf Club and partial acquisition of Cammeray Golf Course	Moderate	Moderate	Moderate
	Perceived air quality impacts associated with operation support facilities located near social infrastructure	Moderate	Negligible	Negligible

7. Environmental management measures

This section provides an overview of the measures to manage the socio-economic impacts of the project's construction and operation. It provides an overview of the broad objectives for management of socio-economic impacts, as well as key strategies for addressing various issues.

7.1 Overview

Project-specific environmental management measures have been developed with the aim of minimising or mitigating, as far as practical, potential socio-economic impacts of the project's construction and operation. These are described in Table 7-1.

Broadly, the expected environmental outcomes of the environmental management measures are to avoid or minimise impacts on communities, businesses and social infrastructure from the construction and operation of the project. This would be achieved through:

- Implementation of environmental management measures, for example noise, vibration and dust mitigation, and traffic management strategies
- Early and ongoing consultation and communication to ensure local and regional communities, businesses, transport users and managers of social infrastructure are informed about the project's construction and operation. Future consultation would be carried out in accordance with Appendix E (Community consultation framework) of the environmental impact statement.

7.2 Socio-economic environmental management measures

Recommended safeguards and management measures to mitigate or manage socio-economic impacts of the project's construction and operation are summarised in Table 7-1. Additional measures relevant to the management of socio-economic impacts are also outlined in other chapters of the environmental impact statement, including:

- Chapter 8 (Construction traffic and transport)
- Chapter 9 (Operational traffic and transport)
- Chapter 10 (Construction noise and vibration)
- Chapter 11 (Operational noise and vibration)
- Chapter 12 (Air quality)
- Chapter 13 (Human health)
- Chapter 20 (Land use and property)
- Chapter 22 (Urban design and visual amenity).

Table 7-1 Summary of environmental management measures

Ref	Impact	Environmental management measure	Location
Construction			
SE1	Social infrastructure	Where feasible and reasonable, the extent of permanent impact on public open space areas (for example Artarmon Park) should be minimised in further design development.	BL/GHF
SE2	Social infrastructure	Ongoing engagement should be carried out with representatives of user groups and managers of social infrastructure located near surface construction works/construction support sites and sensitive social infrastructure above the tunnel alignment (for example, schools, places of worship, aged care, childcare centres, health and medical facilities) about the timing and duration of construction works and management of potential impacts.	BL/GHF
SE3	Stakeholders, community and business	Consultation for the project would be carried out in accordance with the Community consultation framework provided as Appendix E of the environmental impact statement.	BL/GHF
SE4	Employment benefits	A workforce strategy for the project that includes strategies to increase employment and training opportunities for groups such as Aboriginal people, women, young people and the unemployed should be developed and implemented to help maximise employment benefits of the project.	BL/GHF
BU1	Community and business	Where businesses are affected by property acquisition, or lease cessation, the acquisition and compensation process should be implemented in line with the <i>Determination of compensation following the acquisition of a business guideline</i> . Compensation for a business conducted on land that is acquired should be determined in accordance with the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> (NSW) as relevant.	BL/GHF
BU2	Community and business	Specific consultation should be carried out with businesses potentially impacted during construction. Consultation should aim to identify specific potential construction impacts for individual businesses.	BL/GHF
BU3	Community and business	Based on consultation with businesses, specific feasible and reasonable measures to maintain business access, visibility and parking and address other potential impacts as they arise through the construction process should be identified and implemented. A phone hotline that enables businesses to find out about the project or register any issues should be maintained.	BL/GHF

Beaches Link = BL, Gore Hill Freeway Connection = GHF

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Annexure A: Business Impact Assessment

Transport for NSW

Beaches Link and Gore Hill Freeway Connection
Technical working paper: Business impact assessment
December 2020

Prepared for

Transport for NSW

Prepared by

HillPDA Consulting

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Glossary of terms and abbreviations

Term	Definition
A	
ABS	Australian Bureau of Statistics
Arterial roads	The main or trunk roads of the state road network that carry predominantly through traffic between regions.
B	
BIA	Business Impact Assessment
Business ambience	The character and atmosphere of an environment in which a business is operating.
Business visibility	The exposure of a business storefront and signage/advertising to potential customers.
C	
CBD	Central business district
Construction footprint	The construction footprint is the area required to construct the project.
Construction support site	Parcel of land on which construction-related support activities will be carried out
CPI	Consumer price index
CPTED	Crime prevention through environmental design
Cumulative impacts	Impacts that, when considered together, have different and/or more substantial impacts than a single impact assessed on its own.
D	
dB(A)	A-weighted decibels
DCP	Development Control Plan
DPIE	NSW Department of Planning, Industry and Environment
E	
Employee productivity	The efficiency of a worker or group of workers in terms of output and ability to carry out standard tasks over a specific period of time.
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
F	
G	
GCCSA	Greater Capital City Statistical Area
GIS	Geographical information systems
GRP	Gross Regional Product
GSC	Greater Sydney Commission
GSP	NSW Gross State Product
H	
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two-axle truck) or larger, in accordance with the Austroads Vehicle Classification System.
I	
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
Interchange	A grade separation of two or more roads with one or more interconnecting carriageways.
IVA	Industry Value Added
J	
Just Terms Act	<i>Land Acquisition (Just Terms Compensation) Act 1991 (NSW)</i>
L	

Term	Definition
LCZ	Landscape character zones
LEP	Local Environmental Plan
LGA	Local government area
Local road	A road or street used primarily for access to abutting properties.
LoS	Level of service
M	
Motorway	Fast, high volume controlled access roads. May be tolled or untolled.
Motorway facility and ventilation outlet	Operational facility for the mechanical introduction/removal of air to/from the mainline tunnels.
M4-M5 Link	Including mainline tunnels and Rozelle Interchange of the M4-M5 Link.
N	
NCA	Noise catchment area
P	
Passing trade	Pedestrians, cyclists and motorists who choose to patronise a business because they see it when walking/riding/driving past, not because they planned to go there.
Portal	The entry and/or exit to a tunnel.
Project	The Beaches Link and Gore Hill Freeway Connection project
Project footprint	The land required to operate the project. This includes permanent operational infrastructure (including the tunnels), and land required temporarily for construction.
Public transport	Includes train, bus (government and private), ferry (government and private) and light rail (government and private) services.
R	
Roads and Maritime	Roads and Maritime Services (now a part of Transport for NSW)
S	
SA1	Statistical Area 1 (ABS)
SA2	Statistical Area 2 (ABS)
SEARs	Secretary's environmental assessment requirements. Requirements and specifications for an environmental assessment prepared by the Secretary of the NSW Department of Planning, Industry and Environment under section 115Y of the <i>Environmental Planning and Assessment Act 1979</i> (NSW).
SEIA	Socio-economic impact assessment
SEIFA	Socio-Economic Indexes for Areas
Sensitive receiver	Includes residences, educational institutions (including preschools, schools, universities, technical and further education or TAFE institutions colleges), health care facilities (including nursing homes, hospitals), religious facilities (including churches), child care centres, passive recreation areas (including outdoor grounds used for teaching), active recreation areas (including parks and sports grounds) and commercial premises (including film and television studios, research facilities, entertainment spaces, temporary accommodation such as caravan parks and camping grounds, restaurants, office premises, retail spaces and industrial premises).
SEPP	State Environmental Planning Policy
Service demand	Demand for services and resources providing direct or indirect employment or benefits from a project (eg for construction recruitment agencies and construction suppliers)"
Socio-economic	Involving combination of social and economic matters.
Shared user path	Pathway shared by pedestrians and cyclists.
Spoil	Surplus excavated material.
Study area	Study area includes the construction footprint and operational footprint and other areas that may experience indirect impact.

Term	Definition
T	
U	
UDLP	Urban Design and Landscape Plan
Urban design	The process and product of designing human settlements, and their supporting infrastructure, in urban and rural environments.
V	
Ventilation outlet	The location and structure from which air within a tunnel is expelled.
W	
X	
Y	
Z	

Executive summary

Transport for NSW (formerly Roads and Maritime Services) is seeking approval under Part 5, Division 5.2, of the *Environmental Planning and Assessment Act 1979* to construct and operate the Beaches Link and Gore Hill Freeway Connection project (the project), which would comprise two main components:

- Twin tolled motorway tunnels connecting the Warringah Freeway at Cammeray and the Gore Hill Freeway at Artarmon to the Burnt Bridge Creek Deviation at Balgowlah and Wakehurst Parkway at Killarney Heights, and an upgrade of Wakehurst Parkway (the Beaches Link)
- Connection and integration works along the existing Gore Hill Freeway at Artarmon (the Gore Hill Freeway Connection).

This report identifies and assesses the business impacts that may result from the project during construction and operation. This report considers the direct, indirect and cumulative impacts to businesses, including evaluating the significance of impacts and required mitigation strategies to minimise adverse impacts and maximise benefits of the project. In doing so, it responds directly to the Secretary's environmental assessment requirements (SEARs).

In particular, the SEARs require:

- Meaningful and effective engagement with businesses during project design and delivery
- Assessment of the operational transport impacts of the project including property and business access and street parking
- Assessment of the impacts from construction and operation on potentially affected businesses.

Important note

This document considers impacts on local businesses along the Beaches Link and Gore Hill Freeway Connection project corridor. The findings should not be conflated with the economic appraisal of the Western Harbour Tunnel Beaches Link program of works, which considers the wider economic impact of the program to the state of New South Wales.

The project

Key construction activities with the potential to impact on businesses are:

- Early works and site establishment
- Construction of the Beaches Link Tunnel
- Construction of the Gore Hill Freeway Connection
- Construction of operational facilities including a motorway control centre at the Gore Hill Freeway in Artarmon and tunnel support facilities at the Gore Hill Freeway in Artarmon and Wakehurst Parkway in Frenches Forest
- Construction of ventilation outlets and motorway facilities at the Warringah Freeway in Cammeray, Gore Hill Freeway in Artarmon, Burnt Bridge Creek Deviation in Balgowlah and Wakehurst Parkway in Killarney Heights
- The installation of motorway tolling infrastructure
- Testing of plant and equipment, and commissioning of the project.

Once operational, the project has the potential to alter travel patterns with a long term improvement in network efficiency anticipated. Some changes would improve freight and commercial vehicle movements and employee and customer access for locations both within the study area and further afield, creating direct business cost efficiencies and improving productivity.

Study area

The study area for this assessment includes those businesses and local business centres that may experience changes to existing conditions due to the location of the project, construction activities and changes in movement patterns for business owners, workers and customers. The study area comprises the Australian Bureau of Statistics (ABS) Statistical Areas Level 2 (SA2) geographies that are affected by or are located near the project and the section of Middle Harbour next to the project alignment.

For the purposes of this assessment, the study area has been divided into two 'precincts'. The SA2s that are affected by or were close to the project footprint, defined the study area and include:

- Eastern Precinct:
 - Balgowlah-Clontarf-Seaforth
 - Manly Vale-Allambie Heights
 - Forestville-Killarney Heights
 - Frenchs Forest-Belrose.
- Western Precinct:
 - Cremorne-Cammeray
 - St Leonards-Naremburn
 - Chatswood (East)-Artarmon
 - Willoughby-Castle Cove-Northbridge
 - Mosman.

Business centres

The existing business environment of the study area has been reviewed and businesses in centres have been consulted to understand sensitivities and dependencies. HillPDA engaged with businesses through a survey conducted over a three-week period in November 2017. Businesses were approached at random with over 210 businesses participating in the survey.

The study area includes a diversity of centres ranging from local centres to larger strategic centres. Frenchs Forest Business Hub is a strategic centre in the Eastern Precinct, while the Western Precinct contains the strategic centres of the St Leonards and the Chatswood. These are large strategic centres providing a mix of commercial, retail, health and education services. The large retail centres such as Austlink Business Park, Forestway Shopping Centre, Balgowlah Centre and Spit Junction are generators of economic productivity and employment. There are several local centres within the study area with The Spit, Seaforth Centre, Miller Street Cammeray, Manly Vale business centre, Military Road Cremorne and Military Road Mosman identified as being partially affected by the project.

In total, the study area contains 27,820 businesses, providing 101,590 jobs (all employment). Most people travel to work in these centres by car from both within and outside of the study area.

Scoping

Scoping identified a broad range of potential issues that could arise from the project with the capacity to directly or indirectly affect the operation or revenue capacity of businesses. This included potential impacts on: passing trade, employee and customer access, servicing and delivery, character and amenity, employee productivity, business visibility and demand for goods and services. Effects such as the impact of tolling and alterations in trade catchments were also identified.

Business perceptions

Engagement with businesses found that businesses in the area have varying degrees of sensitivity and dependency to the issues identified.

Generally, there was a perceived high dependency (69 per cent) on vehicular passing trade, with 43 per cent of businesses surveyed being majorly dependent. Sixty-six per cent of surveyed businesses perceived a dependency on pedestrian and cyclist passing trade, with 32 per cent of these being majorly dependent. In response to these findings, changes in traffic, pedestrian and cycle movements have been given detailed consideration in the assessment of business impacts.

Changes in access to a centre, for example through congestion and changes in travel times, may result in long term changes to consumer and worker behaviour. The business survey found that 83 per cent of businesses believed themselves to be sensitive to travel time delays, with 39 per cent of the respondents believing themselves to be majorly sensitive.

Most customers and employees were said to use private vehicles as their primary transport mode. During construction, 53 per cent of businesses surveyed believed construction of the project would have no discernible positive or negative effects on travel time and access. However, 63 per cent of business respondents believed that operation of the project would be positive for employee and customer access.

Most businesses (65 per cent) perceived they were dependent on on-street parking, with 39 per cent of these businesses recording major dependencies.

The potential for the project to impact on deliveries and loading arrangements was also considered. The impact was perceived by businesses to be neutral or positive, with 60 per cent of businesses believing construction would have a neutral effect and approximately 39 per cent stating that the operation of the project would have a positive effect on servicing and delivery.

The potential for impacts from reduced exposure was perceived to be moderate, with 70 per cent of businesses stating that they were dependent on business exposure and visibility and 47 per cent majorly dependent. Warringah Mall, Spit Junction and Frenchs Forest were the business centres that recorded the highest perceived dependencies during the survey.

Changes to the local character and amenity of a place can affect the enjoyment and desirability of the environment, visitor numbers and trends, and consequently the economic activity of a commercial centre and the businesses located there. Overall, 82 per cent of businesses perceived that they were dependent on the identity and character of the commercial centre they were located in, with 53 per cent being majorly dependent. Fifty-three per cent perceived that they were dependent on a pleasant visual amenity, 11 per cent had a high sensitivity to noise, 16 per cent had a high sensitivity to air quality and 18 per cent had a high sensitivity to odour.

Overall, the business survey indicated that most businesses believed the project would have a neutral effect on demand for goods and services. The findings of the business survey assisted in determining the sensitivity of businesses and their ability to adapt and respond to project related changes to the socio-economic environment.

Assessment of potential impacts

The potential impact to businesses in each centre has been assessed having regard for the sensitivity of businesses and business centres to project changes and to changes to traffic, cyclist, and pedestrian movement. The assessment results in a range of potential positive and negative impacts as identified in Table E-1.

Table E-1: Potential impacts on business revenue and operation

	Potential positive impacts on business revenue and operation	Potential negative impacts on business revenue or operation
Construction	<ul style="list-style-type: none"> • Increase in passing trade at Seaforth Centre, Manly Vale Business Centre, The Spit and Artarmon Industrial • Increase in construction worker expenditure and demand for services at Frenchs Forest Business Hub, Balgowlah Centre, Seaforth Centre, The Spit, Miller Street Cammeray and Artarmon Industrial • Increase in business visibility at Frenchs Forest Business Hub, Seaforth Centre, Miller Street Cammeray and Artarmon Industrial. 	<ul style="list-style-type: none"> • Reduced employee productivity and communication at Balgowlah Neighbourhood Centre and Artarmon Industrial • Reduced character and amenity at Balgowlah Neighbourhood Centre, Seaforth Centre, The Spit and Artarmon Industrial. • Reduced business visibility at Artarmon Industrial • Reduced servicing and delivery at Frenchs Forest Business Hub, Manly Vale Business Centre, Balgowlah Centre, Seaforth Centre and Artarmon Industrial • Reduced employee and customer access at Frenchs Forest, Manly Vale Business Hub, Balgowlah Centre, Seaforth Centre, Miller Street Cammeray and Artarmon Industrial • Restricted access capacity and altered amenity for maritime users of Middle Harbour • Property acquisitions require businesses to relocate or close.
Operation	<ul style="list-style-type: none"> • Improvement in network travel time and connectivity enhancing employee and customer access, commute times, servicing and delivery efficiencies • Increase in passing trade and potential sales at Balgowlah Centre and Artarmon • Increased service and delivery across most centres with more direct and efficient transport networks • Improved character and amenity from reduced surface road traffic including benefits for businesses along Military Road. • Improved demand for services across most centres • Greater connectivity to other centres including the major employment centres of Chatswood, St Leonards, North Sydney, Macquarie Park and Sydney CBD • Increased potential for new and repeat customers with expanded trade catchments. 	<ul style="list-style-type: none"> • Localised alterations to traffic environment due to changes in traffic demand, effecting the efficiency of servicing and delivery and employee and customer access in some directions • Tolling would present a discernible change, costing individuals and businesses within the range commonly experienced by receivers • Localised changes in amenity and character due to introduction of transport infrastructure and changes in traffic volumes in some areas • Redistribution of traffic patterns causing some businesses to experience a reduction in passing trade and altered trade catchments.

Overall, the significance of potential construction impacts on businesses is considered to be low, with any impacts (positive or negative) more likely to be experienced at an individual business level. Key potential benefits include increased passing trade, business visibility and demand for services. While there may be temporary impacts on some businesses during construction, including employee and customer access, servicing and delivery, there is not expected to be a lasting impact on any of the centres once construction ceases.

Some businesses may be subject to potential cumulative impacts from the successive, incremental and/or combined effects of constructing multiple projects. Centres that may experience cumulative impacts include North Sydney, Miller Street Cammeray and Artarmon.

Once operational, the project is expected to deliver long term benefits to businesses within the study area and further afield. It is considered that the project would be beneficial for employee and customer access, servicing, delivery and demand for services across most centres. Some centres would also benefit from improvements in passing trade, character and amenity and business visibility. The improvement in the efficiency of the transport network and enhanced access between certain areas has the capacity to increase connectivity for employees and customers and enhance the efficiency of freight and commercial vehicle movements. Enhancements to the freight and commercial vehicle network is expected to have follow on benefits to local businesses with reduced transport times increasing productivity and reducing costs. Once operational, the project, in conjunction with other major transport projects, is expected to deliver beneficial cumulative impacts for businesses.

These include:

- Supporting Sydney's long term economic and employment growth, through improved transport connectivity to key employment areas across the city
- Alleviating congestion and contributing to improved connectivity, speeds, reliability and safety of the broader road network, which is of particular importance to the contribution and efficiencies of the freight industry
- Generating economic effects and benefits to businesses through reduced operational expenses and opportunity for increased revenues
- Improving business centre viability and regeneration opportunity as a result of new connections
- Improved connections across the network enhancing accessibility for customers and employees and creating greater opportunity for business synergies.

The construction phase of the project would potentially impact a larger number of business centres than what is identified in the operational phase. The potential impacts during construction are generally short term and intermittent in nature and would unlikely have lasting effects of business viability. Once operational, businesses would retain a high ability to absorb and adapt to the change and would likely continue operating as normal.

Management measures

To mitigate and manage the potential impacts of the project during construction and operation, a range of management measures have been identified including ongoing consultation with businesses, measures to maintain business access, visibility and parking and a hotline to find out information and register issues. The intent of these measures would be to maximise communication with businesses and develop feasible and reasonable measures to assist in alleviating adverse effects. Where businesses are affected by property acquisition or lease cessation, a process would be implemented in line with the *Determination of compensation following the acquisition of a business guide* (NSW Government, n.d.)

1.0 INTRODUCTION

This section provides an overview of the Beaches Link and Gore Hill Freeway Connection (the project), including its key features and location. It also outlines the Secretary's environmental assessment requirements addressed in this technical working paper.

1.1 Overview

The Greater Sydney Commission's *Greater Sydney Region Plan – A Metropolis of Three Cities* (Greater Sydney Commission, 2018) proposes a vision of three cities where most residents have convenient and easy access to jobs, education and health facilities and services. In addition to this plan, and to accommodate for Sydney's future growth the NSW Government is implementing the *Future Transport Strategy 2056* (Transport for NSW, 2018), that sets the 40 year vision, directions and outcomes framework for customer mobility in NSW. The Western Harbour Tunnel and Beaches Link program of works is proposed to provide additional road network capacity across Sydney Harbour and Middle Harbour and to improve transport connectivity with Sydney's Northern Beaches. The Western Harbour Tunnel and Beaches Link program of works include:

- The Western Harbour Tunnel and Warringah Freeway Upgrade project which comprises a new tolled motorway tunnel connection across Sydney Harbour, and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to connect to the Beaches Link and Gore Hill Freeway Connection project
- The Beaches Link and Gore Hill Freeway Connection project which comprises a new tolled motorway tunnel connection across Middle Harbour from the Warringah Freeway and the Gore Hill Freeway to Balgowlah and Killarney Heights and including the surface upgrade of the Wakehurst Parkway from Seaforth to Frenchs Forest and upgrade and integration works to connect to the Gore Hill Freeway at Artarmon.

A combined delivery of the Western Harbour Tunnel and Beaches Link program of works would unlock a range of benefits for freight, public transport and private vehicle users. It would support faster travel times for journeys between the Northern Beaches and areas south, west and north-west of Sydney Harbour. Delivering the program of works would also improve the resilience of the motorway network, given that each project provides an alternative to heavily congested existing harbour crossings.

1.2 The project

Transport for NSW is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* to construct and operate the Beaches Link and Gore Hill Freeway Connection project, which would comprise two components:

- Twin tolled motorway tunnels connecting the Warringah Freeway at Cammeray and the Gore Hill Freeway at Artarmon to the Burnt Bridge Creek Deviation at Balgowlah and the Wakehurst Parkway at Killarney Heights, and an upgrade of the Wakehurst Parkway (the Beaches Link)
- Connection and integration works along the existing Gore Hill Freeway and surrounding roads at Artarmon (the Gore Hill Freeway Connection).

A detailed description of these two components is provided in Section 1.4.

1.3 Project location

The project would be located within the North Sydney, Willoughby, Mosman and Northern Beaches local government areas, connecting Cammeray in the south with Killarney Heights, Frenchs Forest and Balgowlah in the north. The project would also connect to both the Gore Hill Freeway and Reserve Road in Artarmon in the west.

Commencing at the Warringah Freeway at Cammeray, the mainline tunnels would pass under Naremburn and Northbridge, then cross Middle Harbour between Northbridge and Seaforth. The mainline tunnels would then split under Seaforth into two ramp tunnels and continue north to the Wakehurst Parkway at Killarney Heights and north-east to Balgowlah, linking directly to the Burnt Bridge Creek Deviation to the south of the existing Kitchener Street bridge.

The mainline tunnels would also have on and off ramps from under Northbridge connecting to the Gore Hill Freeway and Reserve Road east of the existing Lane Cove Tunnel. Surface works would also be carried out at the Gore Hill Freeway in Artarmon, Burnt Bridge Creek Deviation at Balgowlah and along the Wakehurst Parkway between Seaforth and Frenchs Forest to connect the project to the existing arterial and local road networks.

1.4 Key features of the project

Key features of the Beaches Link component of the project are shown in Figure 1-1 and would include:

- Twin mainline tunnels about 5.6 kilometres long and each accommodating three lanes of traffic in each direction, together with entry and exit ramp tunnels to connections at the surface. The crossing of Middle Harbour between Northbridge and Seaforth would involve three lane, twin immersed tube tunnels
- Connection to the stub tunnels constructed at Cammeray as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project
- Twin two lane ramp tunnels:
 - Eastbound and westbound connections between the mainline tunnel under Seaforth and the surface at the Burnt Bridge Creek Deviation, Balgowlah (about 1.2 kilometres in length)
 - Northbound and southbound connections between the mainline tunnel under Seaforth and the surface at the Wakehurst Parkway, Killarney Heights (about 2.8 kilometres in length)
 - Eastbound and westbound connections between the mainline tunnel under Northbridge and the surface at the Gore Hill Freeway and Reserve Road, Artarmon (about 2.1 kilometres in length).
- An access road connection at Balgowlah between the Burnt Bridge Creek Deviation and Sydney Road including the modification of the intersection at Maretimo Street and Sydney Road, Balgowlah
- Upgrade and integration works along the Wakehurst Parkway, at Seaforth, Killarney Heights and Frenchs Forest, through to Frenchs Forest Road East
- New open space and recreation facilities at Balgowlah
- New and upgraded pedestrian and cyclist infrastructure
- Ventilation outlets and motorway facilities at the Warringah Freeway in Cammeray, the Gore Hill Freeway in Artarmon, the Burnt Bridge Creek Deviation in Balgowlah and the Wakehurst Parkway in Killarney Heights
- Operational facilities, including a motorway control centre at the Gore Hill Freeway in Artarmon, and tunnel support facilities at the Gore Hill Freeway in Artarmon and the Wakehurst Parkway in Frenchs Forest
- Other operational infrastructure including groundwater and tunnel drainage management and treatment systems, surface drainage, signage, tolling infrastructure, fire and life safety systems, roadside furniture, lighting, emergency evacuation and emergency smoke extraction infrastructure, Closed Circuit Television (CCTV) and other traffic management systems.

Key features of the Gore Hill Freeway Connection component of the project are shown in Figure 1-2 and would include:

- Upgrade and reconfiguration of the Gore Hill Freeway between the T1 North Shore & Western Line and T9 Northern Line and the Pacific Highway
- Modifications to the Reserve Road and Hampden Road bridges

- Widening of Reserve Road between the Gore Hill Freeway and Dickson Avenue
- Modification of the Dickson Avenue and Reserve Road intersection to allow for the Beaches Link off ramp
- Upgrades to existing roads around the Gore Hill Freeway to integrate the project with the surrounding road network
- Upgrade of the Dickson Avenue and Pacific Highway intersection
- New and upgraded pedestrian and cyclist infrastructure
- Other operational infrastructure, including surface drainage and utility infrastructure, signage and lighting, CCTV and other traffic management systems.

A detailed description of the project is provided in Chapter 5 (Project description) of the environmental impact statement.

Subject to planning approval, construction of the project is planned to commence in 2023, with completion of the main construction works planned for around the end of 2027. The project is planned to commence operation around 2028. Construction works for open space and recreation facilities is planned to be completed around 2028.

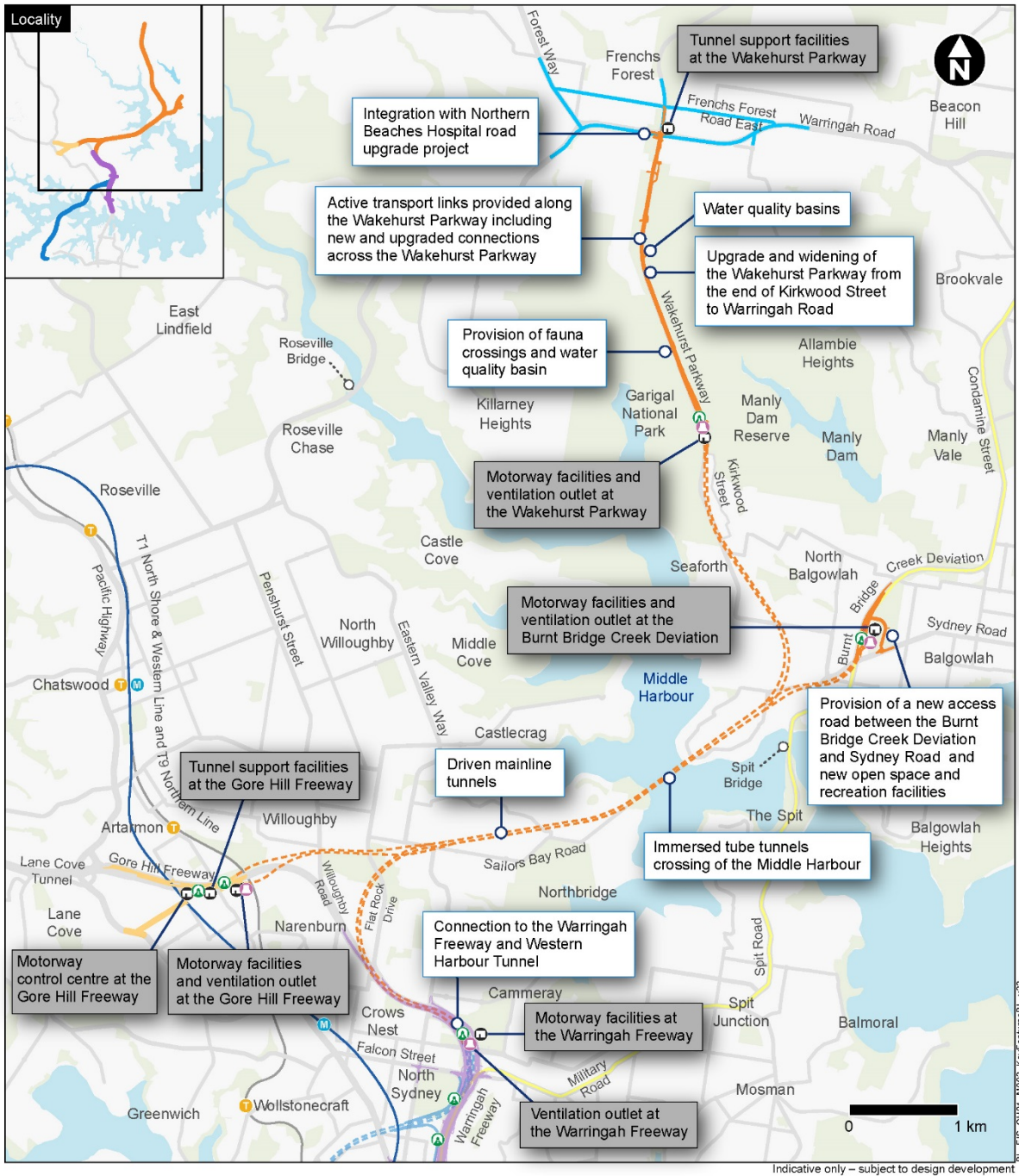


Figure 1-1: Key features of the Beaches Link component of the project

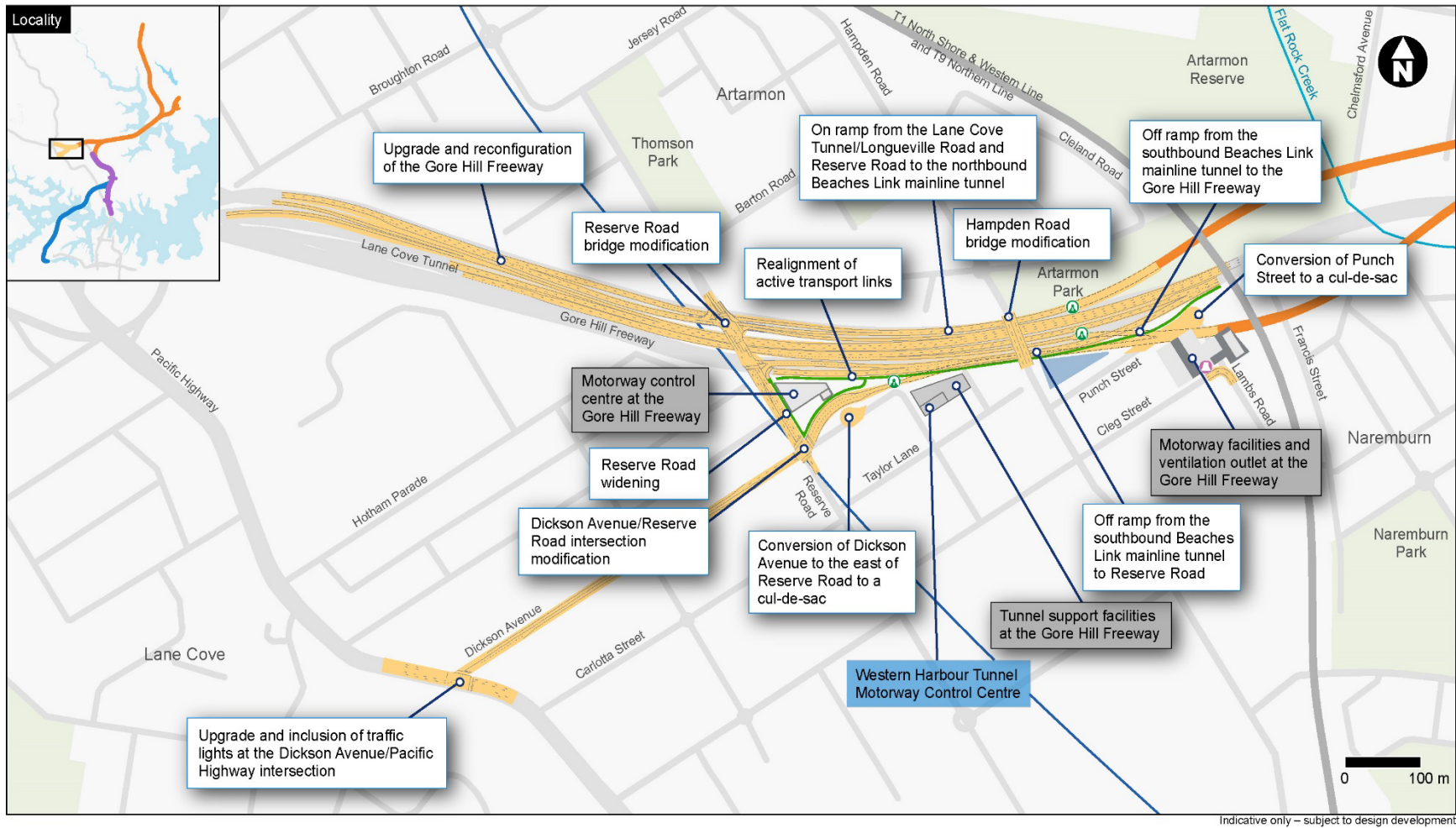


Figure 1-2: Key features of the Gore Hill Freeway component of the project

1.5 Key construction activities

The area required to construct the project is referred to as the construction footprint. Most of the construction footprint would be located underground within the mainline and ramp tunnels. However, surface areas would also be required to support tunnelling activities and to construct the tunnel connections, tunnel portals, surface road upgrades and operational facilities.

Key construction activities would include:

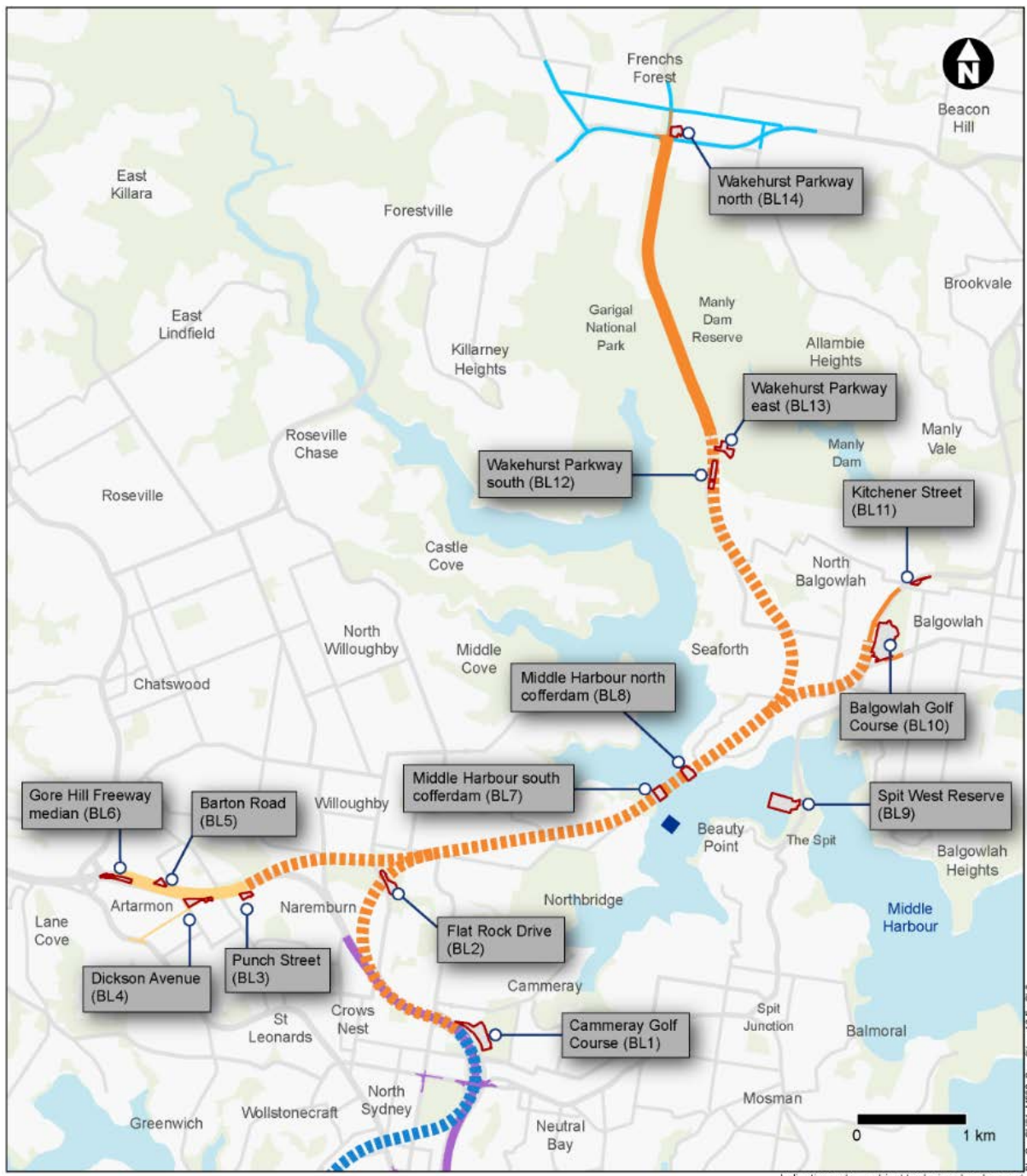
- Early works and site establishment, with typical activities being property acquisition and condition surveys, utilities installation, protection, adjustments and relocations, installation of site fencing, environmental controls (including noise attenuation and erosion and sediment control), traffic management controls, vegetation clearing, earthworks, demolition of structures, building construction support sites including acoustic sheds and associated access decline acoustic enclosures (where required), construction of minor access roads and the provision of property access, temporary relocation of pedestrian and cycle paths and bus stops, temporary relocation of swing moorings and/or provision of alternative facilities (mooring or marina berth) within Middle Harbour
- Construction of the Beaches Link, with typical activities being excavation of tunnel construction access declines, construction of driven tunnels, cut and cover and trough structures, construction of surface upgrade works, construction of cofferdams, dredging and immersed tube tunnel piled support activities in preparation for the installation of immersed tube tunnels, casting and installation of immersed tube tunnels and civil finishing and tunnel fitout
- Construction of operational facilities comprising:
 - A motorway control centre at the Gore Hill Freeway in Artarmon
 - Tunnel support facilities at the Gore Hill Freeway in Artarmon and at the Wakehurst Parkway in Frenchs Forest
 - Motorway facilities and ventilation outlets at the Warringah Freeway in Cammeray (fitout only of the Beaches Link ventilation outlet at the Warringah Freeway (being constructed by the Western Harbour Tunnel and Warringah Freeway Upgrade project), the Gore Hill Freeway in Artarmon, the Burnt Bridge Creek Deviation in Balgowlah and the Wakehurst Parkway in Killarney Heights
 - A wastewater treatment plant at the Gore Hill Freeway in Artarmon
 - Installation of motorway tolling infrastructure
- Staged construction of the Gore Hill Freeway Connection at Artarmon and upgrade and integration works at Balgowlah and along the Wakehurst Parkway with typical activities being earthworks, bridgeworks, construction of retaining walls, stormwater drainage, pavement works and linemarking and the installation of roadside furniture, lighting, signage and noise barriers
- Testing of plant and equipment and commissioning of the project, backfill of access declines, removal of construction support sites, landscaping and rehabilitation of disturbed areas and removal of environmental and traffic controls.

Temporary construction support sites would be required as part of the project (refer to Figure 1-3), and would include tunnelling and tunnel support sites, civil surface sites, cofferdams, mooring sites, wharf and berthing facilities, laydown areas, parking and workforce amenities. Construction support sites would include:

- Cammeray Golf Course (BL1)
- Flat Rock Drive (BL2)
- Punch Street (BL3)
- Dickson Avenue (BL4)
- Barton Road (BL5)
- Gore Hill Freeway median (BL6)

- Middle Harbour south cofferdam (BL7)
- Middle Harbour north cofferdam (BL8)
- Spit West Reserve (BL9)
- Balgowlah Golf Course (BL10)
- Kitchener Street (BL11)
- Wakehurst Parkway south (BL12)
- Wakehurst Parkway east (BL13)
- Wakehurst Parkway north (BL14).

A detailed description of construction works for the project is provided in Chapter 6 (Construction work) of the environmental impact statement.



Indicative only – subject to design development

Legend

Construction features

- Beaches Link
- Gore Hill Freeway Connection
- Construction support site
- Temporary mooring facility for completed immersed tube tunnel units

Connecting projects

- Western Harbour Tunnel
- Warringah Freeway Upgrade
- Northern Beaches Hospital road upgrade project (completed 2020)

Figure 1-3: Overview of the construction support sites

1.6 Purpose of this report

This report has been prepared to support the environmental impact statement for the project and to address the Secretary's environmental assessment requirements (SEAR) of the Department of Planning, Industry and Environment.

This report identifies and assesses the potential business impacts that may result from the project during construction and operation. This report considers the potential direct, indirect and cumulative impacts on businesses, including evaluating the significance of impacts and required mitigation strategies to minimise adverse impacts and maximise benefits of the project. In doing so, it responds directly to the Secretary's environmental assessment requirements as outlined in Section 1.7. To inform the change to the existing environment, the report relies on information provided by Transport for NSW and various technical specialist reports.

This report is one of several technical documents that form part of the Beaches Link and Gore Hill Freeway connection. The Technical working paper: Socio-economic assessment (Jacobs, 2020) can be referred to for the assessment of the direct and indirect (positive and negative) impacts on the social and economic environment, including residents, social infrastructure users, motorists and the economy.

1.7 Secretary's environmental assessment requirements

The Secretary's environmental assessment requirements relating to this assessment and where these requirements are addressed in this report are outlined in Table 1-1.

Table 1-1: Secretary's environmental assessment requirements – Business impacts

Desired performance outcome	Requirement	Where addressed
Consultation The project is developed with meaningful and effective engagement during project design and delivery.	1. The project must be informed by consultation, including with relevant local, State and Commonwealth government agencies (including the Harbour Master where disturbance of seabeds, shipping channel closures or marine movement of materials/spoil are proposed), infrastructure and service providers, special interest groups (including Local Aboriginal Land Councils, Aboriginal stakeholders, and pedestrian and bicycle user groups), affected landowners, businesses and the community.	Section 2.4 – Business survey approach Attachment A – Business survey Attachment B – Business survey report Chapter 7 (Stakeholder and community engagement) of the environmental impact statement
Transport and traffic	2. The Proponent must assess and model the operational transport impacts of the project including but not necessarily limited to: (h) property and business access and on street parking	Section 6.0 assesses the impact to businesses from changes to access and on street parking during operation. Technical working paper: Traffic and transport (Jacobs, 2020)
Socio-economic, land use and property The project minimises impacts to property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	2. The Proponent must assess impacts from construction and operation on potentially affected properties, businesses, recreational users and land and water users (including from cumulative and extended construction time frames and construction fatigue), property acquisitions/adjustments, future land uses, access, relevant statutory rights, and community severance and barrier impacts resulting from the project.	Section 5.0 – Construction impacts Section 6.0 – Operation impacts Section 5.3 – Maritime impacts Section 7.0 – Cumulative impacts Chapter 20 (Land use and property) of the environmental impact statement Technical Working Paper: Socio-Economic Assessment (Jacobs, 2020)

1.8 Structure of this report

The remainder of this report is structured as follows:

- **Section 2:** Describes the methods of assessment employed for the business impact assessment
- **Section 3:** Describes the existing business environment within the study area including identifying business types, characteristics, sensitivities and dependencies
- **Section 4:** Identifies potential issues and impacts based on business survey responses
- **Section 5:** Evaluates the potential impacts to business and business centres resulting from construction of the project
- **Section 6:** Evaluates the potential impacts to business and industry resulting from operation of the project
- **Section 7:** Evaluates the potential cumulative impacts to business and industry
- **Section 8:** Identifies management and mitigation measures to reduce the negative or enhance the positive effects of the project
- **Section 9:** References
- **Attachment A:** Business survey
- **Attachment B:** Business survey report.

2.0 ASSESSMENT METHODOLOGY

2.1 Methodology overview

This business impact assessment methodology has been developed according to the SEARs and relevant components of the *Socio-economic Assessment Practice Note EIA-N05* (Transport for NSW, 2020).

The business impact assessment is informed by the outcomes of the various technical working papers that have been prepared for the project environmental impact statement. This includes Technical working paper: Air quality (ERM, 2020), Technical working paper: Traffic and transport (Jacobs, 2020), Technical working paper: Noise and vibration (Renzo Tonin, 2020), Technical working paper: Urban design, landscape character and visual impact assessment (Arup, 2020) and Technical working paper: Socio-economic assessment (Jacobs, 2020). In consideration of the results of the technical working papers and the outcomes of consultation with businesses, a comprehensive assessment of construction and operation impacts on businesses has been prepared in accordance with the Practice Note.

In preparing the business impact assessment, the following process was implemented:

1. Review of assessments for similar projects to scope issues and identify the potential scale and magnitude of impacts
2. Definition of the study area (refer to Section 2.2)
3. Development of the existing profile of business and industry characteristics within the study area and the geographic and aesthetic environment present
4. Review of strategic planning and policy documents to determine the existing and future proposed characteristics of the study area
5. Survey of businesses and review of characteristics, values and sensitivities raised during these business surveys
6. Identification of likely changes/impacts that may occur as a result of the project, including specific effects on business and business centres
7. Assessment of the significance of business impacts during construction and operation
8. Assessment of cumulative business impacts
9. Identification of mitigation measures, plans and strategies for monitoring and managing the impacts during both construction and operation.

2.2 Defining the study area

The study area for this assessment includes those businesses and local business centres that may experience changes to existing conditions due to the location of the project, construction activities and changes in movement patterns for business owners, workers and customers. The study area is shown in Figure 2-1 and Figure 2-2. It comprises the Australian Bureau of Statistics (ABS) Statistical Areas Level 2 (SA2) geographies that are affected by or are located near the project and the section of Middle Harbour adjacent to the project alignment.

For the purposes of this assessment, the study area has been divided into two 'precincts' located east and west of Middle Harbour. While Middle Harbour does not fall within a specific precinct, it is still considered as part of the study area. Although the whole study area was considered, areas near (within 400 metres) of a temporary construction support site are more likely to experience direct impacts from construction. The study area is the same for the Technical working paper: Socio-economic assessment (Jacobs, 2020). Broader effects on businesses outside the study area are also considered in the impact assessment (see Section 5.0 and Section 6.0).

The SA2s that are affected by, or were near the project footprint defined by the study area include:

- Eastern Precinct (see Figure 2-1):
 - Balgowlah-Clontarf-Seaforth
 - Manly Vale-Allambie Heights
 - Forestville-Killarney Heights
 - Frenchs Forest-Belrose.
- Western Precinct (see Figure 2-2):
 - Cremorne-Cammeray
 - St Leonards-Naremburn
 - Chatswood (East)-Artarmon
 - Willoughby-Castle Cove-Northbridge
 - Mosman.

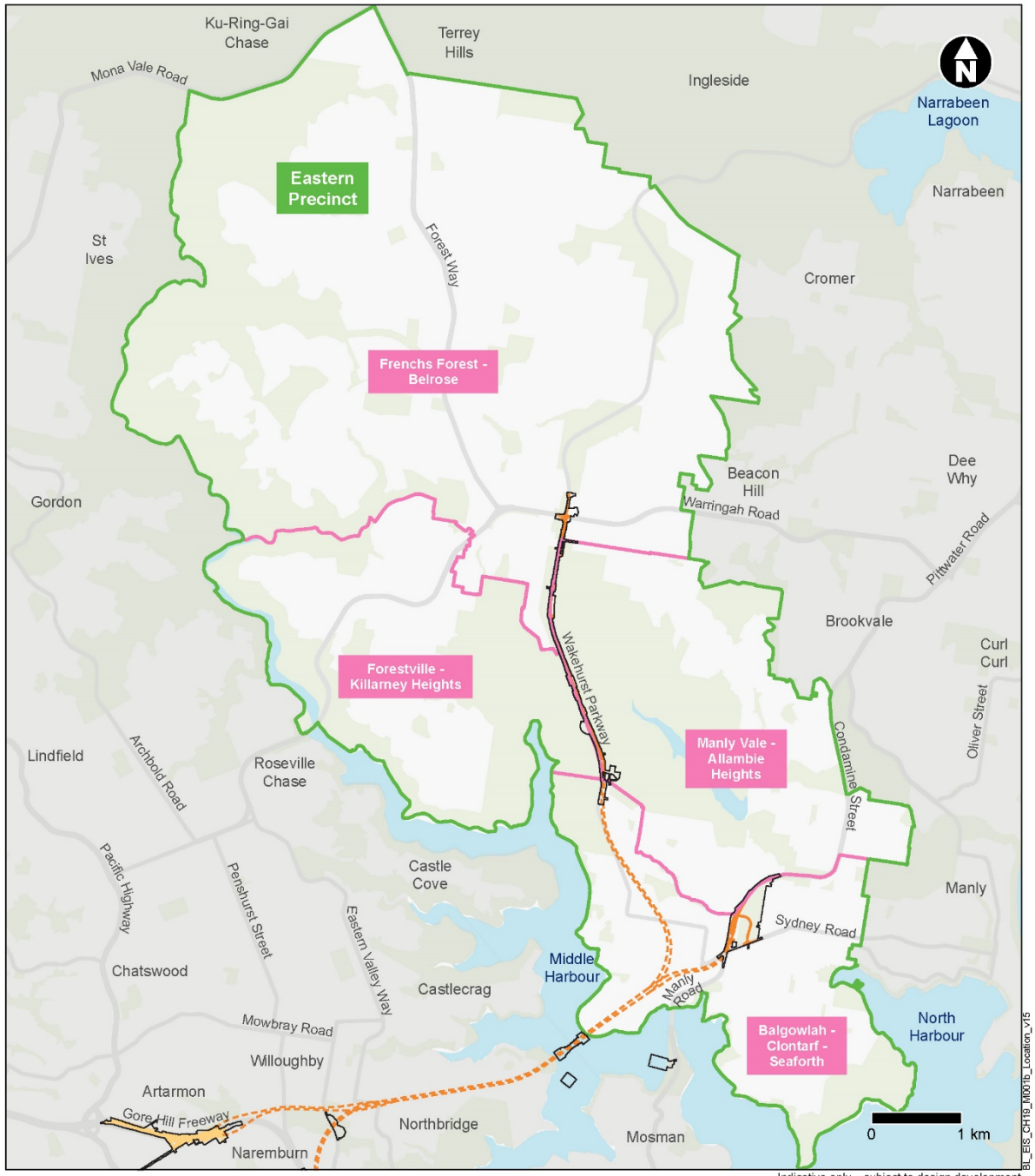
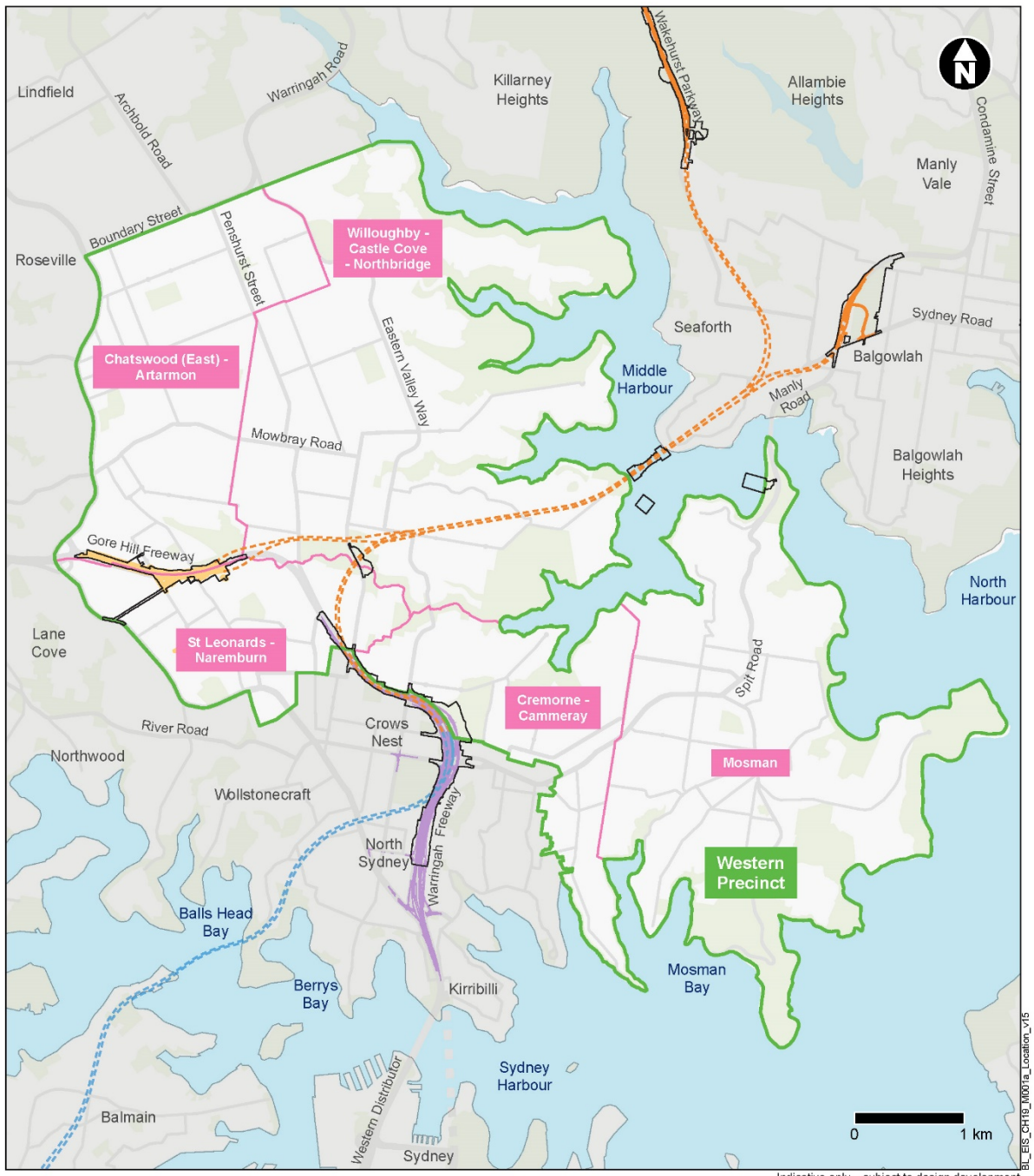


Figure 2-1: Eastern Precinct study area extent and SA2s
 Source: Jacobs (2020)



Indicative only – subject to design development

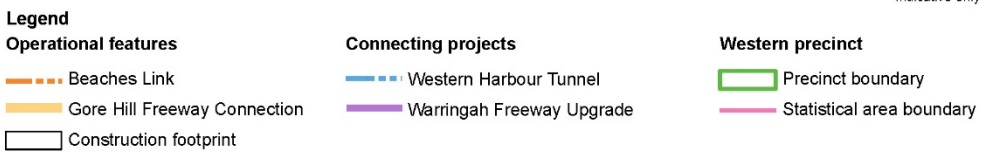


Figure 2-2: Western Precinct study area extent and SA2s
 Source: Jacobs (2020)

The study area extent has been defined to capture the business centres most likely to be affected by the project. It is acknowledged that there may be potential indirect secondary impacts experienced by business centres outside the study area. However, these centres are not the focus of this assessment. Some potential benefits and impacts would also be experienced by businesses in the wider region. As such, this assessment considered potential impacts on the surrounding local government areas and the Greater Sydney region at a broader level, where relevant.

When considering potential direct construction and operational effects, the scoping of issues determined that businesses within near the temporary construction support sites or operational intersections were more likely to be exposed to potential impacts. In most instances, direct impacts were generally confined to within a 400 metre radius of construction support sites. Scoping identified key potential impacts on businesses, including employee and customer access, passing trade, servicing and delivery, character and amenity, employee productivity and communication, business visibility and demand for services. The study area characteristics section of this report identifies the local centres located near temporary construction support sites and surface works or that may be more susceptible to the direct or indirect effects of construction and operation.

2.3 Data sources used to inform the study

The preparation of this report has been informed primarily by project design information and other technical specialist reports prepared for the environmental impact statement. Additional data in this report has been derived from:

- ABS 2016 Census
- ABS 8165.0 Counts of Australian Businesses 2019
- Outcomes of business surveys (Attachment B of this report)
- Geographic information system (GIS) information on land zoning as informed by relevant local environmental plans.

2.4 Business survey approach

A business survey was conducted to gain a better understanding of the main issues, perceptions and concerns of businesses regarding the project’s construction and operation. Only publicly available information regarding the project was provided to the survey respondents to inform their responses. This included the reference design and preliminary planning information. The business surveys were conducted in local centres and other locations that may be more susceptible to direct or indirect effects of construction and/or operation. The surveys were conducted over a three-week period in November 2017. Businesses were approached at random with over 218 businesses participating in the survey. Further engagement with previously consulted businesses and additional maritime business stakeholders will be carried out during the environmental impact assessment exhibition period.

Businesses were surveyed at nine locations (see Figure 2-3) and the number of surveys carried out in each location is outlined in Table 2-1.

Table 2-1: Number of business surveys conducted

Survey location	Number surveyed
Eastern Precinct	
Austlink Business Park	15
Balgowlah	26
Frenchs Forest	18
Manly Vale	26
Warringah Mall	24
Seaforth Village/Spit Bridge	28
Western Precinct	

Survey location	Number surveyed
Artarmon	33
Military Road	30
Spit Junction	18
Total	218

The number of surveys collected in each location varied slightly depending on the location's size and the number of businesses present. Every effort was made to survey a range of business types across the study area. North Sydney businesses were surveyed as part of the Western Harbour Tunnel and Warringah Freeway Upgrade EIS project.

The business surveys included a wide variety of business types, including retail shops, industrial premises, real estate agencies, cafes, pubs, restaurants, auto service centres and professional service businesses.

All information gathered as part of the business surveys was collated into a database. Findings were analysed and summarised in a survey report (refer to Attachment B of this report).

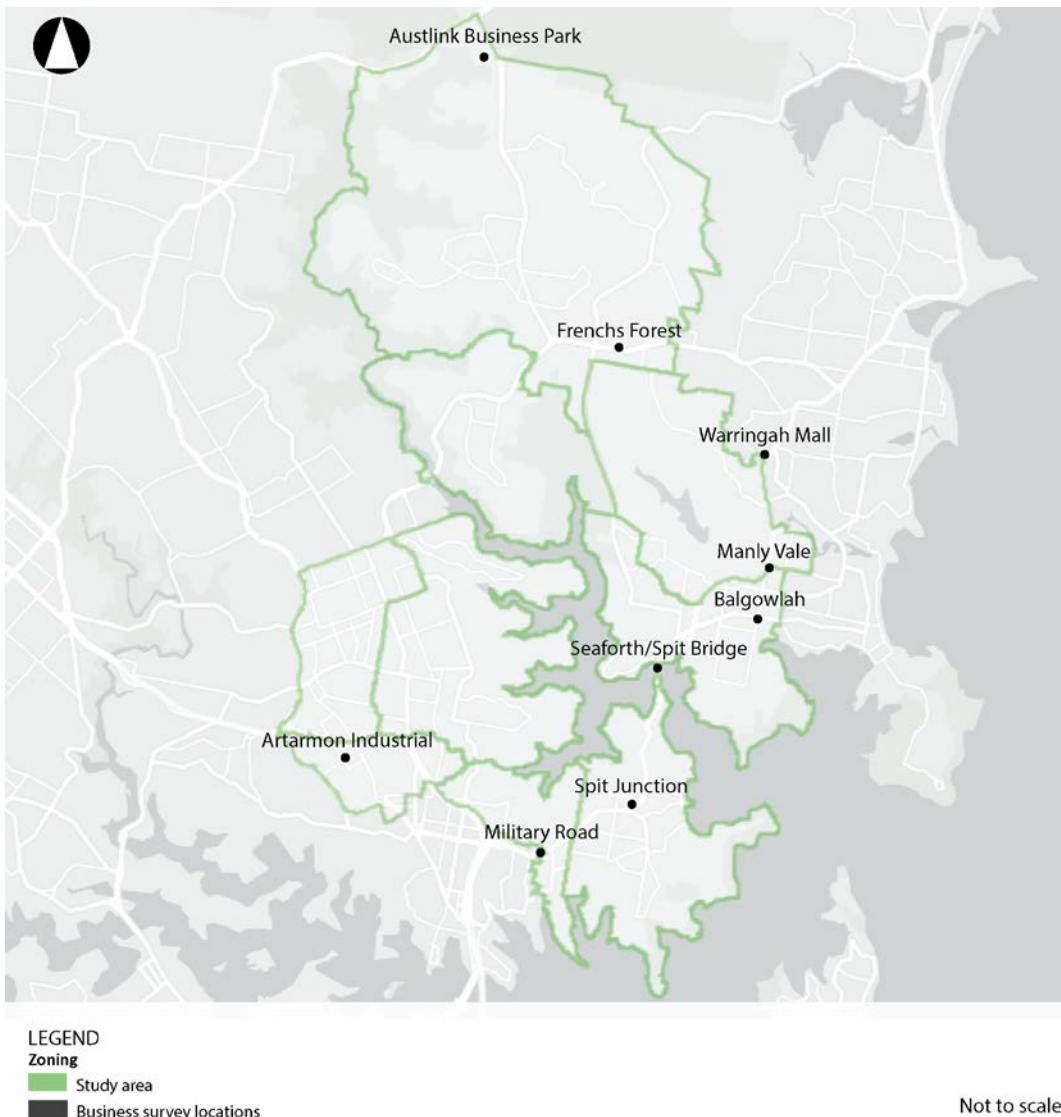


Figure 2-3: Business survey locations

2.5 Evaluation methodology

The impact assessment presented in this report identifies and evaluates potential changes to the business environment and industry condition arising from construction and/or operation of the project. This includes the assessment of potential direct and indirect (positive or negative) impacts as well as consideration of potential cumulative impacts. The evaluation methodology used for this assessment has been developed by Transport for NSW to align with the *Socio-economic Assessment Practice Note EIA-N05 (Transport for NSW, 2020)*. The assessment methodology is consistent with that applied in the Technical working paper: Socio-economic.

Potential positive and negative social and economic impacts and opportunities are discussed in the report, however, the methodology used requires that only negative impacts are assigned a level of significance. The level of significance of potential negative impacts is assessed by considering the sensitivity of the receptor and the magnitude of the proposed works. A grading matrix is used to identify the level of significance of the negative impact. The assessment of impacts is based on the information available at the time, research carried out to prepare this Business Impact Assessment, other technical studies, and review of consultation outcomes carried out by Transport for NSW.

2.5.1 Sensitivity

Sensitivity refers to the qualities of the receiver which influence its vulnerability to change and capacity to adapt. In this context, the receiver may be communities, businesses, business clusters, social infrastructure, residences, etc.

Qualities that contribute to the level of sensitivity of a receiver may include, but are not limited to, existing aspects of the social and economic environment such as:

- Amenity, including noise levels, visual quality, air quality, etc
- Demographic composition and patterns
- Economic activity and types of industry and/or businesses present
- Connectivity and access
- Property and land use types and known future changes (eg re-zoning)
- Community values
- Community cohesion
- Level of community concern.

The levels of sensitivity are set out in Table 2-2 below. Professional judgement has been used to determine the level of sensitivity.

Table 2-2: Levels of sensitivity

Sensitivity	Description
Negligible	No vulnerability and able to absorb or adapt to change
Low	Minimal areas of vulnerabilities and a high ability to absorb or adapt to change
Moderate	A number of vulnerabilities but retains some ability to absorb or adapt to change
High	Multiple vulnerabilities and/or very little capacity to absorb or adapt to change

Source: Socio-economic Assessment Practice Note EIA-N05, Transport for NSW (2020)

2.5.2 Magnitude

Magnitude refers to the scale, duration, intensity and scope of the proposal, including how it would be constructed and operated. Qualities of magnitude include, but are not limited to:

- Scale and intensity (the types of works, operational uses and built form, etc)
- Spatial extent (eg the geographical area affected which may be local, suburb, regional, State, international or to community groups etc)
- Duration (short, medium or long term, hours of works, frequency, reversibility, etc).

The levels of magnitude are set out in Table 2-3 below. Professional judgement has been used to determine the level of magnitude.

Table 2-3: Levels of magnitude

Magnitude	Example
Negligible	No discernible positive or negative changes caused by the impact. Change from the baseline remains within the range commonly experienced by receivers.
Low	A discernible change from baseline conditions. Tendency is that the impact is to a small proportion of receivers over a limited geographical area and mainly near the project. The impact may be short term, or some impacts may extend over the life of the project.
Moderate	A clearly noticeable difference from baseline conditions. Tendency is that the impact is to a small to large proportion of receivers and may be over an area beyond the vicinity of the project. Duration may be short to medium term, or some impacts may extend over the life of the project.
High	A change that dominates over existing baseline conditions. The change is widespread or persists over many years or is effectively permanent.

Source: Socio-economic Assessment Practice Note EIA-N05, Transport for NSW (2020)

2.5.3 Assessing level of significance

Potential positive and negative social and economic impacts and opportunities are discussed in this report, however, in accordance with the practice note, only negative impacts are assigned a level of significance. The level of significance is considered for construction impacts, operational impacts and cumulative impacts.

Issue appraisal tables have been included in the construction and operation sections of the report. These tables assess the potential negative impacts that may arise as a result of the project and have the capacity to affect business revenue and viability. Positive impacts and opportunities are not assessed in the issue appraisal table and are not assigned a level of significance under this methodology.

The level of significance for potential negative impacts are considered using the grading matrix shown in Table 2-4 below. The combination of sensitivity and magnitude determines the level of significance when compared to the baseline condition.

Table 2-4: Assessing the level of significance

	Magnitude				
		High	Moderate	Low	Negligible
Sensitivity	High	High	High-moderate	Moderate	Negligible
	Moderate	High-moderate	Moderate	Moderate-low	Negligible
	Low	Moderate	Moderate-low	Low	Negligible
	Negligible	Negligible	Negligible	Negligible	Negligible

Source: Socio-economic Assessment Practice Note EIA-N05, Transport for NSW (2020)

Business centre specific evaluation

The evaluation component of the construction and operation section appraises both potential positive and negative impacts and considers the overall effect of the project on the centre specific business environment. The conclusion states the result of the full evaluation.

3.0 STUDY AREA CHARACTERISTICS

This section provides an overview of the study area business environment. The information in this section has been informed by the Australian Census of Housing and Population (ABS, 2016), Australian Statistics Business Indicators (ABS, 2016) and the Bureau of Transport Statistics (NSW Government, 2017). Where relevant, the Greater Sydney Metropolitan area was used as a comparison to enable the study area to be placed into perspective.

3.1 Business centre profiles

A hierarchy of centres has been applied to the study area. The hierarchy is based largely on the work in the *Greater Sydney Region Plan* by the Greater Sydney Commission (GSC) which identified that some centres make a substantially greater contribution to the economy of Greater Sydney than others. The GSC has defined a hierarchy which includes three types of centres: metropolitan city centres, strategic centres and local centres. These centres vary in terms of scale and contribution to Greater Sydney's job growth and productivity as well as service provision to local communities. According to the GSC's definitions, there are no metropolitan city centres in the study area. Chatswood, St Leonards and Frenchs Forest are strategic centres located in the study area and there are several local centres.

The GCS has also classified industrial areas. Industrial land can include a range of activities from major freight and logistics and heavy manufacturing to light industry, urban services and new economy or creative uses. Some industrial areas include businesses that support surrounding residential populations and commercial communities. This study includes industrial centres with businesses that service other businesses and populations.

The hierarchy of business centres relevant to the study area is defined in Table 3-1. Businesses that operate outside of business and industrial zones have not been identified in the study area characteristics. However, they have been considered in the assessment of impacts (refer to Section 5.0 and Section 6.0).

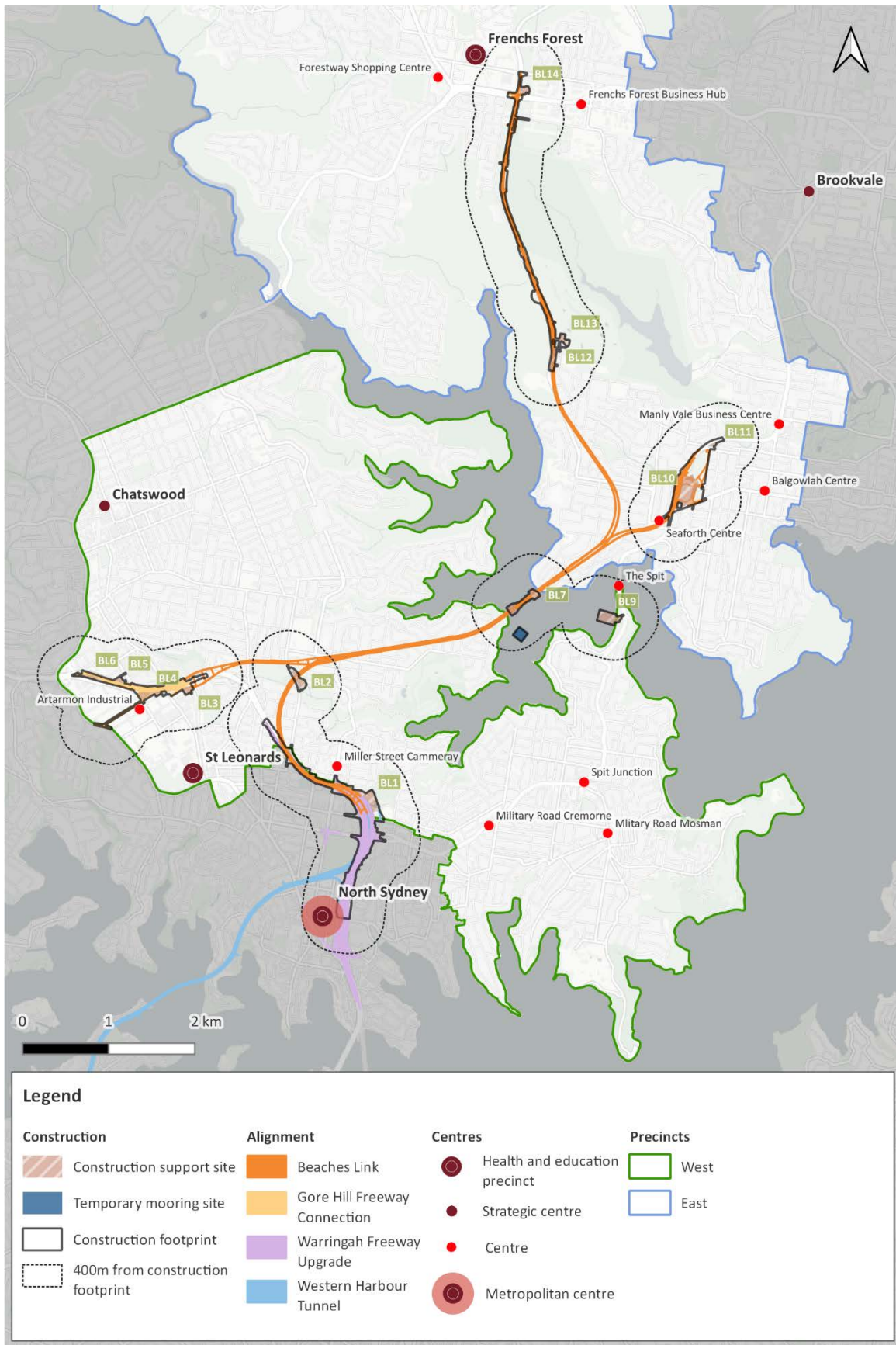
Table 3-1: Business centre hierarchy

Hierarchy	Description
Strategic centres	<p>Strategic centres are defined when the mix of activities, size and location enable the community to access a wide range of goods, services and jobs. Strategic centres generally include:</p> <ul style="list-style-type: none"> • High levels of private sector investment • Flexibility, so that the private sector can choose where and when to invest • Co-location of a wide mix of land uses, including residential • High levels of amenity and walkability • Areas identified for commercial uses, and where appropriate, commercial cores. <p>The strategic centres of Chatswood, St Leonards and Frenchs Forest are located in the study area. The Metropolitan Cluster (Sydney CBD and North Sydney) is located near the study area. Impacts on North Sydney are not directly anticipated, however indirect impacts may be experienced (see Section 6.3).</p>
Local centres	<p>Local centres are the focal point of neighbourhoods and meet residents' needs for shopping, social interaction, cultural and creative expression. They vary in size from a cluster of local shops to large-box format retail centres. They each perform a variety of functions, but all form an important part of local community life as social connectors.</p>

Hierarchy	Description
Industrial centres	<p>Industrial centres include a wide range of business that service other business and populations. Typically includes warehousing, freight and logistics, construction and building supplies, and domestic storage. May also include:</p> <ul style="list-style-type: none"> • New economy uses (eg artisan industries such as furniture making, upholstery, niche manufacturing) and creative uses • Industrial and urban services wholesale such as low to medium scale buildings supplying industrial and urban services businesses with hardware, building materials and related resources.
Working waterfront	<p>The working waterfront includes business centres located on a waterfront. Businesses in the working waterfront are most commonly marine related, including dry storage, slipways, harbour cruises, government agency (Transport for NSW), public marina berths as well as supportive food services such as cafes.</p>

Source: HillPDA, adapted from Greater Sydney Commission, 2018

Business centres located within 400 metres of a construction site or construction footprint are most likely to experience direct impacts arising from the project. The business centres in the study area and their proximity to project construction sites is shown in Figure 3-1.



Note: Apart from the motorway facilities, cut and cover structures, trough structures and tunnelling works in Cammeray, the construction footprint shown on the Warringah Freeway would consist of low impact activities such as traffic control and management, line marking and staged surface roadworks tie in works, and utility and cable works required to connect to the Western Harbour Tunnel and Warringah Freeway Upgrade project and other local roads.

Figure 3-1: Study area business centres

Centres in the study area have been separated into two precincts:

- Eastern Precinct
 - Frenchs Forest Business Hub
 - Forestway Shopping Centre
 - Seaforth Centre
 - Balgowlah Centre
 - Manly Vale Business Centre
- Western Precinct
 - Artarmon Industrial
 - Miller Street Cammeray
 - Military Road Cremorne
 - Military Road Mosman
 - Spit Junction
 - The Spit.

It should be noted that the Artarmon Industrial Centre is within the study area for the Western Harbour Tunnel and Warringah Freeway Upgrade project as well as the Beaches Link and Gore Hill Freeway Connection project. The Western Harbour Tunnel and Warringah Freeway Upgrade project is subject to a separate environmental impact assessment. The study area also contains a wide variety of businesses located outside of a business centre.

The following section provides an overview of the characteristics of the above business centres.

3.1.1 Eastern Precinct

The Eastern Precinct includes the SA2s of Frenchs Forest-Belrose, Forestville-Killarney Heights, Manly Vale-Allambie Heights and Balgowlah-Clontarf-Seaforth, within the Northern Beaches local government areas. The precinct contains several commercial and industrial areas.

The following sections provide an overview of centres near to the construction footprint containing business and industrial zones. Businesses that operate outside of business and industrial zones have not been overviewed in the study area characteristics but have been considered in the assessment of impacts (refer to Section 5.0 and Section 6.0).

3.1.1.1 Frenchs Forest Business Hub

Figure 3-2 shows Frenchs Forest Business Hub. Table 3-2 describes the businesses in the area.



Figure 3-2: Frenchs Forest Business Hub

Source: HillPDA (2020)

Table 3-2: Frenchs Forest Business Hub

Area	Area (hectares)	Function/observations
B7 Business Park zone	63	<ul style="list-style-type: none"> Frenchs Forest Business Hub is located on both sides of Warringah Road at Frenchs Forest. There is a diverse range of uses in the cluster, which all make use of the large floorplates available. Commercial businesses in the area include corporate offices, gym/fitness centres, sports facilities, storage facilities/warehouses, medical laboratories and distribution centres. There are several bulky goods retailers such as homeware and furniture stores. Many businesses in the cluster, such as commercial offices and distribution centres, would not receive customers visiting their premises. Those that do are destination services as many customers would drive specifically to the businesses. The gym/fitness centres cater mostly to employees working within the cluster.
Centre surrounds		<ul style="list-style-type: none"> Immediately to the west of the centre is the Northern Beaches Hospital, a 488-bed facility. To the west of the hospital is a public high school There are also two small neighbourhood centres that offer local convenience services The high school caters to students in Frenchs Forest and the surrounding suburbs.

3.1.1.2 Forestway Shopping Centre

Figure 3-3 shows Forestway Shopping Centre and surrounds. Table 3-3 describes the businesses present.



Figure 3-3: Forestway Shopping Centre

Source: HillPDA (2020)

Table 3-3: Forestway Shopping Centre

Area	Area (hectares)	Function/observations
B2 Local Centre zone	2	<ul style="list-style-type: none"> Forestway Shopping Centre is a large shopping centre consisting of several retail and commercial businesses. Within the shopping centre, there are clothing and homeware retail businesses as well as a large supermarket and food retailers. There are several cafes and restaurants. The centre also includes commercial businesses such as banks, travel agents, a gym/fitness centre and personal services businesses. There is also a carwash located next to the main building. The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Centre surrounds		<ul style="list-style-type: none"> To the east of the centre is the Northern Beaches Hospital, and a public high school. The high school caters to students in Frenchs Forest and the surrounding suburbs. The hospital caters to patients from the Northern Beaches.

3.1.1.3 Manly Vale Business Centre

Figure 3-4 shows the Manly Vale Business Centre. Table 3-4 describes the businesses in the area.



Figure 3-4: Manly Vale Business Centre

Source: HillPDA (2020)

Table 3-4: Manly Vale Business Centre

Area	Area (hectares)	Function/observations
B2 Local Centre	4	<ul style="list-style-type: none"> The Manly Vale cluster zoned B2 Local Centre extends from the northern end of the Burnt Bridge Creek Deviation and includes a range of retail and commercial businesses Retail businesses include cafes, takeaways and restaurants, clothing stores, a pharmacy and homewares stores. Commercial businesses include interior designers, professional services businesses, personal services businesses, a doctor's surgery and a cluster of surfboard manufacturers Some businesses, such as the pharmacy, doctor's surgery and cafes, serve a neighbourhood catchment while those such as interior designers and surfboard manufacturers are destination services as many customers would drive specifically to the businesses.
B6 Enterprise Corridor	11.7	<ul style="list-style-type: none"> The cluster zoned B6 Enterprise Corridor contains a mix of commercial and retail businesses largely characterised by having large floorplates Retail businesses include supermarkets, furniture stores, wholesalers, hardware stores, construction supply businesses and specialist retailers such as a Jet Ski showroom. Also present are several cafes servicing mainly employees of businesses in the area Commercial businesses include automotive rental, repair and mechanical services as well as gym/fitness centres. Balgowlah Business Park is located on Roseberry Street and contains a range of different business types Many businesses in the area are destination services as customers would drive specifically to the business. Many commercial businesses

Area	Area (hectares)	Function/observations
		in the business park service customers state and nation-wide and operate largely online. Businesses would have some reliance on passing trade.
Centre surrounds		<ul style="list-style-type: none"> A public primary school is located to the west of the centre on Sunshine Street. The school caters to a neighbourhood catchment An industrial estate is north-east of the centre providing business park type services.

3.1.1.4 Balgowlah Centre

Figure 3-5 shows the Balgowlah Centre. Table 3-5 describes the businesses in the area.



Figure 3-5: Balgowlah Centre

Source: HillPDA (2020)

Table 3-5: Balgowlah Centre

Area	Area (hectares)	Function/observations
B2 Local Centre	5	<ul style="list-style-type: none"> Balgowlah Centre consists of Stockland Balgowlah, a large shopping centre and several retail and commercial businesses on Sydney Road between Boyle Street and Woodland Street Within Stockland Balgowlah there are clothing, homeware and retail businesses as well as a large supermarket and other food retailers. The centre includes several commercial businesses such as travel agents, a gym/fitness centre and personal services businesses. There is also a carwash located in the underground carpark. Along Sydney

Area	Area (hectares)	Function/observations
		<p>Road, there are several cafes and restaurants as well as some commercial offices and retail stores</p> <ul style="list-style-type: none"> The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
B1 Neighbourhood Centre	0.6	<ul style="list-style-type: none"> Several commercial businesses are located along Sydney Road near Wanganella Street. These contain uses such as gyms, vet clinics, real estate agents, childcare services and allied health services The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade
Centre surrounds		<ul style="list-style-type: none"> Two schools are located to the west of the centre, a boys only secondary college on Maretimo Street and a public primary school on Kembridge Avenue. Four childcare centres are located west of Bangaroo Street The primary school and childcare centres cater to a neighbourhood catchment, while the boys only secondary college caters to students from Balgowlah and the surrounding suburbs. Commercial businesses on Sydney Road cater to both the local neighbourhood and residents of neighbouring suburbs such as Manly, Manly Vale and Seaforth.

3.1.1.5 Seaforth Centre

Figure 3-6 shows Seaforth and surrounds. Table 3-6 describes the businesses present.



Figure 3-6: Seaforth Centre

Source: HillPDA (2020)

Table 3-6: Seaforth Centre

Area	Area (hectares)	Function/observations
B2 Local Centre	3.4	<ul style="list-style-type: none"> • B2 Local Centre zoned land at Seaforth is comprised of a wide variety of businesses spanning retail and commercial uses • Retail businesses include several cafes and restaurants. Commercial businesses include real estate agents, a veterinary hospital and personal services businesses. There are also a number of 'neighbourhood shops' such as a post office. Bupa aged care facility and Balgowlah RSL Club are also in this cluster • The cluster caters primarily to a neighbourhood catchment and would have some reliance on passing trade • There are two schools near the construction site and footprint.
B1 Neighbourhood Centre	0.3	<ul style="list-style-type: none"> • A cluster of commercial businesses are located along Sydney Road at the junction of Dudley Street and Coral Street. These contain uses such as an art gallery and specialised retail.

3.1.2 Western Precinct

The Western Precinct includes the SA2s of Cremorne-Cammeray, St Leonards-Naremburn, Chatswood (East)-Artarmon, Willoughby-Castle Cove-Northbridge and Mosman, all within the North Sydney, Willoughby and Mosman local government areas.

The following sections provide an overview of centres near to the construction footprint containing business and industrial zones. Businesses that operate outside of business and industrial zones have not been overviewed in the study area characteristics but have been considered in the assessment of impacts (see Section 5.0 and Section 6.0).

3.1.2.1 Artarmon Industrial

Figure 3-7 shows the Artarmon Industrial area. Table 3-7 describes the businesses in the area.

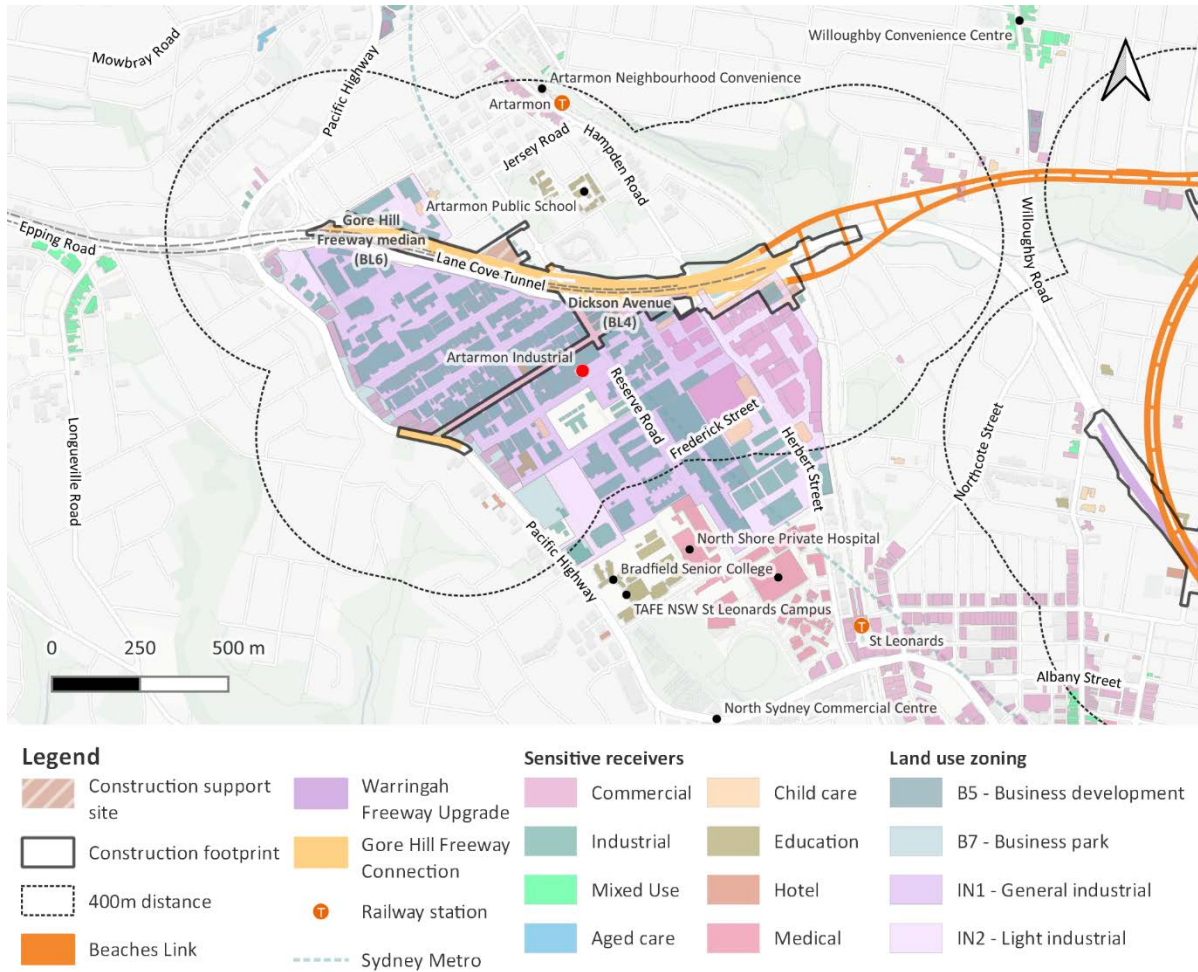


Figure 3-7: Artarmon Industrial

Source: HillPDA (2020)

Table 3-7: Artarmon Industrial

Area	Area (hectares)	Function/observations
IN1 General Industrial	55.4	<ul style="list-style-type: none"> The area of Artarmon zoned IN1 General Industrial is characterised by many automotive and film-related businesses as well as construction-related commercial businesses Automotive businesses include vehicle sales, rental and repair. Film-related businesses include SBS studios and film equipment rental and sales. Construction-related businesses include equipment sale and hire as well as the sale of construction materials such as concrete Businesses located in the cluster are destination stores as many customers would drive specifically to the businesses.
IN2 Light Industrial	21.1	<ul style="list-style-type: none"> Land in Artarmon zoned IN2 is located in two distinct areas to the east and south of Artarmon. The areas include businesses in the automotive and film industry as outlined above but also present are other businesses which require large floorplates Businesses in the area include gym and fitness facilities, warehouse/storage facilities and commercial businesses which require warehouses. There are also large hardware and homeware stores, a waste facility and a major postal facility Businesses in the area service both a neighbourhood and wider catchment and are unlikely to be dependent on passing trade. These businesses are

Area	Area (hectares)	Function/observations
		destination services as many customers would drive specifically to the businesses.
B7 Business Park	3.05	<ul style="list-style-type: none"> The area zoned B7 Business Park is located on the eastern side of the Pacific Highway between Campbell Street and Allison Avenue The area comprises a mix of automotive repair, rental and sales businesses, warehousing storage facilities and retailers requiring large floorplates which is very similar to the areas zoned IN1 and IN2. There is also a commercial office building at the northern end of the cluster which differentiates the B7 zoning from the areas zoned industrial.
Centre surrounds		<ul style="list-style-type: none"> There are several industrial businesses near the junction of Lane Cove Road and the Pacific Highway. These are businesses located on large floorplates such as a customer support centres; printing business and audio visual equipment hire service. Two clusters of commercial businesses, comprising neighbourhood shops such as cafes, restaurants and convenience stores, are located on Hampden Road and Artarmon Road. Royal North Shore Hospital is near the centre.

3.1.2.2 Miller Street Cammeray

Figure 3-8 shows the Miller Street Cammeray and surrounds. Table 3-8 describes the businesses present.



Figure 3-8: Miller Street Cammeray location context

Source: HillPDA, 2020

Table 3-8: Miller Street Cammeray description

Land zoning	Area (ha)	Function/observations
B1 Neighbourhood Centre	2.7	<ul style="list-style-type: none"> The cluster contains a diverse mix of uses including a Stockland shopping centre, food and drink retailers, commercial businesses and neighbourhood shops Neighbourhood shops include a post office, service station, bakery, convenience stores, cafés and newsagents The cluster caters primarily to a neighbourhood catchment. However, as a state road, businesses along Miller Street would also attract passing trade from residents of neighbouring suburbs.

3.1.2.3 Military Road Cremorne

Figure 3-9 shows Military Road Cremorne. Table 3-9 describes the businesses in the area.



Figure 3-9: Military Road Cremorne

Source: HillPDA (2020)

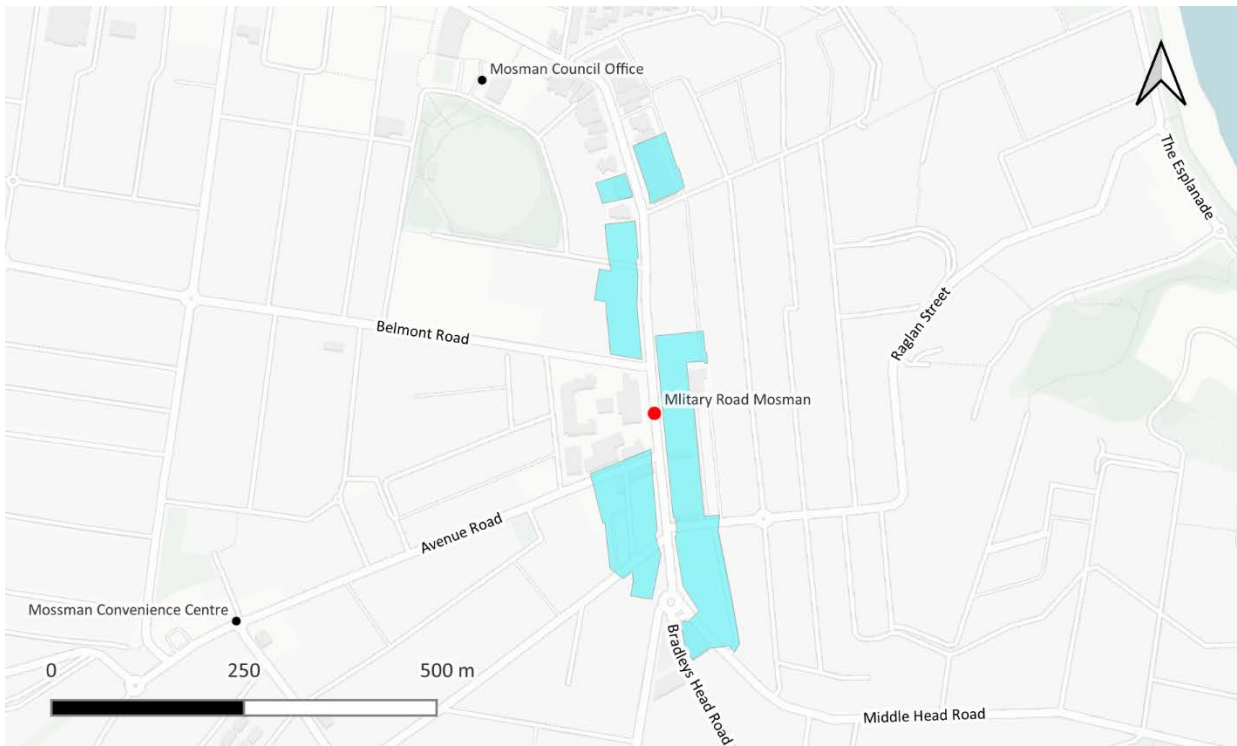
Table 3-9: Military Road Cremorne

Area	Area (hectares)	Function/observations
B4 Mixed Use	5.2	<ul style="list-style-type: none"> The area of Military Road in Cremorne zoned B4 Mixed Use comprises a wide range of different uses including residential, community facilities and schools Businesses in the area include commercial offices, food and drink retailers, sports clubs, accommodation services and two major supermarkets Businesses in the cluster serve local residents as well as commuters and those visiting for work. Commercial businesses are not likely to rely on passing trade however retail businesses would have some reliance on passing trade.
B2 Local Centre	1.2	<ul style="list-style-type: none"> The area of Military Road in Cremorne zoned B2 Local Centre consists of a small parcel of land at the junction of Military Road, Glover Street and Macpherson Street The area comprises two businesses, a car dealership, medical centre as well as a mixed-use building. This building comprises residential apartments and townhouses and ground floor retail space. These are residential apartments with an adjoining retail or commercial space facing Military Road. These spaces are currently in the leasing/sales stage The car dealership is a destination business specialising in a particular brand of vehicle while the medical centre services a neighbourhood catchment. The retail and mixed-use spaces service a mix of

Area	Area (hectares)	Function/observations
		neighbourhood catchment and further afield depending on the type of businesses and would have some reliance on passing trade.
Centre surrounds		<ul style="list-style-type: none"> An independent prep, junior and senior school is located to the south-west on Military Road and a childcare centre is located to the north of the school on Waters Road The childcare centre serves a neighbourhood catchment while the independent school caters for students from Cremorne and neighbouring suburbs such as Neutral Bay, Mosman and Manly.

3.1.2.4 Military Road Mosman

Figure 3-10 shows Military Road Mosman. Table 3-10 describes the businesses in the area.



Legend Land use zoning
 B2 - Local centre

Figure 3-10: Military Road Mosman

Source: HillPDA (2020)

Table 3-10: Military Road Mosman

Area	Area (hectares)	Function/observations
B2 Local Centre	5.7	<ul style="list-style-type: none"> B2 Local Centre zoned land is comprised of a wide variety of businesses spanning retail and commercial uses Retail businesses include several cafes and restaurants as well as boutique clothing stores. Commercial businesses include interior design and personal services businesses. There are also a number of 'neighbourhood shops' such as convenience stores and pharmacies The cluster caters primarily to a neighbourhood catchment. Commercial businesses are not likely to rely on passing trade however retail businesses would have some reliance on passing trade.

3.1.2.5 Spit Junction

Figure 3-11 shows Spit Junction. Table 3-11 describes the businesses in the area.



Legend	
Land use zoning	
■	B2 - Local centre
■	B6 - Enterprise corridor

Figure 3-11: Spit Junction

Source: HillPDA (2020)

Table 3-11: Spit Junction

Area	Area (hectares)	Function/observations
B2 Local Centre	7	<ul style="list-style-type: none"> B2 Local Centre zoned land at Spit Junction is comprised of a wide variety of businesses spanning retail and commercial uses as well as Mosman Municipal Council buildings Retail businesses include several cafes and restaurants as well as clothing stores. Commercial businesses include a cluster of medical and gym/fitness businesses Some businesses in the area, such as speciality retailers, service both a neighbourhood and wider catchment and are unlikely to be dependent on passing trade. These businesses are destination services as many customers would drive specifically to the businesses. Others, such as cafes, restaurants and medical businesses, cater primarily to a neighbourhood catchment and would have some reliance on passing trade.
B6 Enterprise Corridor	4.6	<ul style="list-style-type: none"> B6 Enterprise corridor zoned land at Spit Junction is comprised of a larger format retailers such as car dealerships and furniture shops and smaller commercial premises including allied health services, professional suites, car wash and cafes. A retirement village is also located in the enterprise corridor zone.

3.1.2.6 The Spit

Figure 3-12 shows The Spit and surrounds. Table 3-12 describes the businesses present.

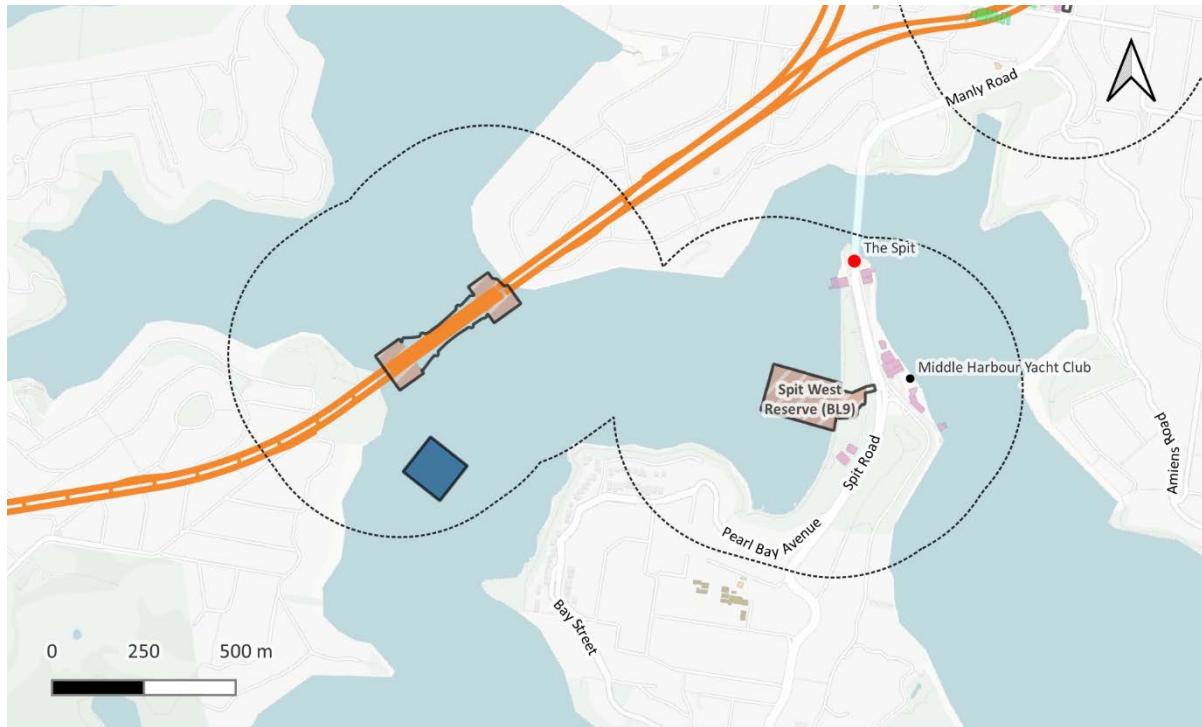


Figure 3-12: The Spit

Source: HillPDA (2020)

Table 3-12: The Spit

Area	Area (hectares)	Function/observations
RE2 Private Recreation	0.7	<ul style="list-style-type: none"> The Spit is home to several boating related businesses and a small commercial element Boating related businesses include three marinas, cafes and restaurants serving visitors and users of the facilities. The range of businesses includes boat rental/sales and insurance businesses and a commercial diving operation. There is also Middle Harbour Yacht Club, which is used as a wedding venue as well as by members. The small commercial element consists of an office space on the eastern shore of The Spit These businesses are primarily destination services as many customers would drive specifically to the businesses. They also service local residents and visitors who visit to enjoy the amenity of the area.

3.2 Business and employment

3.2.1 Number of businesses

Based on June 2019 reporting for business entries and exits (i.e. businesses establishing and closing), the study area contains 27,818 registered businesses within and outside of centres and employment zones, Table 3-13 identifies the business centres within each SA2 that would contain a proportion of the registered businesses. The local centres contributing to businesses within the SA2 vary in size and scale, with Chatswood (East)-Artarmon SA2 containing the greatest number of businesses.

Table 3-13: Number of registered businesses in SA2s

SA2 Level	Business centres within SA2	Estimated number of businesses
Eastern Precinct		
Frenchs Forest-Belrose	Frenchs Forest Business Hub Forestway Shopping Centre Glenrose Shopping Centre	3099
Forestville-Killarney Heights	Forestville Centre	1229
Manly Vale-Allambie Heights	Manly Vale Business Centre Allambie Heights Village	1591
Balgowlah-Clontarf-Seaforth	Seaforth Centre Balgowlah Centre	2627
Western Precinct		
Chatswood (East)-Artarmon	Chatswood Centre Chatswood Industrial	5837
Willoughby-Castle Cove-Northbridge	Willoughby Road Centre Penshurst Road Centre Edinburgh Road Centre	3393
St Leonards-Naremburn	Artarmon Industrial	3492
Cremorne-Cammeray	Miller Street Cammeray Military Road Cremorne	2275
Mosman	Spit Junction Military Road Mosman The Spit	4275
TOTAL		27,818

Source: ABS, 8165.0 - Counts of Australian Businesses, including Entries and Exits June 2015 to June 2019 (Released Feb 2020)

3.2.2 Industry Value Added

'Industry Value Added' (IVA) refers to the total value of goods and services produced by an industry, minus the cost of goods and services used in the production process per year. IVA is a more refined measure of economic contribution than gross output as some industries have higher levels of output but require large amounts of input expenditure to achieve that (eg mining versus retail sales). For the purposes of this assessment, IVA excludes taxes (less subsidies) and dwelling ownership.

Small area estimates of IVA (eg at the SA2 level) are not routinely provided by the ABS as part of their standard release. As a result, to estimate local economic activity HillPDA divided total Greater Sydney IVA by the most recent industry employment estimates within the study area (ABS place of work – SA2 level).

Using this approach, the study area was found to generate around \$11.7 billion of IVA per year. Comparatively, in June 2016, Greater Sydney IVA was around \$284.5 billion and NSW Gross State Product was around \$538.5 billion.

Across the study area, the top three industries by IVA are financial and insurance services; professional, scientific and technical services; and information media and telecommunications, which represent 20.6 per cent, 20.6 per cent and 12.2 per cent of IVA respectively.

Table 3-14 summarises HillPDA's estimates of IVA by industry sector for each of the SA2s within the study area. The values in the table exclude the categories of inadequately described, not stated and not applicable.

Table 3-14: Annual Industry Value Added by industry section (\$million, rounded)

Description	Cremorne-Cammeray	Mosman	Balgowlah-Clontarf-Seaforth	Forestville-Killarney Heights	Frenchs Forest-Belrose	Manly Vale-Allambie Heights	St Leonards-Naremburn	Chatswood (East)-Artarmon	Willoughby-Castle Cove-Northbridge	Total industry contribution	Industry proportional contribution (%)
Agriculture, forestry and fishing	0.96	1.75	0.79	0.00	3.58	0.87	3.05	1.40	0.96	13.35	0.1%
Mining	0.00	2.43	0.00	0.00	3.44	0.00	21.06	14.38	0.61	41.91	0.4%
Manufacturing	5.96	14.06	16.76	5.63	119.48	11.25	150.86	90.90	11.03	425.93	3.6%
Electricity, gas, water and waste services	2.05	3.51	3.22	0.00	22.25	3.81	29.27	74.35	2.63	141.09	1.2%
Construction	24.46	75.23	52.76	24.69	97.47	37.03	161.29	196.35	81.64	750.92	6.4%
Wholesale trade	9.08	16.32	14.76	4.54	234.56	6.39	194.12	201.79	9.22	690.78	5.9%
Retail trade	24.76	62.41	57.27	13.91	125.66	18.22	91.30	264.96	49.02	707.52	6.0%
Accommodation and food services	30.39	53.33	23.47	9.70	42.27	8.22	33.76	120.90	26.96	348.99	3.0%
Transport, postal and warehousing	9.74	7.76	8.01	4.07	53.24	4.07	95.27	63.60	22.06	267.83	2.3%
Information media and telecommunications	16.68	20.67	17.38	5.87	129.41	9.63	668.41	381.18	237.68	1486.90	12.7%
Financial and insurance services	35.41	104.50	58.78	17.88	61.53	13.75	415.60	551.39	52.94	1311.77	11.2%
Rental, hiring and real estate services	35.23	111.65	65.68	16.12	33.14	13.14	153.14	201.50	75.83	705.41	6.0%
Professional, scientific and technical services	50.66	111.01	68.91	36.63	186.63	40.35	697.70	464.27	86.67	1742.83	14.8%
Administrative and support services	20.97	34.50	22.86	9.74	54.92	16.10	103.89	125.26	21.64	409.88	3.5%
Public administration and safety	3.47	60.46	13.29	5.66	23.35	6.47	44.27	186.57	31.67	375.22	3.2%
Education and training	46.18	75.42	38.21	44.69	96.77	44.94	77.17	88.05	65.54	576.96	4.9%
Health care and social assistance	31.63	81.68	47.64	25.03	118.05	86.59	591.39	218.48	59.15	1259.63	10.7%
Arts and recreation services	7.19	61.73	8.20	5.90	21.56	4.24	24.60	27.46	16.49	177.37	1.5%
Other services	11.20	33.07	17.94	8.23	46.34	8.60	87.27	71.55	21.95	306.14	2.6%
Total	366.0	931.5	535.9	238.3	1473.7	333.7	3643.5	3344.3	873.7	11,740.4	
SA2 Proportional contribution	3.1%	7.9%	4.6%	2.0%	12.6%	2.8%	31.0%	28.5%	7.4%		

Source: ABS place of work and Forecast ID – Greater Sydney Worker Productivity

3.2.3 Employment by industry

Table 3-15 shows the employment figures across the study area. Around 101,600 people were employed within the ABS Place of Work 2016 study area. The top three industries of employment were health care and social assistance; professional, scientific and technical services; and retail trade, which represented 15.4 per cent, 13.8 per cent and 11.0 per cent of total jobs respectively.

The top three SA2s contributing to employment were St Leonards-Naremburn SA2, Chatswood (East)-Artarmon and Frenchs Forest-Belrose, which represented 29.0 per cent, 27.2 per cent and 13.9 per cent of total jobs respectively.

Table 3-15: Study area employment by industry sector

Description	Cremorne-Cammeray	Mosman	Balgowlah-Clontarf-Seaforth	Forestville-Killarney Heights	Frenchs Forest-Belrose	Manly Vale-Allambie Heights	St Leonards-Naremburn	Chatswood (East)-Artarmon	Willoughby-Castle Cove-Northbridge	Total jobs
Agriculture, forestry and fishing	11	20	9	0	41	10	35	16	11	153
Mining	0	12	0	0	17	0	104	71	3	207
Manufacturing	53	125	149	50	1062	100	1341	808	98	3786
Electricity, gas, water and waste services	7	12	11	0	76	13	100	254	9	482
Construction	210	646	453	212	837	318	1385	1686	701	6448
Wholesale trade	64	115	104	32	1653	45	1368	1422	65	4868
Retail trade	390	983	902	219	1979	287	1438	4173	772	11,143
Accommodation and food services	514	902	397	164	715	139	571	2045	456	5903
Transport, postal and warehousing	79	63	65	33	432	33	773	516	179	2173
Information media and telecommunications	71	88	74	25	551	41	2846	1623	1012	6331
Financial and insurance services	103	304	171	52	179	40	1209	1604	154	3816
Rental, hiring and real estate services	118	374	220	54	111	44	513	675	254	2363
Professional, scientific and technical services	408	894	555	295	1503	325	5619	3739	698	14,036
Administrative and support services	155	255	169	72	406	119	768	926	160	3030
Public administration and safety	30	523	115	49	202	56	383	1614	274	3246
Education and training	556	908	460	538	1165	541	929	1060	789	6946
Health care and social assistance	393	1015	592	311	1467	1076	7349	2715	735	15,653
Arts and recreation services	78	670	89	64	234	46	267	298	179	1925
Other services	151	446	242	111	625	116	1177	965	296	4129
Inadequately described	140	289	215	74	704	117	896	1082	213	3730
Note stated	45	85	58	29	182	37	351	368	66	1221
Total jobs	3576	8729	5050	2384	14,141	3503	29,422	27,660	7124	101,589

Source: ABS place of work 2016

3.3 Maritime activities

Middle Harbour supports a small number of commercial and recreational activities. Of relevance to this study are the businesses that are dependent on the harbour (whether on water or adjacent) to operate. The report *Our Harbour Our Asset* (Hoisington, 2015) attempts to establish the economic contribution and value of Sydney Harbour, including Middle Harbour. This report has been drawn on to assist in categorising the types of businesses using the harbour. Table 3-16 categorises examples of the different business functions reliant on the harbour.

Table 3-16: Businesses reliant on the harbour for operation

Harbour function	Example business operations (public and private)
Maritime	Boat moorings, boat ramps, boat licensing, marine rescue, boat maintenance and repairs, tow boats, marina facilities, fuel services
Tourism	Harbour cruises, outdoor recreation and sporting activity operators and hire facilities, recreational boat hire
Commercial	Commercial fishing movements (commercial fishing is not allowed in the harbour, but boats travel in the harbour to moor and distribute catch), charter boats, science and research, refuelling, water taxi services

Middle Harbour does not accommodate any major commercial shipping operations, with most of the maritime traffic associated with recreational and sporting activities. Several commercial marinas are located in Middle Harbour including:

- Middle Harbour Yacht Club, The Spit
- Smiths Boatshed Marina, The Spit
- Fergusons Boat Shed, The Spit
- D'Albora Marina, The Spit
- Cammeray Marina, Cammeray
- Northbridge Marina, Northbridge
- Castlecrag Marina, Castlecrag
- Roseville Bridge Marina, Roseville
- Clontarf Marina; Clontarf.

As identified in Annexure A (Navigation Impact Assessment) of the Technical working paper: Traffic and Transport (Jacobs, 2020), competitive yachting occurs relatively frequently (once per week on average) with majority of activity occurring downstream of The Spit Bridge. Business operations near the study area are more oriented around maritime, navy bases, tourism and commercial functions. The area is highly popular for recreation users with several on-land businesses, such as kayak hire, boat chartering and restaurants, benefiting from being close to the harbour.

Several moorings are also available for commercial use throughout Middle Harbour. The location of these moorings within the study area is shown in Figure 3-13.

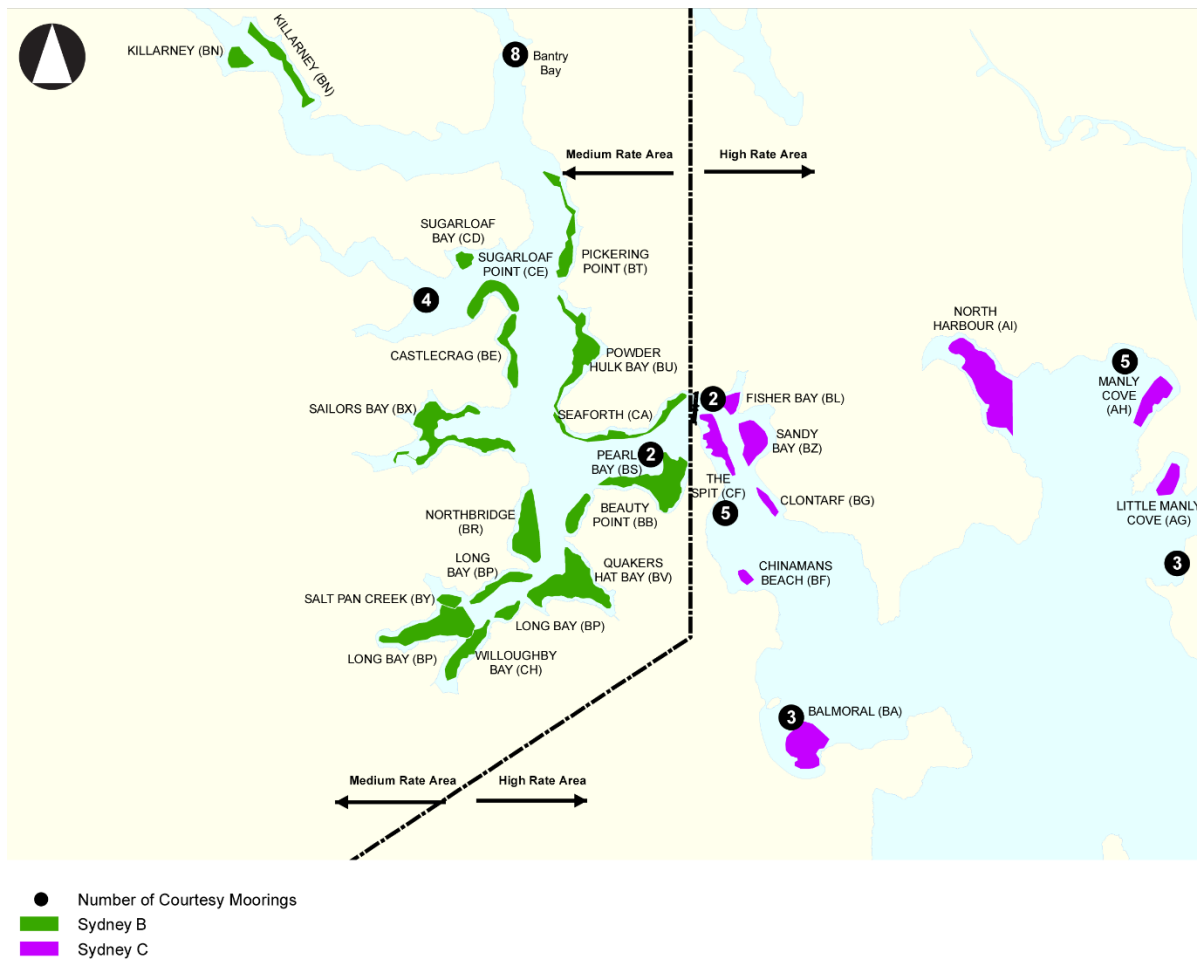


Figure 3-13: Moorings within the study area

Source: Transport for NSW (2016) viewed at: <https://www.rms.nsw.gov.au/documents/maritime/moorings/mooring-map-sydney.pdf>.

3.4 Transport and access

This section provides an overview of the existing transport environment as it relates to business and industry in the study area. The section draws on the study area characteristics findings from the Technical working paper: Traffic and transport (Jacobs, 2020).

3.4.1 Road network

There are several key roads that provide access to the local business centres. These road connections and the associated business centres with higher reliance on the road connection have been identified in Table 3-17. The higher order motorways, major arterial roads and sub-arterial roads generally carry larger volumes of traffic and provide essential connections for commuters, freight and commercial vehicles.

Table 3-17: Summary of key roads - connecting local centres

Road	Location	Road type and speed limit	Key destinations	Reliant local centres
Gore Hill Freeway and Artarmon				
M1 Gore Hill Freeway	Artarmon, Naremburn, Willoughby	Motorway 80 km/h	Connectivity to the Sydney metropolitan area as part of the Sydney Orbital Network.	Artarmon
M2 Lane Cove Tunnel	Artarmon	Motorway 80 km/h	Connectivity to the Sydney metropolitan area as part of the Sydney Orbital Network.	Artarmon
Pacific Highway	Artarmon	Major arterial road 60 km/h	St Leonards, Chatswood, Pymble, Hornsby, Central Coast and Newcastle (via M1 Pacific Motorway)	Artarmon Military Road Spit Junction
Willoughby Road	Naremburn, Willoughby	Sub-arterial road 60 km/h	St Leonards, Crows Nest, Chatswood (via Mowbray Road)	Willoughby Road Centre
Brook Street/Flat Rock Drive	Naremburn	Sub-arterial road 60 km/h	St Leonards, Willoughby, Northern Beaches (via Eastern Valley Way/Warringah Road)	St Leonards
Reserve Road	Artarmon	Collector road 50 km/h	Artarmon commercial areas, Royal North Shore Hospital	Artarmon
Hampden Road	Artarmon	Collector road 50 km/h	St Leonards, Artarmon railway station, Royal North Shore Hospital	Artarmon
Herbert Street	Artarmon	Collector road 50 km/h	St Leonards railway station, Royal North Shore Hospital	Artarmon
Dickson Avenue/Punch Street/Cleg Street	Artarmon	Local road 50 km/h	Provides access to commercial properties in Artarmon.	Artarmon
Balgowlah and surrounds				
A8 Spit Road	Mosman	Major arterial road 60 km/h	Mosman, North Shore, Northern Beaches (via Condamine Street/Pittwater Road)	Mosman Balgowlah Seaforth/Spit Bridge Spit Junction Military Road (Cremorne)

Road	Location	Road type and speed limit	Key destinations	Reliant local centres
A8 Manly Road	Seaforth	Major arterial road 60 km/h	Mosman, Manly, Northern Beaches (via Condamine Street/Pittwater Road), Forest District (via Frenchs Forest Road/Wakehurst Parkway)	Seaforth/Spit Bridge Manly Vale Balgowlah
A8 Burnt Bridge Creek Deviation	Balgowlah, North Balgowlah	Major arterial road 80 km/h	Mosman, Manly, Northern Beaches (via Condamine Street/Pittwater Road), Forest District (via Condamine Street/Allambie Road)	Manly Vale
A8 Condamine Street/Pittwater Road	Manly Vale, Brookvale	Major arterial road 60 km/h	Manly, Northern Beaches, Mona Vale	Balgowlah
Sydney Road	Balgowlah, Seaforth	Sub-arterial road 50 km/h (in Seaforth), 60 km/h elsewhere	Seaforth, Manly	Seaforth Balgowlah
Kitchener Street	Balgowlah	Collector road 50 km/h	Provides access between North Balgowlah and Balgowlah.	Balgowlah
Kenneth Road	Manly Vale	Collector road 50 km/h	Manly Vale, Manly	Balgowlah
Wakehurst Parkway/ Frenchs Forest Road	Seaforth	Major arterial road 60 km/h	Seaforth, Northern Beaches, Forest District	Frenchs Forest Seaforth
Frenchs Forest and surrounds				
Wakehurst Parkway	Frenchs Forest, Killarney Heights	Major arterial road 80 km/h	Seaforth, Northern Beaches, Forest District	Seaforth Frenchs Forest
A38 Warringah Road	Frenchs Forest	Major arterial road 70 km/h	Chatswood, Northern Beaches, Forest District	Frenchs Forest
Forest Way	Frenchs Forest	Major arterial road 70 km/h	Forest District	Frenchs Forest
Frenchs Forest Road East/ Frenchs Forest Road West	Frenchs Forest	Sub-arterial road 50 km/h	Northern Beaches, Forest District (via Warringah Road and Forest Way)	Frenchs Forest

Source: Technical Working Paper: Traffic and Transport (Jacobs, 2020).

3.4.2 Public transport

The study area is serviced by public transport with access to rail, bus and ferry services. The information in this section has been informed by the Technical working paper: Traffic and transport (Jacobs, 2020). For the purpose of this section, due to the geographic distribution of the study area, the bus transport network has been discussed in relation to three regions which are consistent with the transport and traffic report. These are Gore Hill Freeway and Artarmon; Balgowlah and surrounds; and Frenchs Forest and surrounds.

3.4.2.1 Rail

Heavy rail services are provided by Sydney Trains at Artarmon and St Leonards railway stations, which are located on the T1 North Shore and Western Line and T9 Northern Line providing direct connections to Sydney central business district (CBD), Chatswood, Macquarie Park, Epping, Hornsby, Parramatta, Blacktown, Penrith and Richmond. Direct services are also provided to and from the Central Coast from Artarmon and St Leonards during the weekday peak periods.

The rail service supports businesses in the St Leonards-Naremburn SA2 and the Chatswood (East)-Artarmon SA2. This includes the business centres at Chatswood, around the Artarmon Industrial estate and in St Leonards.

The Sydney Metro is made up of multiple stages:

- Stage 1 Sydney Metro Northwest, which opened 26 May 2019
- Stage 2 City and Southwest, which includes the Chatswood to Sydenham project and is anticipated to open in 2024
- The Sydenham to Bankstown upgrade.

The Sydney Metro Northwest route runs through the study area with a platform at Chatswood station and the Chatswood to Sydenham project includes a platform under construction at Crows Nest. Construction of Sydney Metro Chatswood to Sydenham project involved tunnelling which is now complete under the harbour from Barangaroo to Blues Point.

3.4.2.2 Bus

The Gore Hill Freeway and Artarmon area is a major thoroughfare for buses with 67 unique bus routes and about 3100 individual timetabled services on weekdays, 1500 services on Saturdays and 1200 services on Sundays and public holidays. Bus services are operated by Sydney Buses, Forest Coach Lines, Hills Bus and Transdev NSW. Major bus corridors in the Gore Hill Freeway and Artarmon area include:

- Warringah Freeway – for services to Sydney CBD, Chatswood and the Hills District
- Gore Hill Freeway/Lane Cove Tunnel – for services to Sydney CBD, Lane Cove, Marsfield and the Hills District
- Pacific Highway – for services to Sydney CBD, Chatswood, Epping and the Hills District.

These services support businesses in the St Leonards-Naremburn SA2, Chatswood (East)-Artarmon SA2, Willoughby-Castle Cove-Northbridge SA2 and Cremorne-Cammeray SA2. All local centres in this area have access to a bus connection.

The Balgowlah area is a major thoroughfare for buses with 36 unique routes and about 1400 individual timetabled services on weekdays, 700 services on Saturdays and 700 services on Sundays and public holidays. The B-Line is one of the major services. Bus services are operated by Sydney Buses. Major bus corridors in the study area include:

- Spit Road/Manly Road – for services to Sydney CBD, Neutral Bay, Mosman, Manly, Dee Why, Seaforth and Frenchs Forest
- Sydney Road – for services to Sydney CBD, Manly, Warringah and Mona Vale
- Burnt Bridge Creek Deviation – for services to Sydney CBD, Mona Vale, Dee Why and Avalon.

These services support businesses in the Cremorne-Cammeray SA2, Mosman SA2, Balgowlah-Clontarf-Seaforth SA2, Manly Vale-Allambie Heights SA2 and Frenchs Forest-Belrose SA2. All local centres have access to a bus connection.

The Frenchs Forest area is well-served by buses with 19 unique routes and about 600 individual timetabled services on weekdays, 300 services on Saturdays and 200 services on Sundays and public holidays. Bus services are operated by Sydney Buses and Forest Coach Lines. Warringah Road and Forest Way are major bus corridors for services to Sydney CBD, Chatswood, Terrey Hills and Belrose.

These services support businesses in Frenchs Forest-Belrose SA2 and Forestville-Killarney Heights SA2. All local centres in this area have access to a bus connection.

3.4.2.3 Ferry

Several public ferries also use the waterway near the study area. Circular Quay, Barangaroo and Pyrmont Bay are all primary employment destinations with various ferry routes likely to cross over the study area. As can be seen in Figure 3-14, Sydney Ferries routes that cross the study area include the Parramatta River ferry, Cross Harbour ferry and the Cockatoo Island ferry.

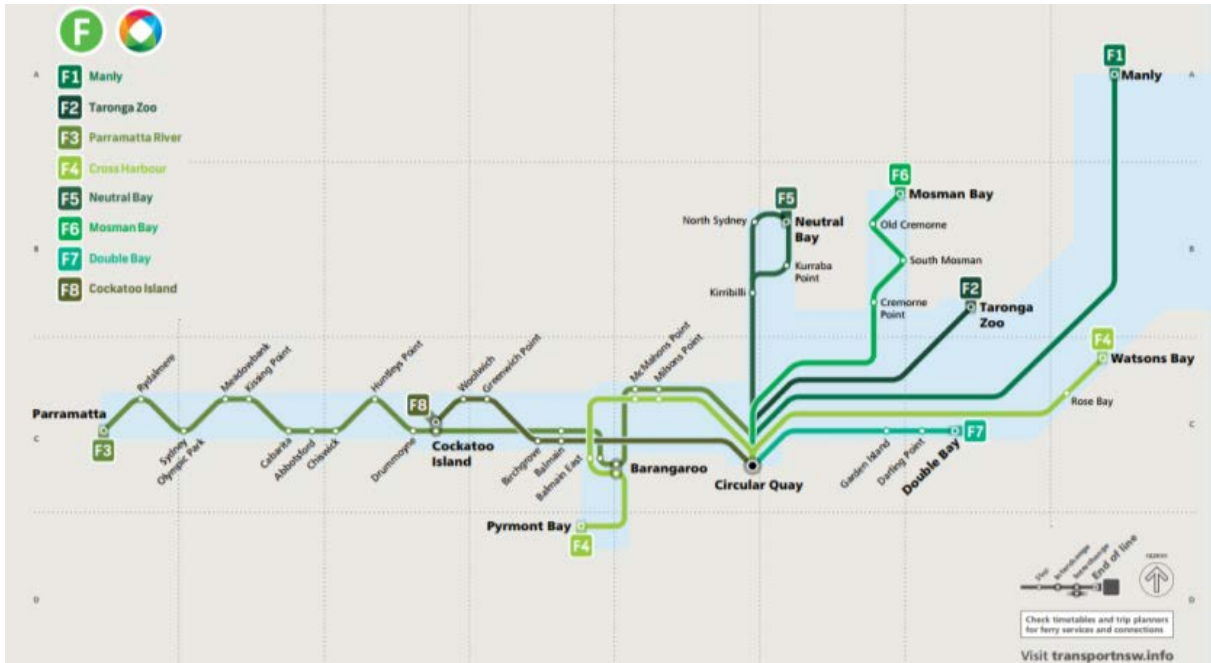


Figure 3-14: Sydney Ferries Network

Source: Transport for NSW (2020)

Ferry services in the study area are provided from wharves located in Cremorne Point, Mosman and Manly. These wharves are served by the F6 Mosman Bay Line and the F1 Manly Line, which provide direct connections to Circular Quay.

3.4.3 Active transport

The pedestrian network in the study area is well developed with footpaths provided alongside most roads and controlled crossings provided at most signalised intersections.

According to the Technical working paper: Traffic and transport (Jacobs, 2020), important pedestrian activity occurs:

- Along Hampden Road near Artarmon railway station at Artarmon
- Around the commercial area of Artarmon
- Around the health, educational and commercial land uses in St Leonards
- Along Spit West Reserve at Mosman
- Around the marinas at the southern end of Spit Bridge at Mosman
- Near the Balgowlah and Manly Vale local town centres on Sydney Road and Condamine Street
- Around the Warringah Aquatic Centre at Frenchs Forest
- Near the Frenchs Forest local town centre on Warringah Road and Forest Way.

Pedestrians are prohibited from walking along the Gore Hill Freeway and Lane Cove Tunnel. A shared path is provided next to the southern side of the Gore Hill Freeway. The pedestrian network in the Frenchs Forest area is limited with no footpaths provided alongside Wakehurst Parkway and most local

roads. Footpaths are provided alongside the other arterial roads in this area, including Warringah Road where a pedestrian bridge spans the road next to Frenchs Forest Public School.

The cycle network across the study area consists of a mixture of off-road shared paths on local and collector roads. Off-road shared paths are provided at the following locations:

- Along the southern side of the Gore Hill Freeway at Artarmon
- Next to Flat Rock Creek in Willoughby located between Weedon Road and Flat Rock Drive
- Around Artarmon Reserve in Artarmon, Naremburn Park in Naremburn, Bicentennial Reserve in Willoughby and the Willoughby Leisure Centre located in Willoughby
- Spit Bridge at Mosman
- Spit West Reserve at Mosman
- Next to Burnt Bridge Creek in Balgowlah between Baringa Avenue and Condamine Street
- White Street, Lauderdale Avenue, The Crescent, Commonwealth Parade and Fairlight Walk between Balgowlah and Manly
- Karingal Crescent Reserve at Frenchs Forest
- Shared user bridge connecting Karingal Crescent Reserve and Forest Way in Frenchs Forest
- Between Wakehurst Parkway north of Warringah Road and Frenchs Forest Road East west if Inverness Avenue in Frenchs Forest
- Shared user bridge connecting Warringah Aquatic Centre and Bantry Bay Road in Frenchs Forest
- Allambie Road located between Aquatic Drive and Eaton Square in Allambie Heights
- Manly Dam Bike Track within Garigal National Park at Manly Vale.

The Gore Hill Freeway presents a barrier to north–south movements for pedestrians and cyclists, with crossings available at select locations including:

- Shared user bridge connecting Willoughby Road and Slade Street in Naremburn
- Underpass connecting Park Road and Northcote Street in Naremburn to Willoughby Road in Willoughby
- Underpass connecting Chelmsford Avenue in Naremburn and Willoughby
- Hampden Road at Artarmon
- Reserve Road at Artarmon.

3.4.4 Modes of travel

Travel to work data for the study area was sourced from ABS 2016 census. The data reveals that car travel was the predominant mode of travel to work for residents with 47.8 per cent using a car as a driver or a passenger. This was lower than the Greater Sydney average of 58.8 per cent. The second most common form of transport was by bus, with 17.8 per cent of residents travelling to work using this method. This was higher than the Greater Sydney average of 11.6 per cent.

Compared to Greater Sydney, the study area recorded a marginally lower proportion of other vehicle users (for example truck, motorbike and taxi). The study area had a relatively high proportion of people who worked from home compared to Greater Sydney.

The proportion of those travelling to work using one, two or three methods of transport was similar in the study area and Greater Sydney. In the study area, 78.6 per cent used one method of transport, while 80.6 per cent did in Greater Sydney. The proportion of those using two methods of transport was 6.2 per cent in the study area, lower than 13.2 per cent in Greater Sydney.

Table 3-18: Travel to work data

Method of travel	Western Precinct (%)	Eastern Precinct (%)	Study Area (%)	Greater Sydney (%)
One method				
Train only	11.6	0.4	7.2	10.9
Bus only	16.8	13.6	15.6	5.5
Other public transport	1.5	0.7	1.2	0.7
Car only (as driver or passenger)	39.8	57	46.6	56.6
Walked or cycled	7.8	3.6	6.1	4.8
Truck	0.1	0.6	0.3	0.9
Motorbike/scooter	0.8	1.3	1	0.7
Other one method	11.6	0.5	0.6	0.5
Two methods				
Train and car (as driver or passenger)	0.5	0.4	0.5	1.8
Train and one other method	3.6	2.1	3	4.7
Bus and car (as driver or passenger)	0.5	1.2	0.8	0.4
Bus and one other method	1.2	1.6	1.3	0.5
Other two methods	0.6	0.8	0.6	0.6
Three methods				
Train and two other methods	0.6	0.5	0.6	0.6
Bus and two other methods (excl train)	0.1	0.2	0.1	0
Other three methods	0	0	0	0
Other				
Worked at home	6.8	7.4	7	4.4
Did not go to work	7.3	8.9	7.9	7.8
Method of travel not stated	0.6	0.8	0.7	0.9

Source: ABS Census data 2016

3.5 Amenity

3.5.1 Noise

Changes in environmental noise has the potential to impact (both positively and/or negatively) on business amenity and ambience.

The Technical working paper: Noise and vibration (Renzo Tonin & Associates, 2020) documents the existing acoustic environment of the project, including measured background noise levels and measured road traffic noise levels. The sensitivity of commercial and industrial receivers depends on the occupancy type and/or dependency on pleasant environments. For instance, a cafe or restaurant that has outdoor seating may be more sensitive to noise than a heavy industrial premise.

The Technical working paper: Noise and vibration defines noise management levels for airborne noise and ground-borne noise. The noise management levels are derived from the rating background level plus 10 dB(A).

Airborne noise management levels at commercial premises (including offices and retail outlets) and industrial premises are 70 dB(A) and 75 dB(A) respectively. Ground-borne noise management levels at commercial premises (including offices) is 50 dB(A) internal, commercial premises (including retail) is 60 dB(A) internal and industrial premises is 65 dB(A) internal. The noise level represents the point above which there may be some reaction to noise.

Table 3-19 identifies the measured background noise levels where in proximity to a business centre.

Table 3-19: Measured background noise levels in proximity to a business centre

Address	Closest business centre	Rating Background Level, dB(A)		
		Day (7am–6pm)	Evening (6pm–10pm)	Night (10pm–7am)
20/2 Parkes Road at Artarmon	Artarmon Industrial	67	63	46
3/2 Cleland Road at Artarmon	Artarmon Industrial	55	53	40
2 Ross Street at Seaforth	Seaforth	43	39	30
1/6 Whittle Avenue at Balgowlah	Seaforth	58	54	37
469 Sydney Road at Balgowlah	Sydney Road Balgowlah	55	50	32
2 Pitt Street at Balgowlah	Manly Vale Business Centre	47	45	30

Source: Adapted from Technical working paper: Noise and vibration (Renzo Tonin & Associates, 2020).

The existing traffic noise levels at the monitoring locations where road traffic was the dominant noise source are summarised in Table 3-20 where relevant to business centres.

Table 3-20: Measured traffic noise levels where relevant to business centres

Address	Closest business centre	Measured road traffic noise level, dB(A)	
		L _{Aeq,15hour} (7am–10pm)	L _{Aeq,9hour} (10pm–7am)
20/2 Parkes Road at Artarmon	Artarmon Industrial	74	69
3/2 Cleland Road at Artarmon	Artarmon Industrial	61	57
1/6 Whittle Avenue at Balgowlah	Seaforth	67	64
469 Sydney Road at Balgowlah	Sydney Road Balgowlah	73	71
2 Pitt Street at Balgowlah	Manly Vale Business Centre	55	51

Source: Adapted from Technical Working Paper: Noise and Vibration (Renzo Tonin & Associates, 2020).

3.5.2 Landscape character

The Technical Working Paper: Urban design, landscape character and visual impact assessment (Arup, 2020) describes the urban and landscape character along the project corridor. Much of the project corridor consists of low, medium and high density residential zoning, interspersed by industrial and commercial cores such as Artarmon, Manly Vale, Warringah Mall and Frenchs Forest. In the north, the urban character of the project corridor transitions from urban to suburban, terminating with significant swathes of open space.

Four precincts have been defined in the report to describe the environment.

Artarmon precinct

Artarmon is a mixed use urban area with residential land use in the north and industrial and institutional land use to the south. The depressed configuration of the Gore Hill Freeway allows visual connectivity across the road while restricting pedestrian connectivity. Despite significant urban development, the Gore Hill Freeway has a discernible green edge with Artarmon Reserve and oval alongside the roadway.

Balgowlah precinct

Balgowlah is an established residential area, with a commercial area along Sydney Road. Despite significant road infrastructure, the precinct has a leafy character, well vegetated streetscapes and open space that includes Burnt Bridge Creek riparian corridor and Balgowlah Golf Course.

Engagement with Northern Beaches Council has identified potential for the residual land associated with Balgowlah Golf Course and properties acquired in Dudley Street to be developed for new and improved open space and recreation facilities. Use of the residual land for such facilities would align with the Northern Beaches Sportsground Strategy and address the current under supply of sporting grounds available for public use in the local area. A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council would take place to give the community an opportunity to provide input into the final layout of the new and improved open space and recreation facilities at Balgowlah.

Seaforth precinct

Seaforth is a residential and parkland area. The precinct has a distinct bushland character comprising parts of Garigal National Park, Manly Dam Reserve and Bantry Reserve. Seaforth shopping centre is located off Sydney Road and offers a variety of retail and business services with residential apartments above.

Wakehurst Parkway and Frenchs Forest precinct

The Wakehurst Parkway connection is a link to the growing Northern Beaches area. There has been significant growth in the Frenchs Forest precinct associated with the Northern Beaches Hospital development.

An outer suburban suburb of Sydney, Frenchs Forest is a predominantly residential area, with some industrial areas in the south-east. Wakehurst Parkway has a distinct green edge and sections of sandstone cutting. There is also an extensive existing network of hiking and mountain bike trails in the area.

4.0 BUSINESS SURVEY

The following section presents the findings of the business survey. The business survey gauged the perception of a sample of businesses across the study area to potential impacts associated with construction and operation of the project (refer Section 2.4 for business survey methodology). At the time of the survey, only publicly available information was provided to the survey respondents regarding the project alignment and design to inform their responses. This included the reference design and preliminary planning information. This section draws on the comments and information gathered by the business survey to characterise the sensitivities and dependencies of business types to the issues scoped. The survey methodology is discussed in Section 2.4. The business survey itself can be found in Attachment A and a summary of all survey results can be found in Attachment B of this report.

It is important to note that the information from the business survey reflects the business' perceptions of the impacts the project will have, while an assessment of modelled impacts on businesses is provided in Section 5.0 and Section 6.0. Based on the findings of the survey and further progression of the project design, while in or close to the study area, the centres of Warringah Mall and Austlink Business Park were not considered to be directly influenced by the project. Considering this, the centres were not specifically profiled as part of the assessment.

4.1 Passing trade

Passing trade may be defined as those pedestrians, cyclists and motorists who choose to patronise a business because they see it when walking, riding or driving past, and they had not previously planned to go there. The business survey sought information on customer travel choices to determine how changes in passing trade may impact on businesses.

Business survey findings highlighted a high dependency on motor vehicle passing trade:

- Sixty-nine per cent of surveyed businesses perceived a dependency on motor vehicle passing trade with 43 per cent highly dependent. Thirty per cent of business respondents suggested they were not dependent
- Manly Vale and Warringah Mall were the surveyed business centres that recorded the highest dependencies on motor vehicle passing trade
- Retail trade, personal services, and accommodation and food services were the business types most dependent on motor vehicle passing trade.

Business survey findings highlighted a high dependency on pedestrian and cyclist passing trade:

- Sixty-six per cent surveyed perceived a dependency on pedestrian and cyclist passing trade, with 44 per cent of these majorly dependent. Thirty-two per cent of businesses perceived they were not dependent
- Military Road and Warringah Mall were the surveyed business centres that recorded the highest dependencies on pedestrian and cycle passing trade
- Accommodation and food services and retail trade were the business types perceived to be the most dependent on pedestrian and cyclist passing trade.

Construction

During the construction phase, hoardings and changes to vehicle, pedestrian and cyclist flows may influence the level of passing trade. The business survey indicated:

- Most businesses (65 per cent) perceived there to be neither a positive or negative impact on passing trade during the construction phase
- Thirty per cent of respondents perceived construction would negatively impact passing trade
- Five per cent perceived construction would improve passing trade

- Fifty per cent of businesses in Frenchs Forest and Manly Vale perceived they would be negatively affected by reduction in passing trade
- Seaforth/Spit Bridge recorded the highest proportion of positive responses (15 per cent) to passing trade.

Operation

Businesses were asked about the potential for changes to vehicle, pedestrian and cyclist flows which may influence the level of passing trade at some business centres once the project is operational. The business survey found:

- Half of all businesses surveyed perceived there would be a neutral effect on passing trade while 43 per cent stated the effect would be positive
- Over 78 per cent of businesses in Frenchs Forest and 71 per cent of businesses in Warringah Mall perceived that the project would positively affect passing trade
- Some businesses in Balgowlah, Manly Vale, Military Road, Seaforth/Spit Bridge and Spit Junction perceived that the project would have a negative impact on passing trade. Most significantly, 19 per cent of businesses in Spit Junction and 17 per cent in Military Road returned negative responses.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect passing trade.

4.2 Employee and customer access

Alterations to employee and customer access and travel time may affect business operations during construction due to delayed or hindered access to workplaces, owing to traffic constraints such as congestion, alterations to travel routes or parking availability.

4.2.1 Change in access to centres

Customer journey

Customers would choose between centres that offer similar goods or services. Changes in access to a centre or business, for example through reconfigurations of connectivity to centres, may result in long term changes to consumer behaviour and permanent economic impacts (positive and negative) for certain local businesses. The business survey found:

- Many business respondents indicated that their customers were from the local government area (40 per cent), 26 per cent indicated they serviced the local suburb, 15 per cent were travelling from the broader district and 19 per cent from Greater Sydney or wider
- Customers travelling to the local centre were generally travelling by private vehicle (85 per cent) or walking (10 per cent)
- Public transport was not a preferred travel method for customers, with only five per cent of respondents suggesting travelling by this method.

These results reflect the trade catchments of business centres.

Employee journey

The ease of access to a place of employment may also be a factor in attracting or deterring existing or potential employees from remaining in a job or applying for a job. If a place of work becomes too difficult to access, individuals may seek alternative employment options in response to the reduced time available to spend with family and friends or in non-work-related activities. As such, employers may have difficulty attracting or retaining staff, which may affect business productivity and function. Alternatively, if access to a particular centre is improved, businesses may be more likely to attract employees. The business survey findings suggested:

- Of the businesses surveyed, 74 per cent of employees were travelling by private vehicle only, 21 per cent were travelling by public transport and five per cent were travelling by active transport.

When asked if their business was sensitive to employee travel time delays:

- Eighty-three per cent of businesses perceived they were sensitive to travel time delays, with 39 per cent perceiving they were majorly sensitive and 18 per cent of businesses perceiving they were not sensitive at all
- Frenchs Forest and Seaforth/Spit Bridge were perceived to be the most sensitive to travel time delays
- Education, personal services and construction business types were perceived as the most sensitive to travel time delays.

Construction

Within the study area, the construction phase of the project would result in changes in certain areas to road, public transport and active transport networks, which may affect employee and customer access. Business survey responses were provided based on perceptions regarding high level information at the time. The responses indicated that:

- Fifty-three per cent perceived construction would have a neutral effect on employee and customer access, while 46 per cent stated they would be affected negatively
- The only business locations to indicate construction would have a positive effect were Artarmon Industrial, Military Road and Seaforth/Spit Bridge (three, three and four per cent respectively)
- The largest proportion of negative responses was found in Manly Vale and Frenchs Forest, where 58 and 56 per cent of businesses respectively perceived that employee and customer access would be negatively affected during construction.

Operation

Upon operation, the project would result in changes to vehicle, pedestrian and cyclist flows and road configuration due to the new road, public transport and active transport infrastructure. This may potentially impact access to particular centres as well as travel times for customers and employees. Business survey responses were provided based on perceptions regarding high level information at the time. The responses indicated that:

- Sixty-three per cent of businesses perceived employee and customer access would be positively affected by the operation of the project, 32 per cent perceived the effect would be neutral and five per cent perceived the effect would be negative
- Most business locations returned positive responses except for Spit Junction. The highest rates of positive responses were from Austlink Business Park (87 per cent positive), Frenchs Forest (78 per cent positive) and Warringah Mall (75 per cent positive). No businesses in these locations perceived employee and customer access would be affected negatively.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect employee and customer access.

4.2.2 Changes in access to and availability of parking

The removal or increased competition for car parking has the potential to impact convenience for workers, clients and customers. These changes have the potential to influence decisions by customers/clients to use a certain business. If there are competing centres in more easily accessible locations that offer similar goods or services, a reduction in the availability of parking may result in changed consumer behaviour and lost revenue opportunity for businesses.

Changes to parking availability may affect the daily routine of a business, level of activity, passing trade or business operations. Permanent reductions in on-street parking may deter visitors from accessing a

business due to an increase in travel time and lack of convenience and may affect the vibrancy of a centre. Business survey responses indicated that:

On-street parking

- Most businesses (65 per cent) were dependent on on-street parking, with 39 per cent of these businesses recording major dependencies. Thirty-five per cent of businesses identified no dependencies for on-street parking
- The business centres of Military Road, Seaforth/Spit Bridge and Spit Junction were most dependent on on-street parking
- Construction, personal services, recreational service/fitness and education business types recorded a higher dependency on on-street parking.

Convenient customer parking

- Convenient customer parking was considered a dependency for 65 per cent of business survey respondents with 39 per cent of respondents indicating a major dependency on convenient customer parking. Thirty-five per cent of businesses were not reliant on customer parking to support business functions
- Businesses within Frenchs Forest, Manly Vale, Spit Junction and Warringah Mall were most dependent on convenient customer parking
- Personal services, recreational services/fitness, retail trade and education business types recorded a higher dependency on convenient customer parking.

Of the businesses surveyed, 46 per cent of businesses surveyed did not have designated parking and would rely on public spaces. Sixteen per cent had one or two car spaces, 11 per cent had three to five car spaces, 11 per cent had six to 10 car spaces and three per cent had 11 to 20 car spaces. Thirteen per cent of respondents indicated they shared car spaces with a mall or other private area.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to influence the availability of car parking for employees and customers.

4.3 Servicing and delivery

Businesses often rely on deliveries to support the sale of products and/or services, as well as relying on services from other businesses such as refuse collection. These activities are often required to occur daily, and in some cases, multiple times per day. It therefore follows that temporary street closures, travel time alterations and alterations to car parking and loading zones could collectively or individually hinder servicing and delivery opportunities. This may temporarily impact travel times and vehicle-related costs as well as revenue for businesses.

Some business types are likely to be more affected by changes to access than others, particularly those that rely on timely deliveries or distribution. A key factor in receiving deliveries is access at the business location itself; this access is often reliant on dedicated loading zones.

Of the businesses surveyed, 62 per cent stated they were dependent on loading zones, 31 per cent majorly so. Forty-six per cent stated they were not dependent on loading zones at all.

Construction

The construction phase of the project would result in changes to loading zones, traffic performance and road network configuration, which can affect the reliability and timeliness of servicing and delivery. Survey responses indicated that during construction:

- Sixty per cent of businesses perceived construction would have a neutral effect, 39 per cent stated that it would have a negative effect and one business stated the effect would be positive
- Responses in all locations were mixed neutral/negative with the locations returning the largest proportion of negative responses being Frenchs Forest (61 per cent) and Manly Vale (50 per cent).

Operation

Upon operation, the project would result in changes to traffic flows and would have both positive and negative impacts on the availability of parking spaces and loading zones. This may influence servicing and delivery of goods with some businesses potentially benefiting from improved conditions while others may not. Of the businesses surveyed:

- About 54 per cent perceived that the operation of the project would have a positive effect on servicing and delivery, 43 per cent stated the effect would be neutral and four per cent stated it would be negative
- Across all centres, 40 per cent or more of businesses indicated servicing and deliveries would be positively affected, most significantly in Belrose (73 per cent), Frenchs Forest (78 per cent) and Warringah Mall (71 per cent)
- The locations perceived to be most negatively affected were Balgowlah and Manly Vale, in which eight per cent of businesses stated the effects would be negative.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect the efficiency of servicing and delivery.

4.4 Business visibility

Businesses that rely on storefront exposure to attract customers may be affected by the presence of construction hoardings or reduced visibility of business advertising.

Business survey results indicated that:

- Seventy per cent of businesses perceived they were dependent on business exposure and visibility with 47 per cent of those majorly dependent. Twenty-nine per cent of business respondents perceived they were not dependent
- Warringah Mall, Spit Junction and Frenchs Forest were the surveyed business centres that recorded the highest dependencies
- Personal services and accommodation and food services were the business types most dependent on business exposure and visibility.

Construction

The construction phase of the project would result in changes to the level of business exposure and visibility.

Business survey results indicated that:

- Most businesses (88 per cent) perceived there would be a neutral effect from the construction phase on business exposure and visibility, 10 per cent believed construction would negatively affect business exposure and visibility and two per cent believed business exposure and visibility would be affected positively
- One hundred per cent of businesses surveyed in Austlink Business Park and Frenchs Forest perceived construction would have a neutral effect on business exposure and visibility
- Businesses in Seaforth/Spit Bridge indicated a negative response (26 per cent) as did those in Warringah Mall and Manly Vale (19 per cent respectively). Small numbers of businesses in three centres perceived construction would have a positive impact (three per cent in Artarmon Industrial, four per cent in Balgowlah and seven per cent along Military Road).

Operation

Upon operation, the project would result in changes to vehicle, pedestrian and cyclist flows. This may influence the level of business visibility and exposure at some locations with some businesses benefiting as potential customers are redirected towards their business, while others might not, as vehicle traffic bypasses the centre. The business survey results indicated that:

- Most businesses (85 per cent) perceived there would be a neutral impact from operation on business exposure and visibility. Five per cent of respondents perceived construction would negatively affect business exposure and visibility and 10 per cent perceived business exposure and visibility would be affected positively
- Businesses in Artarmon Industrial (21 per cent) and Seaforth/Spit Junction (25 per cent) perceived they would have the largest positive change in business exposure and visibility. The largest negative effect was perceived among businesses along Military Road (17 per cent negative response). One hundred per cent of businesses in Frenchs Forest and Warringah Mall indicated they thought the effect would be neutral.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect business visibility.

4.5 Character and amenity

Amenity is generally associated with the pleasantness of an area or business environment, but also has a physical (or tangible) component. This includes the character and appearance of buildings, proximity to commercial or recreational facilities, quality infrastructure and absence of noise, unsightliness or offensive odours. It also has a psychological or social component.

The local character and amenity of a place can affect the enjoyment and desirability of the environment, visitation numbers and trends and consequently the economic activity of a commercial centre and the businesses located there. Of the businesses surveyed:

- Overall, 28 per cent perceived they had a low to moderate sensitivity to noise and 65 per cent had no sensitivity. The categories of personal services and accommodation and food services (including cafes and restaurants) were perceived to be more sensitive to noise. Business centres that identified as being more sensitive to changes in the acoustic environment were Military Road, Seaforth/Spit Bridge and Spit Junction
- Twenty-eight per cent perceived they had low to moderate sensitivity to diminished air quality, with the category of education perceived to be most sensitive to air quality alterations. Business centres that believed they would be more sensitive to changes in the air quality were Seaforth/Spit Bridge and Spit Junction
- Fourteen per cent perceived they had low to moderate sensitivity to odour and 77 per cent had no sensitivity. The category of personal services was perceived to be the most sensitive to odour. Business centres that identified as being more sensitive to odour were Seaforth/Spit Bridge and Spit Junction
- Nineteen per cent perceived they had low to moderate dependency on visual amenity and 66 per cent had no dependency. The categories of education and accommodation and food services were perceived to be most dependent on pleasant visual amenity. Business centres that thought they would be more dependent on pleasant visual amenity were Seaforth/Spit Bridge and Spit Junction
- Thirty per cent perceived they had moderate dependency on the identity and character of the business centre and 44 per cent had no dependency. The categories of education and accommodation and food services were perceived to be most dependent. Business centres that believed they would be more dependent on identity and character of the business area were Warringah Mall, Spit Junction, Seaforth/Spit Bridge and Frenchs Forest.

Construction

Construction works have the potential to temporarily affect the amenity of an area by altering the appearance of buildings through installation of construction hoardings, noise, construction equipment, unsightliness, odours, the removal of established vegetation, the installation of acoustic sheds, fencing, and/or the visual appearance of temporary construction support sites. These impacts would affect the overall amenity of the business environment and may impact where a person visits or purchase goods and services during the construction phase.

Construction may also generate noise levels that impede communication. This can affect the function of businesses that require interaction between customers and employees. Businesses such as retail, food and beverage services or customer support centres may experience communication difficulties during highly noisy activities, reducing the ability for employees to hear instructions and orders or conduct conversations, potentially increasing the instances of errors or reducing the number of sales.

Excess noise has the potential to affect employee productivity as staff may have greater difficulty concentrating on a task or may experience a reduction in their health and wellbeing (ie headaches, increased stress and anxiety). This may affect productivity, efficiency and revenue capacity of businesses, particularly if the construction activities continue for extended periods.

Food and beverage services that rely on outdoor dining may be particularly sensitive to quiet outdoor environments. Of the businesses surveyed:

- Thirty-three per cent perceived sensitivity to noise (five per cent stating that this sensitivity was major), while 65 per cent perceived no sensitivity to noise
- Eighty-nine per cent perceived the effect of construction on the amenity of their business would be neutral. Two per cent stated the effect would be positive, while eight per cent stated that the effect would be negative.

Operation

Operation of the project has the potential to alter the amenity and character of the environment via the removal and addition of infrastructure, alterations to landscaping and urban design features, increases or reductions in noise and air quality. These changes may affect the long term visitation patterns of a business area. Of the businesses surveyed:

- Eighty-eight per cent perceived the effect of project operation on the amenity of their business would be neutral. Eleven per cent perceived the effect would be positive, while two per cent perceived the effect would be negative
- The highest rates of positive responses were at Spit Junction (29 per cent) and Military Road (23 per cent)
- Businesses in two locations perceived operation would have a negative effect on business amenity. These were Balgowlah and Manly Vale, in which eight per cent of businesses returned negative responses.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect business character and amenity.

4.6 Demand for goods and services

The demand for goods and/or services can be described as the willingness and ability of buyers or consumers to purchase goods and services. The construction and operation of projects has the potential to directly and indirectly affect the local and regional demand for goods and services. This can be through basic increases in demand for construction material and services or in adversely through changes in trade catchments. The business survey indicated that most businesses perceived the project (construction and operation) would have a neutral effect on demand for goods and services.

Construction

The survey identified that most businesses in the study area believed that construction would have a neutral effect on demand for services and products. Of the businesses surveyed:

- Ten per cent of businesses commented that they would be negatively affected from customers avoiding the area due to the presence of construction support sites while others stated they would benefit from increased trade from construction workers in the area
- All businesses in Frenchs Forest and Belrose perceived there would be a neutral effect on demand for goods and services during construction.

- The business centres that recorded the most negative responses to demand during construction were Seaforth/Spit Bridge, where 26 per cent of businesses perceived their demand for goods and services would be affected negatively, followed by Manly Vale and Warringah Mall (19 per cent)

Locations with high dependency on amenity and high sensitivity to construction related disturbances (such as noise, vibrations and dust) are most likely to be impacted during the construction phase. In the business survey:

- Businesses in Seaforth/Spit Bridge (26 per cent), Manly Vale (19 per cent) and Warringah Mall (19 per cent) perceived they would experience the highest reduction in demand for service
- Some businesses perceived that they would suffer from customers avoiding the area due to the temporary construction support sites.

Operation

Business centres that experience alterations in access and connectivity, local amenity and population characteristics often experience alterations in demand for services upon operation of major infrastructure projects.

Businesses surveyed were asked to indicate how they thought the operation of the project would affect the overall demand for their services or products. The business survey found:

- Most (80 per cent) businesses perceived there would be no impact and 16 per cent had a positive perception of the project. Very few businesses (three per cent) thought there would be a negative impact to demand for services upon operation
- A small proportion of businesses in Balgowlah, Manly Vale and Military Road perceived demand for goods and services would be negatively affected during the operation phase (eight, 12 and seven per cent respectively)
- The majority of businesses in all locations perceived demand for goods and services would not be affected with a minority of businesses perceiving it would be affected positively, most significantly in Artarmon Industrial and Warringah Mall (30 and 33 per cent respectively). The exception was Frenchs Forest where all businesses perceived the effect of the project's operation on demand for goods and services would be neutral.

Section 5.0 and Section 6.0 identify and assess the business centres where construction and operational effects have the capacity to affect demand for goods and services.

5.0 CONSTRUCTION IMPACT ASSESSMENT

This section assesses the potential impacts that may be experienced by businesses and business centres in the study area during project construction. These works have the potential to affect businesses, employees and customers positively or negatively. An assessment of the proposed project activities has been carried out to determine the type, sensitivity and magnitude of the impacts and to identify measures to avoid, minimise, manage and mitigate these.

This section assesses business centres that have a higher likelihood of experiencing direct and indirect construction phase impacts. Only scoped issues that have been assessed to impact businesses have been included in the below assessment. If an issue is not listed, it is assumed to have a negligible impact. Details of construction activities can be found in Chapter 6.0 (Construction works) of the environmental impact statement. The section draws upon various environmental impact statement technical working papers to inform the extent of change from the existing environment, including:

- Technical working paper: Urban design, landscape character and visual impact assessment
- Technical working paper: Traffic and transport
- Technical working paper: Noise and vibration
- Technical working paper: Air quality.

5.1 Centre specific effects

The following sections present an impact assessment of business centres within the study area, as identified in Section 3.1. This section omits business centres which are considered unlikely to experience direct project effects. Businesses that adjoin centres, and are not located in the business zone extent, have also been considered in this assessment as part of the broader centre.

5.1.1 Eastern Precinct

This section assesses business centres and businesses surrounding the centres within the Eastern Precinct that have a higher likelihood of experiencing direct construction impacts.

5.1.1.1 Frenchs Forest Business Hub

As described in Section 3.1.1.1, Frenchs Forest Business Hub comprises a diverse range of uses including corporate offices, gym/fitness centres, sports facilities, storage facilities/warehouses, medical laboratories, distribution centres and bulky goods retailers.

Wakehurst Parkway north construction support site (BL14) would be located in the centre at the north-east of the intersection of Warringah Road and Wakehurst Parkway. Land to be occupied by the Wakehurst Parkway north construction support site (BL14) was previously used as a construction support site for the Northern Beaches Hospital Project.

Construction outcomes

The main construction changes for businesses would be from alterations in traffic and transport movements and an increase in construction vehicles.

Construction benefits

Potential benefits from these changes include:

- An increase in demand for services from workers within Wakehurst Parkway north construction support site (BL14). This is most likely to benefit food and beverage services and convenience retail.

Localised negative impacts

Table 5-1 assesses the potential impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-1: Frenchs Forest Business Hub construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> Peak construction would result in an additional 180 light vehicle and 95 heavy vehicle movements per day along Warringah Road over a five-year period For customers travelling north along Wakehurst Parkway an additional 590 light vehicle and 290 heavy vehicle movements per day would be occurring on the road This would impact on intersection performance and potentially cause travel time delays for customers and employees Bus stops within the construction zone along Wakehurst Parkway would be temporarily relocated, requiring customers and employees to alter travel routes affecting travel time. It is unlikely that many people from the business hub utilise the affected bus stops. 	Low	Low	Low
Servicing and delivery	<ul style="list-style-type: none"> Increased construction traffic along Warringah Road and Wakehurst Parkway potentially resulting in intersection and travel time delays for service and delivery vehicles located within Frenchs Forest Business Park. This is most likely to affect wholesale trade and bulky goods retailers due to higher dependency on service and delivery 	Low	Low	Low

Evaluation

There are likely to be temporary impacts on businesses during construction. The project construction phase would temporarily reduce the efficiency of movement to the centre, having minor effects on employee and customer access and servicing and delivery. Some businesses may benefit from an increase in demand for services. While businesses would have minor sensitivity to changes, generally they would retain a high ability to adapt to the alterations and would be able to continue operating.

Conclusion

Construction of the project would generate short-term, localised impacts on access and connectivity. Some retail and service businesses may benefit from an increase in demand for services.

Overall, construction is not anticipated to effect ongoing centre or business.

5.1.1.2 Manly Vale Business Centre

As described in Section 3.1.1.3, Manly Vale Business Centre occupies 16 hectares and comprises a range of commercial and retail businesses including supermarkets and bulky good retailing. Balgowlah Business Park is located on Roseberry Street and contains a range of different business types. The centre caters to both a neighbourhood and broader destination catchment.

The Manly Vale Business Centre is located in proximity to the construction footprint and Kitchener Street construction support site (BL11) around 700 metres away.

Construction outcomes:

The business environment in Manly Vale would be affected during the construction period by:

- Extensive road works along the Burnt Bridge Creek Deviation between Sydney Road and the Kitchener Street over bridge to connect tunnel portals
- Construction of a new access road to connect the tunnel portals to Sydney Road and connect to the new and improved open space and recreation facilities
- Additional construction vehicles in the area.

Construction benefits:

The centre may benefit from construction works in the area. Benefits may include an increase in demand for services from construction workers in the local area as the centre is one of the closest retail areas to the Kitchener Street construction support site (BL11). Specialised retailers such as the hardware store, cafes, grocery and convenience retail are most likely to benefit from increased trade.

Localised negative impacts

Table 5-2 assesses local negative impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-2: Manly Vale Business Centre construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> Minor reduction in intersection performance at Sydney Road/Manly Road/Burnt Bridge Creek Deviation potentially having flow on effects to Condamine Street. This may increase travel time during peak periods. This is more likely to impact commercial offices and retail providers with 'standard' business operating hours than shift workers Bus access would be maintained along a 24-hour bus lane next to the Burnt Bridge Creek Deviation on a temporary road to the north. 	Low	Low	Low
Servicing and delivery	<ul style="list-style-type: none"> The project would not involve any changes to parking and loading zones in the precinct Minor alterations to traffic conditions may marginally impact service and delivery efficiency to the centre. This would particularly affect the specialised retailers that receive and distribute products or stock such as the local supermarkets, liquor stores, hardware, homewares, cafes and restaurants. 	Low	Low	Low

Evaluation

Changes to the road network would be noticeable and may affect the efficiency of access for employees, customers and for servicing and deliveries for numerous businesses within the centre. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the centre. Effects on character and amenity, business visibility and employee productivity and communication are not anticipated at this centre. Construction in the area may increase demand for some specialised retail, food, beverage, and convenience businesses.

Conclusion

The area has a strong trade catchment supporting local residents and workers and the wider Northern Beaches and North Shore area. While construction would alter access arrangement and potentially marginally increase demand for services, businesses would be able to adapt to any positive or negative changes.

Overall, construction is not anticipated to affect ongoing centre or business performance.

5.1.1.3 Balgowlah Centre

As described in Section 3.1.1.4, Balgowlah Centre occupies five hectares and comprises Stockland Balgowlah and a number of retail and commercial businesses such as travel agents, a gym/fitness centre and personal services businesses. The centre also contains several cafes and restaurants. The centre is located on Sydney Road between Boyle Street and Woodland Street. The centre caters primarily to a neighbourhood catchment.

The Balgowlah Centre is located around 800 metres away from the nearest point of the construction footprint and support sites at Balgowlah Golf Course (BL10) and Kitchener Street (BL11).

A neighbourhood centre is located on the corner of Dudley Street and Sydney Road directly adjoins the Balgowlah Golf Course construction support site (BL10). Another cluster of shops is also located near this construction site at the intersection of Wanganella Street and Sydney Road. This cluster includes more sensitive businesses. A fuel station on the corner of Maretimo Street and Sydney Road adjoins the proposed signalised intersection.

Construction outcomes:

The business environment in Balgowlah would be affected during the construction period by:

- Road works at the Burnt Bridge Creek Deviation, around 700 metres to the north-west
- Works associated with the construction of a ventilation outlet and motorway facilities
- Construction of a new access road to connect the tunnel portals to Sydney Road and connect to the new and improved open space and recreation facilities
- Changes in the noise environment due to establishment and operation of the BL10 construction support site
- Local road upgrades near the tunnel connections
- Upgrades to the existing drainage infrastructure.

Construction benefits:

Both the neighbourhood centre and Balgowlah Centre may benefit from construction works in the area. Benefits may include an increase in demand for services from construction workers in the local area as the neighbourhood centre is one of the closest retail areas to the Balgowlah Golf Course construction support site (BL10). Food and beverage retailers, grocery and convenience stores are most likely to benefit from increased trade with workers dropping in before or after their shifts.

Localised negative impacts

Table 5-3 assesses local negative impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-3: Balgowlah Centre construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> General changes in traffic flows arising from increases in construction traffic volumes which may impact employee or customer access. However, most construction vehicles would generally operate outside of morning and evening peak hours Reduced intersection performance at Sydney Road/Manly Road/Burnt Bridge Creek Deviation and Maretimo Street/Sydney Road. This is likely to increase travel time during peak periods and more likely to impact commercial offices with 'standard' business operating hours than shift workers. Efficiency of access for employees at the Northern Beaches Secondary College Balgowlah Boys Campus would also be affected Bus access would be maintained along a 24-hour bus lane next to the Burnt Bridge Creek Deviation on a temporary road to the north Car parking areas for construction workers would be provided at BL10. Therefore, no loss of parking on adjacent streets is anticipated during construction. 	Low	Low	Low
Servicing and delivery	<ul style="list-style-type: none"> The project would not involve any changes to parking and loading zones in the centre Altered traffic conditions may impact service and delivery efficiency to the centre. This would particularly affect the food and beverage businesses that receive and distribute products or stock such as the local supermarkets, liquor stores, cafes and restaurants. 	Low	Low	Low
Character and amenity	<ul style="list-style-type: none"> Increase in environmental noise due to increases in vehicles along Sydney Road Increase in noise levels at businesses located in the neighbourhood centre zones at Wanganella Street and Maretimo Street due to enhanced noise from site establishment and surface road works associated with the Balgowlah Golf Course B10 construction support site. The businesses are less sensitive to changes in amenity and would generally be able to adapt to the change. 	Low	Low	Low
Employee productivity and communication	<ul style="list-style-type: none"> Slight increase in noise levels that may affect employee productivity and communication for businesses located in the neighbourhood centre zone at Dudley Street and Coral Street. Commercial premises on Wanganella Street may experience minor increases in noise, however employee productivity and communication capacity would be maintained. 	Low	Negligible	Negligible

Evaluation

Changes to the road network would be noticeable and may affect the efficiency of access for employees, customers and for servicing and deliveries. The character and amenity of the area would be altered from airborne noise increases during construction site establishment and surface works. Businesses in the neighbourhood centre zones closest to the construction site would be most susceptible to the changes. Due to the type of businesses operating in these neighbourhood centre zones, it is unlikely the noise impacts would affect employee productivity or communication capacity. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the Balgowlah Centre or neighbourhood centre

The area has a strong local catchment, primarily serving residents, workers and the occasional visitor. Construction in the area may benefit food, beverage and convenience retailers.

Conclusion

Businesses have a strong local catchment, and while construction would alter access arrangements and potentially marginally increase demand for services, any positive or negative changes would be minor.

Overall, construction is not anticipated to effect ongoing centre or business performance.

5.1.1.4 Seaforth Centre

As described in Section 3.1.1.5, Seaforth Centre is located along Sydney Road and provides services and retail shops for the local neighbourhood. Businesses are predominantly cafes, restaurants, real estate agents, a veterinary hospital, post office and personal services businesses. A Bupa aged care facility and Balgowlah RSL Club are the largest businesses in the centre.

The catchment of the Seaforth Centre would be impacted by construction works at Balgowlah and along Wakehurst Parkway to Frenchs Forest, as the centre is located around:

- 200 metres to the south-west of Balgowlah Golf Course construction support site (BL10)
- 900 metres to the south-west of the Kitchener Street construction support site (BL11)
- 1.3 kilometres to the north-east of the Spit West Reserve construction support site (BL9)
- 1.9 kilometres to the south-east of Wakehurst Parkway south and east construction support sites (BL12 and BL13)
- 2.2 kilometres to the south-east of the start of road widening works on Wakehurst Parkway.

A small neighbourhood centre at the intersection of Burnt Street and Kirkwood is also near Wakehurst Parkway south construction support site (BL12).

Construction outcomes

- Changes in the traffic environment for motor vehicles with extended wait periods at the Manly Road/Sydney Road/Burnt Bridge Creek Deviation intersection affecting the amenity of the centre and transport efficiency
- Changes in the noise environment from airborne and ground borne noise associated with the establishment of the Balgowlah Golf Course construction support site (BL10), tunnelling works, surface works and construction of the new and improved open space and recreation facilities
- Increased construction vehicle movements and construction workers in the vicinity of the centre.

Construction benefits

Potential benefits from these changes include:

- An increase in passing trade from workers travelling to/from construction support sites at Wakehurst Parkway south, Wakehurst Parkway east, Kitchener Street, Balgowlah Golf Course and Frenchs Forest. This is most likely to benefit food and beverage services and convenience retailers
- An increase in business visibility due to an additional construction vehicles and workers travelling through the centre. This is most likely to benefit the food and beverage businesses such as the local supermarkets, liquor stores, cafes and restaurants
- The small convenience centre on Kirkwood Street is the closest retail centre to Wakehurst Parkway south and east construction support sites and may benefit from an increase in demand for services from construction workers in the local area. Food, beverage and convenience retailers are most likely to benefit from increased trade
- Seaforth local centre is the closest retail centre to the Balgowlah Golf Course construction support site and would potentially benefit from an increase in demand for services.

Localised negative impacts

Table 5-4 assesses local negative impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-4: Seaforth Centre construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> General changes in the traffic environment arising from Balgowlah Golf Course and Wakehurst Parkway south and east construction traffic. Peak daily movements indicate up to an additional 770 light vehicles could be travelling along Wakehurst Parkway. A proportion of these may travel through Seaforth Centre. Heavy construction vehicles would generally operate outside of morning and evening peak hours with spoil trucks that originate from Wakehurst Parkway east construction support site (BL13) being directed to travel north via Wakehurst Parkway and Warringah Road to avoid potential impacts to the Seaforth Centre Reduced intersection performance at Sydney Road/Manly Road/Burnt Bridge Creek Deviation is likely to increase travel time during peak periods. This is more likely to impact commercial businesses with 'standard' business operating hours with the potential for some customers and employees to run late or avoid the area No changes to parking and loading zones as construction parking would be provided as part of the Balgowlah Golf Course construction support site (BL10) and Wakehurst Parkway south construction support site (BL12). 	Low	Low	Low
Servicing and delivery	<ul style="list-style-type: none"> Increased delivery times due to changed traffic conditions (as described above). This would particularly affect the food and beverage businesses that receive and distribute product or stock such as the local supermarkets, the liquor stores, cafes and restaurants. 	Low	Low	Low
Character and amenity	<ul style="list-style-type: none"> Some reduction in amenity arising from increased wait times at the intersection. The cafes and restaurants along Sydney Road, particularly those with outdoor dining, are most likely to be impacted by reduced amenity from both traffic noise associated with the increase in wait times at the intersection Increase in noise levels at businesses located in the neighbourhood centre zones at Dudley Street and Coral Street due to enhanced noise from site establishment and surface road works associated with the Balgowlah Golf Course B10 construction support site. The businesses are less sensitive to changes in amenity and would generally be able to adapt to the change Increase in ground-borne noise levels from incremental works such as large rock hammering potentially affecting businesses fronting Sydney Road, Ethel Street and Burnt Street Businesses fronting Sydney Road and Ethel Street fall within the human response extent from vibration minimum working distance during rock hammer tunnelling. This form of construction would be incremental, and businesses would be able to adapt. 	Moderate	Low	Moderate-low

Evaluation

Any effects would be experienced at an individual business level, with limited discernible changes to overall performance of the business centre. Changes to the road network would be noticeable and may affect the efficiency of access for employees, customers and for servicing and deliveries. While there may be temporary impacts on some businesses during construction, there is not expected to be a lasting impact on the centre. Effects on character and amenity would be altered due to extended traffic movement periods and ground and airborne noise from tunnelling and construction site establishment. Effects on employee productivity are not anticipated.

The area has a strong local catchment, primarily serving residents, workers and the occasional visitor. Construction in the area may benefit food, beverage and convenience retailers as well as personal service businesses such as hairdressers and allied health services.

Conclusion

Businesses have a strong local catchment, and while construction would alter the traffic environment and potentially marginally increase demand for services, any positive or negative changes would be minor.

Overall, construction is not anticipated to effect ongoing centre or business performance.

5.1.2 Western Precinct

This section assesses business centres and businesses surrounding the identified centres within the Western Precinct that have a higher likelihood of experiencing direct construction impacts.

5.1.2.1 Artarmon Industrial

As described in Section 3.1.2.1, Artarmon Industrial precinct is oriented around automotive, bulky goods, warehousing, film related industries and specialty manufacturing. The centre is a major distributor of goods and services and would be heavily dependent on access.

Artarmon Industrial precinct is located next to the Punch Street construction support site (BL3), the Barton Road construction support site (BL5), Dickson Avenue construction support site (BL4) and the Gore Hill Freeway median construction support site (BL6).

Construction outcomes

Several project elements are located next to the precinct requiring the demolition of existing buildings and realignment of roads associated with the Gore Hill Freeway connection. The main construction effects on businesses would be from:

- Construction and operation of tunnel construction support facility (including acoustic shed) at Punch Street
- Construction of motorway facility and ventilation outlet located on Dickson Avenue and motorway control centre on the Gore Hill Freeway
- Australia post mail zone will be relocated as well as the bus stop
- Alteration of pedestrian flows due to a shared path on the southern side of the Gore Hill Freeway, replacing and connecting to the existing path along Punch Street
- Removal of vegetation next to the Gore Hill Freeway, reducing the visual buffer between the path and nearby businesses
- Removal of the connection between Punch Street and Lambs Road, Artarmon, with conversion of Punch Street to a cul-de-sac
- Removal of the connection between Dickson Avenue east and Reserve Road, Artarmon, with conversion of Dickson Avenue to the east of Reserve Road to a cul-de-sac
- New road connection from portal to Reserve Road

- New traffic light intersection at Dickson Avenue and Pacific Highway, requiring the removal of six motorbike parking space and three, four hour car parking spaces and temporary lane closures of the Pacific Highway while reconfiguration occurs
- Site hoardings would be located along Punch Street impacting business amenity.

These effects would be more strongly felt by businesses adjoining construction support sites with the magnitude of impact dissipating the further the business is from the construction works.

Construction benefits

Potential benefits from these changes include:

- Additional pedestrian and cyclist passing trade would be experienced at Francis Road, Lambs Road, Cleg Street and Reserve Road due to diversions caused by the closure of the shared path next to the Gore Hill Freeway between Reserve Road and Chelmsford Avenue. This is likely to result in increased passing trade for businesses located along these streets
- Potential increase in passing trade and business visibility from additional constructions vehicles:
 - About 120 light vehicles and 35 heavy vehicle movements per day on Barton Road via Reserve Road
 - About 100 light vehicles and 10 heavy vehicle movements per day on Gore Hill Freeway Pacific Highway on ramp
- The centre is the closest commercial area to construction support sites at Punch Street (BL3) and Dickson Avenue (BL4) and may benefit from an increase in demand for services from construction workers in the local area.

Localised negative impacts

Table 5-5 assesses the local negative impacts that may arise during construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-5: Artarmon Industrial construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> ● Gore Hill Freeway/Reserve Road intersection would experience a reduced level of performance during morning peak periods to allow for construction vehicles to access and egress the Punch Street construction support site (BL3) – this additional traffic would have minimal impact on businesses within the Artarmon Industrial Centre as this interchange already performs poorly ● The introduction of traffic at the intersection of Pacific Highway with Dickson Avenue, including the removal of motorbike and carparking would cause temporary delays in accessibility for businesses on Dickson Avenue ● Reduced performance at Reserve Road/Dickson Avenue intersection during the evening peak. However, impacts on customer and employee access were considered minimal as these interchanges would still operate with spare capacity and at an acceptable level of service ● Minimal disruptions to traffic flows with potential to impact on journey times including bus trips during morning and evening peaks along: 	Moderate	Moderate	Moderate

Issue	Construction effects	Sensitivity	Magnitude	Significance
	<ul style="list-style-type: none"> – Reserve Road – Dickson Avenue – Frederick Street – Herbert Street – Punch Street – Hampden Road – Barton Road – Butchers Lane • The T2 transit lanes currently in operation along the Gore Hill Freeway would be permanently removed during construction of the Gore Hill Freeway connection. This is not expected to materially impact employee and customer travel times by bus • Competition for parking may increase with additional construction workers in the area. Workers will be encouraged to make use of public transport • Temporary lane closures on Reserve Road would impact bus services • On ramp and off ramp closures to Gore Hill Freeway could affect access patterns • A bus stop would be relocated which has the potential to cause minor inconvenience for employee and customer access, particularly people with impaired mobility • The eastern Hampden Road footpath between the Gore Hill Freeway bridge structure and Parkes Road would be amended to allow site access across this footpath. Traffic controllers are likely to be required. 			
Servicing and delivery	<ul style="list-style-type: none"> • Full closure of Lambs Road between Punch Road and Cleg Street affecting servicing and deliveries for commercial premises who have the potential to be dependent on access and connectivity • Periodic closures of Reserve Road, Hampden Road, Dickson Avenue and Punch Street during construction would impact services and deliveries • Reduced intersection performances, road closures and increased construction traffic during morning and evening peaks (identified above) would increase travel times for delivery vehicles for businesses located within Artarmon Industrial • Competition for parking may increase with additional construction workers in the area. 	Moderate	Moderate	Moderate
Character and amenity	<ul style="list-style-type: none"> • Industrial land use generally has a lower dependency on character and amenity than commercial or mixed use. However, construction effects on amenity and character may be experienced due to: <ul style="list-style-type: none"> – Visual presence of construction, including construction workers, site hoardings, construction vehicles and construction equipment – Impacts relating to construction of the motorway facility and ventilation outlet (at Punch Street) and the motorway control centre (at Reserve Road)) to be minimised by ensuring the design is recessive and 	Low	Moderate	Moderate-low

Issue	Construction effects	Sensitivity	Magnitude	Significance
	<p>integrated with the surrounding buildings and industrial context</p> <ul style="list-style-type: none"> – Loss of vegetation along Gore Hill Freeway during construction – Increased noise during construction, specifically along Punch Street, Cleg Street, Waltham Street and Gore Hill Freeway. Businesses immediately adjoining the construction support sites Punch Street (BL3) and Dickson Avenue (BL4) would be the most affected – Vibration effects may be experienced by businesses in proximity to the construction support site Punch Street (BL3) and Dickson Avenue (BL4), specifically businesses along Punch Street, Herbert Street and Cleg Street. More sensitive businesses in the area such as print, film production and veterinary hospitals would be more sensitive to vibration impacts. 			
Employee productivity and communication	<ul style="list-style-type: none"> • Businesses along Punch Street, Cleg Street, Waltham Street and Gore Hill Freeway may experience higher noise levels affecting employee productivity and communication • Eighteen commercial and industrial businesses directly adjoining the Gore Hill Freeway Connection surface road works may experience significant increases in noise levels that may incrementally affect employee productivity and communication capacity. Some businesses including media production companies, childcare, office and hospitality services would be more sensitive to this change. 	Low	Low	Low
Business visibility	<ul style="list-style-type: none"> • Site hoardings may impact business visibility along Punch Street and Dickson Avenue. 	Low	Low	Low

Evaluation

While there are likely to be temporary potential impacts on businesses during construction. Localised negative construction effects would be explicitly felt by businesses near (within 400m) the construction footprint, particularly those more reliant on efficient servicing and delivery, quiet environments and a pleasant amenity. Although the visual landscape of the centre would be altered temporarily during construction, industrial land use generally has a lower sensitivity to changes in landscape character and amenity and is unlikely to impact on the industrial areas role and function.

Overall, construction would likely have a discernible negative impact on the centre, but the centre would have minimal vulnerabilities to the change and the change would be short term.

Conclusion

The project would have short-term, localised impacts during construction that would affect businesses. Some businesses may benefit from an increase in demand for services, passing trade and business visibility during construction.

Overall, construction is not anticipated to effect ongoing centre or business performance.

5.1.2.2 Miller Street Cammeray

The Miller Street Cammeray centre (described in Section 3.1.2.2) contains a diverse mix of uses including a Stockland's shopping centre, food and beverage retailers, commercial businesses and

neighbourhood shops. The Miller Street Cammeray centre is located around 300 metres from the Cammeray Golf Course construction support site (BL1).

Construction outcomes

The main construction effects on businesses would be from:

- Changes in access arrangements for pedestrian, cyclist and motor vehicles
- Changes to parking arrangements and restrictions along some sections of Miller Street
- Changed access arrangements removing direct connections between the Sydney Harbour Tunnel and Miller Street at Cammeray.

Construction benefits

The centre is the closest retail location in proximity to the Cammeray Golf Course construction support site (BL1) and may experience an increase in demand for services from construction workers in the local area. Businesses in the centre may also experience increased business visibility from construction workers accessing the site from the Miller Street/Warringah Freeway on ramp. Use types more likely to benefit from construction include convenience retailers and food and beverage retailing.

Localised negative impacts

Table 5-6 assesses local negative impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-6: Miller Street Cammeray Centre construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> ● Local surface works and alterations on Miller Street near Amherst Street which may generate slight delays ● Marginal increase in construction traffic from vehicles using Miller Street/Warringah Freeway for entry to Cammeray Golf Course construction support site (BL1) ● No local road, pedestrian or parking changes are expected. 	Low	Negligible	Negligible

Evaluation

While some employees and customers may be slightly affected by changes in the traffic environment, the impact on the overall function of the business centre would not be discernible. Effects on passing trade, servicing and delivery, character and amenity and employee productivity and communication are not anticipated at this centre.

Conclusion

Businesses have a strong local catchment, and while construction would slightly alter the traffic environment and potentially marginally increase demand for services, business visibility and passing trade, any positive or negative changes would be minor.

Overall, construction is not anticipated to effect ongoing centre or business performance.

5.1.2.3 The Spit

As described in Section 3.1.2.6, the Spit is located along Spit Road at Middle Harbour and is home to several boating related businesses and a small commercial element. These businesses include three marinas, cafes and restaurants serving a local and visitor catchment. There is also Middle Harbour Yacht Club, which is used as a wedding venue as well as by members. The commercial element consists of a small amount of office space on the eastern shore of The Spit.

The foreshore section of The Spit centre includes a pleasant promenade with water views west over Middle Harbour. The reserve is visually separated from Spit Road by mature tree planting and earth

mounding. The catchment of The Spit Centre is located around 100 metres from the Spit West Reserve construction support site (BL9).

Construction outcomes

The main construction effects on businesses would be from:

- Alterations to character and amenity within the Spit West Reserve
- Increased construction vehicle movements and construction workers in the vicinity of this centre
- Changes in access arrangements for maritime users due to temporary relocation of moorings.

Construction benefits

Potential benefits from these changes include:

- An increase in passing trade most likely to benefit cafes and restaurants due to:
 - Up to an additional 200 light vehicle movements per day at Spit West Reserve with 71 additional movements in the morning peak and 86 additional movements in the evening peak
 - Up to an additional 220 heavy vehicle movements per day at Spit West reserve with 60 movements in the morning peak and 60 in the evening peak.
- An increase in business visibility from construction workers accessing construction compounds
- An increase in demand for services due to more construction workers in the area.

Localised negative impacts

Table 5-7 assesses local negative impacts that may arise during project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-7: The Spit construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> ● Construction would require the temporary relocation of moorings in Middle Harbour, including in Pearl Bay, adjacent to Seaforth Bluff and those located next to Spit West Reserve construction support site (BL9). Relocations would be required for about four years and would affect 55 private and commercial moorings. 	Moderate	Low	Moderate-Low

Issue	Construction effects	Sensitivity	Magnitude	Significance
Character and amenity	<ul style="list-style-type: none"> • New built form elements would be introduced into Spit West Reserve, altering the character of the park and making a section inaccessible to the public. The character of the foreshore would also be impacted with an increased exposure to construction built form • There would be a reduction navigable (clear) water within this section of the bay • Increase in construction related traffic may impact on visual amenity • Alterations in visual amenity are unlikely to adversely affect the cafes, restaurants and the function rooms/event spaces, which have a high dependency on visual amenity. This is due to the orientation of view corridors, from the surrounding businesses, overlooking unobstructed areas or already being impeded by the established marina • Increases in noise levels associated with the Middle Harbour Crossing construction works. The café and restaurants associated with the marina on the western side of Spit Road would be more sensitive and exposed to the changes • Increase in noise levels associated the Spit West Reserve construction support site (BL9) potentially affecting the amenity of more sensitive café, restaurant and event businesses on both sides of Spit Road • Construction dust from the operation of the construction site would potentially result in additional cleaning for surrounding businesses with cafes, restaurants and boat sales more sensitive. 	Moderate	Low	Moderate-low

Evaluation

Businesses at The Spit are destination-services as many customers would drive specifically to the businesses. They also service local residents who visit to enjoy the foreshore and amenity of the area. During construction, The Spit is likely to be negatively impacted due to alterations in local amenity and slight reductions in accessibility. Increases in noise levels and construction dust would result in a discernible change from the existing environment. Businesses would generally be less affected by obstructions to view corridors. Local businesses, particularly local cafes may benefit from an increase demand for services. Effects on servicing and delivery and employee productivity and communication, are not anticipated at this centre.

Conclusion

Businesses are destination-services, and while construction would alter the character and amenity of the Spit West Reserve and change accessibility for some maritime users, the change would be minor. Any positive effects generated from demand for services or passing trade would be at an individual business level.

Overall, construction is not anticipated to effect ongoing centre or business performance.

5.2 Property acquisition effects

The nature of direct property impacts, including details of property acquisitions, temporary occupation of land and settlement and subsidence impacts are detailed in Chapter 20 (Land use and property) of the environmental impact statement. This section identifies the consequence of these direct property acquisitions on businesses.

Businesses have specific and individual needs, including but not limited to the location of the business premises, access to the business by employees and customers and the ability to deliver and receive goods and services. The acquisition of properties, including cessation of leases, and subsequent relocation or closure of businesses has the potential to result in:

- Disruptions to business operation
- Loss of revenue
- Relocation and re-establishment costs
- Training expenses for new employees and cost of productivity loss until new workers are at the same skill productivity level as the old
- Trade catchment alterations
- Business closure.

The project has been designed to minimise the need for surface property acquisition and occupation, where feasible. However, given the limited availability of land in the area identified for the project and the desire to minimise acquisition of private residential property, some commercial properties would be required to facilitate construction of the project, resulting in the temporary occupation or permanent acquisition of private land.

The following table provides a more detailed overview of acquisitions as they relate to business uses. Refer to Chapter 20 of the environmental impact statement for a full list of acquisitions, including residential and recreation space that is not the subject of this report.

Table 5-8: Commercial and industrial acquisition requirement for the project

Location	Full/Partial	Acquisition type	Zoning	Lot and DP	Description*
Artarmon					
Reserve Rd at Artarmon	Full	Permanent	IN1 General Industrial	B/DP358256 A/DP939656 1/DP1088625 B/DP/939656	Car parts retailers, motor repair and car wash, hotel/TAB, restaurant, media company
Dickson Avenue at Artarmon	Full	Permanent	IN1 General Industrial	6/DP843043 5/DP843043 7/DP843043 A/DP358256 11/DP574398	Carpark
Waltham St at Artarmon	Full	Permanent	IN1 General Industrial	A/DP334161	Industrial supplies retailer
Punch St at Artarmon	Full	Permanent	IN1 General Industrial	20/A/DP4397 19/A/DP4397	Production company
Cleg St at Artarmon	Full	Permanent	IN1 General Industrial	33/A/DP4397 34/A/DP4397	Industrial supplies retailer
Lambs Rd at Artarmon	Full	Permanent	IN1 General Industrial	39/A/DP4397 40/A/DP4397 35/A/DP4397 37/A/DP4397 38/A/DP4397 36/A/DP4397	Swim school (indoor), catering and events, skin care and cosmetic manufacturing

*Note commas separating services in the description indicate a separate business

Land which would be acquired is predominantly used for commercial use, light industrial use or speciality services. These businesses would service a wider area and would likely employ a small number of workers. Due to the function of these businesses and the fixed supply of alternative industrial zoned land in the surrounding area, it is likely that these businesses would relocate to another trade catchment.

This would result in relocation and establishment costs with potential loss in trade and revenue during this time for individual businesses.

The project would introduce permanent land use impacts at Balgowlah Golf Course as a result of the construction and alignment of tunnel portals, a new access road through the golf course, the establishment of a motorway facility and the realignment and reconstruction of the shared path on the eastern side of Burnt Bridge Creek Deviation. The design of permanent operational infrastructure at this location has been optimised to maximise residual space for future recreation uses. Residual land, primarily to the east and north of the new access road, would progressively become available through the construction period, which would facilitate re-purposing it to the new and improved public open space and recreation facilities. This would allow it to be handed over progressively for use by the community.

The closure of Balgowlah Golf Course would result in a loss of employment. Engagement with Northern Beaches Council has identified potential for the residual land to be developed for new and improved public open space and recreation facilities. Use of the residual land for such facilities would align with the Northern Beaches Sportsground Strategy (Northern Beaches Council, 2017a) which provides for the long term planning of sporting and recreational facilities across the local area. A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council will take place to give the community an opportunity to provide input on the final layout of the new open space and recreation facilities at Balgowlah.

Of the businesses affected by property acquisitions, there are limited co-dependencies or synergies between those that would be acquired and those that would remain operational in the surrounding catchment. Therefore, the operation of remaining businesses would not be substantially affected by these changes.

Table 5-9 assesses potential property impacts that may arise from project construction that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-9: Property acquisition issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Property acquisition	<ul style="list-style-type: none"> • Twelve businesses would no longer be able to operate resulting in a loss of employment • The businesses required to close or relocate were not considered to have synergies with surrounding businesses • Other properties required were vacant or already owned and operated Transport for NSW • The effects of acquisition would be experience by individual business and the broader community that use the business. 	High	Moderate	Moderate-High

Evaluation

Overall, the number of acquisitions and businesses required to cease operation to facilitate the project is relatively low for an infrastructure project of this scale. The impact upon these businesses would be somewhat mitigated by the implementation of the acquisition and compensation process in line with the *Determination of compensation following the acquisition of a business guideline* (NSW Government, not dated). This guideline provides direction to all NSW acquiring authorities in determining compensation for a business conducted on land that is acquired in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991 (NSW)*. It is acknowledged in the guide that each case for business interest compensation should be considered on its individual merits. The business interest may be in the same ownership as the ‘land’ or may be a non-related party.

Any future development (including non-residential development) at heights of 20 metres or higher near ventilation outlets would require planning controls to ensure they are not adversely impacted by the

ventilation outlets. The development of planning controls would be supported by detailed air quality modelling. Further details are provided in the Technical working paper: Air quality (ERM, 2020).

Conclusion

Construction of the project would have permanent impacts on a discrete number of businesses. Negative impacts would be limited to the individual businesses and would unlikely affect the broader business environment or industries.

5.3 Maritime construction effects

The water-based construction associated with the proposal would include the following construction support sites: Middle Harbour south cofferdam (BL7), Middle Harbour north cofferdam (BL8) and Spit West Reserve (BL9). The construction activities would include:

- Up to six closures (full and partial) of Middle Harbour between Northbridge and Seaforth for a period of up to 48 hours during weekdays
- Establishment and operation of the Spit West Reserve construction support site (BL9) in Pearl Bay for over four years
- Installation of cofferdams offshore at Clive Park and Seaforth Bluff
- Dredging activities and the installation of immersed tube tunnel support piles over a period of two years and three months
- Temporary relocation of swing moorings for over four years
- Barge movements to and from the project construction support sites, transporting material and housing machinery
- Boat movements for transporting the construction workforce
- Barge movements for delivering concrete.

Where possible, impacts to waterway users have been minimised by minimising the movement of moorings, limiting closures and maintaining access generally with designated controlled waterway routes through the harbour crossing site. Construction would only require very minimal harbour closures (four partial closures and two full closures of up to 48 hours in each instance of Middle Harbour between Northbridge and Seaforth to facilitate immersions of the immersed tube tunnel units ie a total of up to 12 days) and route alterations that would affect businesses as discussed below.

Table 5-10 assesses negative maritime impacts that may arise during project construction that have the capacity to affect maritime business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 5-10: Maritime construction issues appraisal

Issue	Construction effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> Construction vessels travelling from the outer Sydney Harbour to Middle Harbour would complete their journey when the Spit Bridge is open. Given the length, limited speed and limited manoeuvrability of the immersed tube tunnel segments, the construction contractor may be required to arrange special bridge opening times outside of peak traffic periods in order to transport these segments to their intended destination. Additional bridge opening times would have a limited impact on maritime businesses. However, any additional opening times would require special arrangements and permits to be obtained Some of the moorings to be impacted during construction are commercial. These moorings would be temporarily relocated as close as possible to their original locations during construction. 	Negligible	Low	Negligible
Amenity	<ul style="list-style-type: none"> Impacts on local amenity and altering the views, character and identity of a local centre for Mosman Rowing Club, Northbridge Sailing Club (including Seaforth Moth Sailing Club), Middle Harbour Yacht Club, and businesses located at The Spit local centre. 	Low	Low	Low
Restricted access capacity	<ul style="list-style-type: none"> The project would result in minimal temporary closures to Middle Harbour between Northbridge and Seaforth (four partial closures and two full closures, for a total of up to 12 days during construction). These closures would occur on weekdays to limit the disturbance to harbour recreational users, community groups and clubs. During full closure of Middle Harbour, no boating traffic would be able to pass the location of the Middle Harbour crossing. During partial closure of Middle Harbour, navigational restrictions would prohibit larger vessels from crossing the harbour between Northbridge and Seaforth. Smaller vessels passing through may require escort vessels to be provided. This would result in periods of traffic disruptions, potentially affecting recreational movements and access and connectivity sporting clubs associated with Middle Harbour. During all other days of the construction, partial restrictions of Middle Harbour with controlled access through the site would be required. Recreational users, such as boating, sailing, rowing and kayaking would be allowed to travel through the site in a controlled manner ensuring the safety of both the waterway user and the project team. Access to the foreshore would be maintained where feasible throughout construction. 	Low	Low	Low
Travel time delays	<ul style="list-style-type: none"> Business harbour users such as boat hire businesses and commercial boats would experience a minor increase in travel time resulting from imposed speed restrictions during construction. 	Negligible	Low	Negligible

Issue	Construction effects	Sensitivity	Magnitude	Significance
Operation impacts	<ul style="list-style-type: none"> Interference with training routes used by members of the Mosman Rowing Club and course layouts for Northbridge Sailing Club (including Seaforth Moth Sailing Club) or interference with kayak routes have the potential to result in existing members joining an alternative club. Any impacts on the club may also have indirect impacts on cafes in the Spit which are often visited by club members after training Increased wash from an additional 68 daily barge and workboat movements between Spit West Reserve and the cofferdams and dredging works. Duration of peak works would be relatively short, around two days. 	Low	Low	Low

Evaluation

During construction, maritime businesses and waterway users would experience temporary alterations in access and amenity. Businesses and users will be able to adapt to the change with some disruptions to the way they operate or use the waterway. While there may be temporary impacts during construction, there is not expected to be a lasting impact on businesses. Measures would be defined that outline how marine works would be carried out and mitigate as far as practical potential business impacts. Any effects would be experienced at an individual business level, with no discernible changes to overall performance of the broader maritime industry.

Conclusion

Overall, construction of the project would have short term negative effects at an individual business level, with no discernible changes to the broader maritime business environment.

6.0 OPERATIONAL IMPACT ASSESSMENT

This section provides an assessment of the potential impacts to businesses that may occur due to the operation of the project. Key features of the project are identified in Section 1.1 of this report and a detailed description of the project is provided in Chapter 5 (Project description) of the environmental impact statement.

The proposed works have the potential to affect businesses, employees and customers positively or negatively. This section assesses business centres that have a higher likelihood of experiencing direct and indirect impacts associated with the operation of the project and broader impacts across the transport network. This section draws on various environmental impact statement working papers to inform the extent of change from the existing environment, they comprise:

- Technical working paper: Urban design, landscape character and visual impact assessment
- Technical working paper: Traffic and transport
- Technical working paper: Noise and vibration
- Technical working paper: Air quality.

6.1 Centre specific effects

The following section presents an impact assessment of business centres within the study area, as identified in Section 3.1. This section has omitted business centres which are considered unlikely to experience project affects. Businesses that adjoin centres, and are not located in the business zone extent, have also been considered in this assessment as part of the broader centre.

6.1.1 Eastern Precinct

This section assesses business centres, and businesses surrounding the centres, within the Eastern Precinct that have a higher likelihood of experiencing operational impacts.

6.1.1.1 Frenchs Forest Business Hub

As described in Section 3.1.1.1, Frenchs Forest Business Hub contains a diverse range of businesses including corporate offices, gym/fitness centres, sports facilities, storage facilities/warehouses, medical laboratories and distribution centres. There are also several bulky goods retailers such as homeware and furniture stores.

Project outcomes

Chapter 5 (Project description) of the environmental impact statement describes the project in more detail. The main operational effects on businesses would predominantly be indirect and associated with traffic and road network transport efficiency and improvements to the active transport network.

Operational benefits

Potential benefits from these changes include:

- The direct connection obtained with the Beaches Link Tunnel would substantially improve the accessibility of the centre, potentially increasing the trade catchment of some businesses and enhancing employee accessibility and appeal
- Traffic demand in proximity to the business centre is forecast to increase as a result of the project. This may result in an increase in passing trade and business exposure as more vehicles travel past the centre
- Pedestrian access would be improved due to the modified and new pedestrian and cyclist infrastructure proposed within Frenchs Forest. This would have a minor positive impact on customer and employee access, as most people working and visiting Frenchs Forest do not

come from a local catchment. The gym/fitness centres and cafes are likely to benefit the most as they service a local catchment

- Four new dedicated bus bays and two associated shared user path underpasses would also be provided along Wakehurst Parkway, improving bus and bus passenger safety, and reducing conflicts between buses and general traffic. This would benefit employee and customer safety.

Localised negative impacts

Despite the benefits outlined above, some localised impacts may arise from project operation. Table 6-1 outlines the significance of these localised negative impacts. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 6-1: Frenchs Forest operational issues appraisal

Issue	Operational effects	Sensitivity	Magnitude	Significance
Employee and customer access	<ul style="list-style-type: none"> • The road network performance would be altered due to changes in travel patterns associated with the Beaches Link component of the project and would result in isolated, minor localised increased traffic travel times and minor reduced travel speeds on Wakehurst Parkway, north of Warringah Road, in the southbound direction. This has the capacity to reduce local employee and customer access. The commercial offices located in Frenchs Forest are large employers and therefore sensitive to delays in employee access. While travel times may be reduced on some roads, the substantial increase in connectivity would counter negative impacts enhancing accessibility for a broader catchment (see 6.3) • Reduced local access from Wakehurst Parkway northbound into Frenchs Forest Road East due to removal of a right turn potentially reducing accessibility to businesses on this road frontage. 	Low	Negligible	Negligible
Servicing and delivery	<ul style="list-style-type: none"> • For vehicles travelling northbound during the morning peak on Wakehurst Parkway, the project would result in increased transport and delivery times. The storage facilities/warehouses, medical laboratories and distribution centres would be particularly sensitive to these impacts. 	Low	Low	Low

Evaluation

The Frenchs Forest area is anticipated to experience an increase in traffic demand and accessibility with the establishment of the Beaches Link tunnel. Although the Frenchs Forest Business Hub does not directly adjoin the tunnel entry, it is positioned on a main feeder road with the capacity to benefit from increased transport network accessibility. The additional connections to North Sydney and other centres increase trade catchment for service industries. The additional connection across Middle Harbour to the Warringah Freeway, Gore Hill Freeway and further via the potential Western Harbour Tunnel also has the capacity to increase the trade catchment of some businesses, with the area now more accessible to a broader customer catchment. Effects on character and amenity, employee productivity and communication and business visibility are not anticipated at this centre. For businesses that are dependent on servicing, delivery and distribution, the new road infrastructure would provide noticeable benefits.

Conclusion

The project would have long term strategic benefits, with few discernible localised impacts. Businesses would retain a high ability to absorb and adapt to any localised impacts. Overall, the project would have a positive outcome for businesses in the Frenchs Forest Business Hub.

6.1.1.2 Balgowlah Centre

As described in Section 3.1.1.4, Balgowlah Centre is a mixed-use centre comprising a variation of residential, retailing and commercial office premises.

Project outcomes

Chapter 5 (Project description) of the environmental impact statement describes the project in more detail. The main operational effects on businesses would predominantly be indirect and associated with traffic and road network transport efficiency and improvements to the active transport network.

Operational benefits

Benefits of the project include:

- The operation of the Beaches Link tunnels would result in additional passing trade due to the increase in traffic demand. This is most likely to benefit food and beverage services, convenience stores and non-food retailers along Sydney Road
- Beaches Link will improve connectivity between the centre and other areas by reducing travel times, congestion and increasing the capacity of the road network. This would increase the customer and employment catchments, benefiting businesses within the centre. Speciality retail stores are most likely to benefit from larger customer catchments
- Pedestrian and cyclist infrastructure to be provided as part of the project would improve the overall active transport network in the Balgowlah study area. This is most likely to benefit food and beverage services and convenience stores which service a local catchment
- Servicing, delivery and distribution generally occurs outside peak periods with businesses likely to benefit from increased transport efficiencies and road capacity. The additional, faster and more direct road connection, enhances the efficiency of supply chain movements allowing deliveries to reach their destinations more quickly. This is particularly beneficial for retail businesses in the centre that require regular restocking
- Increase in passing trade, improved access and connectivity and increased business visibility have the potential to increase the number of visitors to the Balgowlah Centre and in turn demand for services
- The project would return an area, equivalent to around 90 per cent of the current open space in Balgowlah as new and improved open space and recreation facilities, subject to consultation. A dedicated consultation process jointly led by Transport for NSW and Northern Beaches Council will take place to give the community an opportunity to provide input on the final layout. As part of this consultation process, a community reference group will be established, with representative stakeholder groups and the community, to support Transport for NSW and Council with the development of this important public space. The future redevelopment of this site has the potential to attract additional visitors to Balgowlah Centre.

Localised negative impacts

The project may result in a very minor increase in environmental noise due to an increase of vehicles along Sydney Road. This is unlikely to noticeably alter local amenity as the existing acoustic environment is already subject to higher vehicle noise. The impact would be negligible.

Evaluation

The Balgowlah business centre does not directly adjoin the Balgowlah Connection, however it is positioned on a main feeder road with the capacity to benefit from increased vehicle movements past the centre. The additional connection across Middle Harbour to the Warringah Freeway, Gore Hill Freeway and further via the potential Western Harbour Tunnel also has the capacity to increase the trade catchment of some businesses, with the area now more accessible to a broader customer catchment. Overall, the project would improve connectivity to the centre from surrounding areas, including expanding the trade catchment of some public serving businesses.

Conclusion

Overall, the project would have long term positive effects on the business environment.

6.1.2 Western Precinct

This section assesses business centres, and businesses surrounding the centres, within the Western Precinct that have a higher likelihood of experiencing operational impacts.

6.1.2.1 Artarmon Industrial

As described in Section 3.1.2.1, the Artarmon Industrial is currently zoned for industrial and business park purposes.

Project outcomes

Several project elements are located next to the precinct requiring the demolition of existing buildings and realignment of roads associated with the Gore Hill Freeway connection. The main operational effects on businesses would be from:

- The conversion of Dickson Avenue and Hampden Road to a cul-de-sac
- Upgrade to the Pacific Highway/Dickson Avenue intersection including new traffic lights and enabling right-turn movements from Pacific Highway northbound to Dickson Ave eastbound, and Dickson Avenue westbound to Pacific Highway northbound
- A shared path on the southern side of the Gore Hill Freeway, replacing and connecting to the existing path
- The new motorway control centre at the Gore Hill Freeway and a new tunnel support facility at Waltham Street
- A motorway facility and ventilation outlet located on the southern side of the Gore Hill Freeway next to Punch Street
 - Groundwater and drainage management and treatment systems, including a water treatment plant
 - Flood walls potentially up to two metres in height above the top of the trough structures
 - Noise attenuation including noise barriers, earth mounds and architectural treatments.

Operational benefits

Potential benefits from these changes include:

- The Beaches Link tunnels would facilitate additional traffic travelling through the road network with generally improved travel times and reduced congestion. Businesses within Artarmon could potentially attract customers and employees from a wider catchment
- Improved connectivity and road network performance would reduce travel times for customers and employees visiting Artarmon, which may encourage more people to work and visit the centre
- Servicing, delivery and distribution generally occur outside peak periods with businesses likely to benefit from the increased efficiencies. The suppliers and contractor businesses in the area that are dependent on deliveries and distribution would most benefit from the change
- With growing demand for 'last-mile' product distribution, the improved connectivity would also enhance the efficiency of delivery to customers within a wider catchment. This would be particularly beneficial for bulky good retailers within the centre
- Businesses may experience an increase in market demand due to the improved connectivity of the centre.

Localised negative impacts

Despite the benefits outlined above, some localised impacts may arise from project operation. Table 6-2 outlines the significance of these localised negative impacts. As discussed in Section 2.5.3, only

negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 6-2: Artarmon Industrial operational issues appraisal

Issue	Operational effects	Sensitivity	Magnitude	Significance
<p>Passing trade</p>	<ul style="list-style-type: none"> Dickson Avenue east of Reserve Road would be converted to a cul-de-sac, and property access from Reserve Road would be removed with access provided via Hesky Lane and the surrounding road network. Therefore, passing trade may be reduced along Reserve Road and increased on Hesky Lane and the surrounding road network, such as Taylor Lane, Cleg Street, Herbert Street and Waltham Street. Businesses are considered unlikely to be impacted due to alterations in passing trade as most businesses are automotive services, wholesale businesses and bulky goods retailers with low dependencies on passing trade To facilitate the installation of motorway support facilities, Lambs Road would be connected directly to Cleg Street at its northern end, while a cul-de-sac would be installed on Punch Street at its eastern end. This would result in a redistribution of passing trade along Punch Street and Herbert Street. Businesses include commercial offices, automotive services and wholesale businesses which are considered unlikely to be impacted due to low dependency on passing trade. 	Negligible	Low	Negligible
<p>Employee and customer access</p>	<ul style="list-style-type: none"> Loss of three car parking spaces would result in a minor increased of competition for parking Customers and employees may experience a minor inconvenience due to disruptions in the local road network and the conversion of Dickson Avenue and Punch Street to cul-de-sacs. However, impacts are considered minimal to businesses as there would be minimal impact on travel times. 	Low	Negligible	Negligible
<p>Character and amenity</p>	<ul style="list-style-type: none"> During operation, the following project elements may have a minor impact on amenity and character: <ul style="list-style-type: none"> Views of the ventilation outlet and motorway facilities (at Punch Street), Tunnel support facility (Waltham Street) and motorway control centre (the Gore Hill Freeway) – impacts to be minimised by ensuring the design is recessive and integrated with the surrounding buildings and industrial context Removal of vegetation along the eastern side of Lambs Road and northern side of Punch Street Portals, which would be integrated into the road corridor through material selection and landscape planting Industrial land use generally has a lower dependency on character and amenity than commercial or mixed use centres. Therefore, these alterations in amenity are considered unlikely to deter people from working at or visiting the centre. 	Negligible	Low	Negligible

Issue	Operational effects	Sensitivity	Magnitude	Significance
Employee productivity and communication	<ul style="list-style-type: none"> Businesses along Punch Street, Cleg Street, Waltham Street and the Gore Hill Freeway may experience higher noise levels due to additional vehicles on the road. These impacts are considered minor and unlikely to affect employee productivity and communication. 	Negligible	Low	Negligible

Evaluation

Most businesses within the centre are generally destination services that customers specifically visit. The centre would substantially benefit from improved connectivity with the capacity for trade catchments to be increased. Where there are potential negative impacts, they are generally at a local level, effecting a small number of receivers that would be able to easily adapt to the change. The centre has a low level of sensitivity to passing trade, character and amenity changes and effect on employee productivity and communication. It is more sensitive to customer and employee access.

While changes to access and connectivity and amenity are anticipated, they are unlikely to result in a noticeable difference on the performance of the industrial area.

Conclusion

Overall, the project would improve connectivity to the centre from surrounding areas, including expanding the trade catchment of some population-serving businesses. This would have long term, discernible benefits to businesses.

6.2 Maritime operational effects

Due to the profile of the bed of the harbour, the immersed tube tunnel units would sit both partially within a trench closer to the shore and above the bed of the harbour supported by piles towards the centre of the crossing.

Table 6-3: Maritime operational issues appraisal

Issue	Operational effects	Sensitivity	Magnitude	Significance
Navigation	<ul style="list-style-type: none"> At the crossing there would be a reduction in navigable water depth of approximately 10 metres, however this is not considered an impact as the passage of vessels in this part of the harbour is already constrained by shallow water depths downstream. 	Negligible	Low	Negligible
Moorings	<ul style="list-style-type: none"> Commercial moorings relocated during construction would be restored at or near their original position upon operation of the project. 	Negligible	Negligible	Negligible

Conclusion

Once in operation, the project would have negligible negative impacts on businesses reliant on the harbour for operation and would improve road access to local businesses at The Spit area due to reduced congestion on the Spit Road/ Military Road corridor

6.3 Broader network effects

North Sydney, Sydney CBD, Macquarie Park, Chatswood and St Leonards are all high density, mixed-use and diverse strategic centres with a high level of employment and economic productivity. A part of this productivity is derived from the ease to which employees, customers, goods and services can get to and from the centres.

The project would result in an improvement in road-based travel times, on most routes, which would substantially increase the number of people that can access these major centres within 30 minutes and improve network servicing and delivery efficiencies. The project would increase the potential trade

catchment of numerous businesses in the centre and improve the labour catchment, increasing the appeal of these major centres as places for business investment and as places to work. These changes have the capacity to improve business productivity and revenue, enhancing the economic prosperity of the Eastern City.

Although North Sydney would experience some localised impacts that would have minor effects on travel time from some localities, these impacts would generally be offset by the benefits arising from broader network improvements. Businesses in North Sydney would retain a high ability to absorb and adapt to the changes.

Specific broader network effects are evaluated in more detail below.

6.3.1 Employee and customer access

As identified in Section 3.1, the *Greater Sydney Region Plan* identifies three types of centres: metropolitan city centres, strategic centres and local centres. These centres vary in terms of scale and contribution to Greater Sydney's job growth and productivity as well as service provision to local communities. The provision of transport infrastructure has an important influence on the role and significance of a centre, and its capacity to attract jobs and visitors.

The *Greater Sydney Region Plan* states the vision to deliver a '30-minute city'. A 30-minute city is where most people can travel to their nearest metropolitan centre or strategic centre within 30 minutes to access jobs, shops and services by public or active transport, seven days a week. Although not directly delivering on the public transport aspect of this vision, the Beaches Link and Gore Hill Freeway Connection project creates capacity on the network to deliver more public and active transport solutions. It also assists in enabling more people access to jobs, shops and services within 30 minutes (drive-time). This is integral for sustaining the economic competitiveness of Greater Sydney and ensuring it is a more attractive place for investment, businesses and skilled workers.

The Beaches Link and Gore Hill Freeway Connection project would improve the efficiency and capacity of the broader road, public and active transport network, assisting in the alleviation of congestion and improving travel times. The project would have a direct impact on employment and customer connectivity, enhancing access to major employment centres in the north west, including Macquarie Park and the strategic centres of North Sydney, Chatswood, Manly and St Leonards and the Harbour CBD. Residents in the Northern Beaches would have quicker and easier access to a wider range of jobs, housing types and activities.

Road

The Technical working paper: Traffic and transport (Jacobs, 2020) identified that improved connectivity delivered by the project would increase traffic volumes into and out of the Northern Beaches peninsula by up to seven per cent. The project would also result in a reduction in peak period traffic volumes on Spit Road and Warringah Road by up to 33 per cent and 23 per cent, respectively, and a reduction in peak period traffic volumes on Mona Vale Road by up to eight per cent.

As identified in the Technical working paper: Traffic and transport (Jacobs, 2020), the project would result in substantially improved accessibility for Northern Beaches residents and workers to major employment and business areas of Chatswood, St Leonards, Macquarie Park and North Sydney. The project would also provide direct access to the new Northern Beaches Hospital at Frenchs Forest and improved connectivity to businesses on the Northern Beaches from Greater Sydney. There is also substantially less traffic congestion forecast on Eastern Valley Way, improving the efficiency of access to the small centres in Willoughby, Middle Cove, Castle Cove, Northbridge and Roseville.

There would be a reduction in traffic demand on the Spit Road and Military Road corridor with improved travel times due to reduced congestion. Customers and employees accessing the centres of Military Road Mosman, Military Road Cremorne, Spit Junction and Neutral Bay would benefit.

Overall, the project would substantially increase the accessibility of the Northern Beaches and reduce travel time from Manly to Chatswood, Chatswood to Dee Why-Brookvale and St Leonards, North Sydney

to Chatswood, St Leonards, Artarmon and Macquarie Park. Any negative impacts associated with road alterations are localised and are offset by network wide improvements in travel time and accessibility. The significance of impacts on employee and customer access would be negligible.

Public transport

The Technical working paper: Traffic and transport (Jacobs, 2020) identified that the improvements in the general traffic travel times would also apply to public transport services. Existing local and B-Line Bus services would benefit from reduced congestion on surface roads resulting in efficiency improvements in journey to work time. The project would further facilitate the operation of express buses that would provide direct access between major centres in the Northern Beaches to the Lower North Sydney, Shore and Inner West. Customer and employee access would improve as a result of the project with travel times on all key public transport routes maintained or improved. This includes:

- Travel times for southbound buses through North Sydney via Pacific Highway and Berry Street
- Travel times for buses from Gore Hill Freeway to the Sydney Harbour Bridge
- Travel times for buses travelling to and from Falcon Street
- Travel times for buses travelling to the Lower North Shore via Warringah Road and Eastern Valley Way corridors.

These improvements would be realised due to the reconfiguration of intersection and bus lane arrangements and reduced demand on surface roads.

Travel times on bus routes through North Sydney may incur localised impacts during peak periods due to changes in traffic patterns, however this would be offset by improved travel times and access once out of North Sydney. The overall effect on customer and employee access would be negligible.

Overall, bus travel times would be maintained or improved as a result of the project, as existing bus priority would be maintained and traffic congestion on surface roads reduced. Employee and customer access via public transport would be improved.

Pedestrian and cyclist

The project includes enhancements to the active transport network to improve safety and connectivity to the major employment centres. Several new shared paths, pedestrian bridges and intersections would be delivered as part of the project. The new pedestrian and cyclist infrastructure would contribute to improving the safety and quality of the active transport network. This would have benefits for not only employees and customers visiting businesses within the study area but for those accessing other employment precincts.

Evaluation

The ease of access to a place of employment is a factor in attracting or deterring existing or potential employees from remaining in a job or applying for a job. If a place of work becomes too difficult to access, it begins to jeopardise the time an individual has to spend with family and friends or carrying out non-work related activities and may cause individuals to seek alternative employment options as their 'travel time budget' is exceeded. A 'travel time budget' is a theoretical idea that commuters have a time threshold in which they are willing to spend travelling to work. As commute times increase, worker productivity and employee work-life balance deteriorate, resulting in people seeking alternate employment closer to home or moving closer to work to reduce time spent travelling.

Improved efficiencies in journey-to-work time expands employment opportunities and increases worker productivity and work-life balance as more time is spent in the office or at home relative to commuting. Additional capacity in the road, bus and active transport networks enhances the accessibility of the city and subsequently employment options. The project would deliver long term improvements for many businesses and business centres within the region relative to the existing conditions.

Conclusion

Overall, the project would have long term positive effects on employee and customer access to businesses both within the study area and external, through improved connectivity and road network efficiency, reduced passenger travel time and improved safety, and active transport network infrastructure.

6.3.2 Freight and efficiency costs

The freight and logistics industry is an important part of the NSW economy as an enabler of economic activity. The *NSW Freight and Ports Plan (2018)* estimates that freight and logistics contributed \$66 billion per annum to NSW Gross State Product in 2017, with the estimated value of products moved by freight in NSW over \$200 billion per annum. The plan estimates that freight volumes will double in the Greater Sydney region in the next 40 years, driven by population growth, increased consumer expectations, online technologies and the decline in manufacturing. Businesses are becoming increasingly dependent on product and service distribution, with the efficiency and reliability of the transport network fundamental to the economic prosperity of businesses and cost savings for the end customer. Delays in vehicle movements directly affect businesses' expenditure and productivity. The Bureau of Transport, Infrastructure and Regional Economics (BITRE) says congestion is costing Sydney around \$6.1 billion per year, with these costs forecast to double by 2030.

One of the objectives of the project is to encourage heavy and commercial vehicles to use the proposed tunnels instead of surface roads. The Technical working paper: Traffic and transport (Jacobs, 2020) estimated that there would be about 8,700 daily heavy vehicle movements (4,400 northbound and 4,400 southbound) which would be removed from survey roads. This would result in road network improvements. The forecast heavy vehicle volumes across Middle Harbour with the Beaches Link in operation in 2027 indicate that:

- Peak period heavy vehicle volumes on Spit Road and Warringah Road would decrease substantially as a result of the project, by up to 71 per cent (3,000 heavy vehicles) and 62 per cent (3,900), respectively
- Peak period heavy vehicle volumes on Mona Vale Road would decrease by up to 26 per cent (1,700 heavy vehicles) as a result of the project
- Peak period heavy vehicle volumes into and out of the Northern Beaches would not change substantially as a result of the project.

Evaluation

The project would result in most heavy vehicle trips on the existing road, travelling through the Northern Beaches peninsula, transferring to the project, with substantial reductions in traffic volumes on the Spit Road and Military Road corridor and the Mona Vale Road and Warringah Road corridor. While the project would generally not increase the volumes of heavy vehicles travelling into and out of the Northern Beaches peninsula, it would substantially reduce the travel times of these trips and increase their productivity. Businesses and business centres across the Northern Beaches would benefit from reduced travel times for light commercial and freight trips, which would in turn reduce transportation costs and increase efficiency.

The movement of these trips from surface arterial corridors to motorways would also increase the amenity of businesses and business centres located along the main arterial corridors into and out of the Northern Beaches peninsula, decreasing the interactions between through traffic, public transport, pedestrians and cyclists and increasing road safety, reducing noise and vibrations and increasing the overall amenity of these arterial corridors. Amenity improvements are most likely to be experienced at The Spit, Spit Junction, Forestville, Seaforth, Neutral Bay and Cremorne.

Any negative impacts to freight movements associated with localised traffic impacts would be offset by local and regional improvements.

Conclusion

The project would deliver significant long term improvements to the efficiency of freight movements and reduce transport costs for a large number of businesses and business centres within the region.

6.3.3 Altered trade catchments

A business trade area (or catchment) is defined as the geographic areas from which a business draws its customers or provides services to. At its simplest, the extent of a business catchments varies depending on the type of product or service provided, the relative location of competitors and the degree of mobility of customers or service providers. Other factors such as the socio-economic status of clientele, geographic barriers, efficiency of transport networks, perceived and actual distance and travel time and appeal of a business centre also contribute to the definition of a catchment.

The introduction of an additional transport connection, which increases the efficiency of a network and connectivity across a broader geographic area, can lead to expanded trade catchment opportunities. The primary trade catchment (the area from which the business attracts or services 60 to 65 per cent of customers) is likely to remain consistent however, there is capacity for the secondary trade catchment (the area from which the business attracts or services 20 to 30 per cent of customers) to increase.

Middle Harbour is a geographic barrier that restricts trade catchments. Although connections currently exist, they are constrained by pinch point locations where the crossing of the water body is required. As identified in Technical working paper: Traffic and transport (Jacobs, 2020), the project would result in substantial reductions in traffic volumes on the existing crossings into and out of the Northern Beaches peninsula, with the largest reductions in traffic volumes being on the Spit Road and Military Road corridor. This redistribution of traffic flow may result in a reduction in passing trade for businesses along these major road corridors, including the centres of Neutral Bay, Military Road Cremorne, Spit Junction, and Military Road Mosman. These centres generally have a strong local catchment, with the opportunity that the trade catchments would increase due to the reduction in congestion, improved accessibility and enhanced amenity. Considering this, any potential reduction in passing trade with likely be offset by an increase to the trade catchment and improved amenity potentially encouraging further patrons.

With the project in place, travel time from Artarmon to Manly, Frenchs Forest to North Sydney and North Sydney to Balgowlah would be between 10 and 15 minutes faster in both directions, compared to an alternative 'Do nothing' scenario in 2027 and 2037. These travel time savings expand the catchment areas benefiting businesses in the suburb and further afield.

Evaluation

Travel time savings mean that business catchment areas based on travel time would expand, as customers further afield would now be able to bypass existing pinch points and access these businesses. Although not all centres would experience the expanded trade catchment benefits, those businesses offering speciality services or products, or destination centres (such as Frenchs Forest Business Hub) may benefit from the expanded catchments.

Conclusion

Overall, the project would have long term positive effects on the business environment.

6.3.4 Tolling

The Beaches Link and Gore Hill Freeway Connection would be a tolled motorway in both directions. Provision for tolling infrastructure would be included in the tunnel design, although no decision on final toll costs has yet been made.

It is expected that any changes to the cost of travelling via tolled roads would be offset by the capacity increases and associated reduction in travel times provided by the project.

Tolling in both directions would add additional expense to businesses, employees and customers utilising the new infrastructure.

The additional tolling expense may deter some customers from driving to a business centre (that induces a toll charge) if there is another centre offering similar services in a location without the toll charge. Although customer behaviour may alter, the trade catchments of businesses would generally remain consistent as customer expenditure is redistributed equally on either end of the connection.

Table 6-4 outlines the significance of these negative impacts that have the capacity to influence business operation. As discussed in Section 2.5.3, only negative impacts have been assigned a level of significance in accordance with the methodology used for this assessment.

Table 6-4: Tolling operational effects appraisal

Issue	Operation effects	Sensitivity	Magnitude	Significance
Tolling	<ul style="list-style-type: none"> Tolling in both directions would predominantly be a cost to individuals with the cost to business negated by the improved efficiencies. Business generally would have minimal vulnerabilities and a high ability to absorb and adapt to changes introduced by tolling. 	Low	Low	Low

Evaluation

Although customer behaviour may alter, the trade catchments of businesses would generally remain consistent as customer expenditure is redistributed equally on either end of the connection.

The direct cost to businesses as a result of paying the additional road toll charge would be offset by the time travel savings gained from the additional road capacity. Similarly, employees who drive to work may incur an additional individual cost, but this would also be offset by reductions in congestion and travel time savings.

Conclusion

Overall, although the introduction of tolling would be a direct cost to businesses and individuals, the travel time savings would offset the negative impacts.

7.0 CUMULATIVE IMPACT ASSESSMENT

This chapter provides an overview of the potential cumulative impacts associated with the construction of the project and identifies mitigation measures to minimise these impacts.

Cumulative impacts are those that result from the successive, incremental, and/or combined effects of a project when added to other existing, planned, and/or reasonably anticipated future projects. The cumulative effect of multiple projects may decrease or intensify the benefits or negative impacts on a business or business centre. Cumulative impacts associated with transport and infrastructure projects include:

- Extended periods of construction impacting local amenity and altering the character and identity of a local centre
- Extended periods of traffic disruptions affecting customers, employees, visitors, suppliers and commercial vehicle movements
- Economic effects including changes to business operation and revenues
- Construction traffic from multiple projects placing additional pressure on road networks and parking capacity
- Consultation and construction fatigue for local communities due to the concurrent or sequential planning and construction nature of the project
- Cumulative benefit associated with improved connections across a network of infrastructure enhancing accessibility for business and industry, including freight.

Construction fatigue relates to receivers that experience construction impacts from one or more projects over an extended timeframe with few or no breaks between construction periods. Construction fatigue may be brought on through potential traffic and access disruptions, increased noise and vibration, reduced air quality, reduced visual amenity, increases in impacts on business workers/owners or any combination of these factors.

The key areas where construction fatigue would be expected are Frenchs Forest, North Sydney, Chatswood and Artarmon. These locations are discussed in more detail below.

7.1 Cumulative construction effects

The projects and local strategic plans considered in this assessment are listed in Table 7-1.

Cumulative construction impacts would be experienced by some businesses. Alterations in the traffic environment would be a nuisance, however most businesses would adapt to the change. Some businesses may experience longer durations of improved passing trade, supporting business revenue. Overall, cumulative effects would be negligible.

Table 7-1: Projects assessed in the cumulative impact assessment

Project name	Brief project description	Project overlap	Indicative timeframes	Relevant business centres	Potential cumulative impacts
Consented projects					
Sydney Metro City & Southwest	<p>The Chatswood to Sydenham component of Sydney Metro City & Southwest involves the construction and operation of a 15.5 kilometre metro line from Chatswood, under Sydney Harbour and through Sydney's CBD out to Sydenham.</p> <p>Components of the project relevant to this assessment include:</p> <ul style="list-style-type: none"> • Chatswood dive site • Artarmon substation • Cross Nest Station • Victoria Cross station. 	Gore Hill Freeway Connection	2017 – 2024	<ul style="list-style-type: none"> • Artarmon • North Sydney 	<ul style="list-style-type: none"> • Extended periods of construction affecting traffic and local amenity • Increase in passing trade for convenience and food and beverage retail businesses • Construction fatigue • Construction traffic from multiple projects placing additional pressure on road networks and parking capacity.
Sydney Metro Victoria Cross over station development	The project involves the construction of a 40-storey (plus 2-storey rooftop plant) commercial office building above the southern entrance of Victoria Cross station.	Beaches Link	2021-2024	<ul style="list-style-type: none"> • North Sydney 	<ul style="list-style-type: none"> • No cumulative impacts greater than a minor nature expected.
Marist Catholic College North Shore	This project involves the demolition of existing buildings and construction of a new six storey building to accommodate teaching facilities, early learning centre and premises for independent tertiary education.	Beaches Link	2020-2026	<ul style="list-style-type: none"> • North Sydney 	<ul style="list-style-type: none"> • No cumulative impacts greater than a minor nature expected.

Project name	Brief project description	Project overlap	Indicative timeframes	Relevant business centres	Potential cumulative impacts
Proposed projects					
Western Harbour Tunnel and Warringah Freeway Upgrade	The Western Harbour Tunnel and Warringah Freeway Upgrade project comprises a new tolled motorway tunnel connection across Sydney Harbour and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to connect to the Beaches Link and Gore Hill Freeway Connection project.	Beaches Link	2020 – 2024	<ul style="list-style-type: none"> • Artarmon • Miller Street, Cammeray 	<ul style="list-style-type: none"> • Extended periods of construction affecting traffic and local amenity • Increase in passing trade for convenience and food and beverage retail businesses • Construction fatigue • Construction traffic from multiple projects placing additional pressure on road networks and parking capacity.

7.2 Potential cumulative operational impacts

Once operational, the project, alongside the other major transport projects (listed below), is predicted to deliver beneficial cumulative outcomes for businesses.

These include:

- Supporting Sydney's long term economic and employment growth through improved transport connectivity to key employment areas across the city
- Alleviating congestion and contributing to improved connectivity, speeds, reliability and safety of the broader road network, which is of particular importance to the contribution and efficiencies of the freight industry
- Generating economic effects and benefits to businesses through reduced operational expenses and opportunity for increased revenues
- Improved business centre viability and regeneration opportunity as a result of new connections
- Improved connections across the network, enhancing accessibility for customers and employees and creating greater opportunity for business synergies, supporting the North Beaches Hospital Precinct Structure Plan.

The projects considered in this assessment are listed in Table 7-2. The cumulative benefits of the projects would support implementation of the strategic plans listed in Table 7-3.

Table 7-2: Cumulative operation impacts to business

Project name	Brief project description	Potential business benefits
Western Harbour Tunnel and Warringah Freeway Upgrade project	The Western Harbour Tunnel and Warringah Freeway Upgrade project comprises a new tolled motorway tunnel connection across Sydney Harbour and an upgrade of the Warringah Freeway to integrate the new motorway infrastructure with the existing road network and to connect to the Beaches Link and Gore Hill Freeway Connection project (this project).	<ul style="list-style-type: none"> ● Increased trade catchments for larger centres such as Artarmon and Manly Vale ● Improved amenity for business centres along Military Road and Sydney Road with reduced traffic volumes ● Improved freight and efficiency.
M4-M5 Link	The M4-M5 Link project includes an interchange at Rozelle with provision for a future connection to the Western Harbour Tunnel and Beaches Link program of works. It also includes an underground tunnel from the Rozelle Interchange to Victoria Road near Iron Cove Bridge, known as the 'Iron Cove Link'.	<ul style="list-style-type: none"> ● Enhanced freight and efficiency ● Improved connections to port and airport ● Particularly benefits large industrial areas such as Artarmon.
Northern Beaches Hospital road upgrade project	This project is now complete and involved road upgrade to enhance connectivity to the new Northern Beaches Hospital and to improve the broader road network capacity.	<ul style="list-style-type: none"> ● Enhanced trade catchments and more efficient employee and customer access for businesses around Frenchs Forest ● Improved freight and efficiency.

Table 7-3: Other strategic plans considered in the cumulative impact assessment

Strategic plan	Brief description	Relevant business locations
Northern Beaches Hospital Precinct Structure Plan	This plan provides the strategic land use planning framework for Frenchs Forest for the next 20 years. The plan includes proposed land use rezoning around the Northern Beaches Hospital to the north and west of Wakehurst Parkway/Warringah Road intersection.	Frenchs Forest
Northern Beaches Sports Ground Strategy	The strategy sets out the 15 year plan to provide a single approach to management and long term planning of sporting facilities on the Northern Beaches.	Balgowlah Business Centre, Seaforth Centre

8.0 MANAGEMENT MEASURES

To mitigate the impacts to local businesses and operations during construction and operation of the project, the proposed mitigation measures are identified in Table 8-1 and the respective technical reports including:

- Technical working paper: Urban design, landscape character and visual impact assessment
- Technical working paper: Traffic and transport
- Technical working paper: Noise and vibration
- Technical working paper: Air quality.

Table 8-1: Environmental management measures – business

Ref	Environmental management measure
BU1	Where businesses are affected by property acquisition or lease cessation, the acquisition and compensation process should be implemented in line with the <i>Determination of compensation following the acquisition of a business guideline</i> . Compensation for a business conducted on land that is acquired in accordance with the <i>Land Acquisition (Just Terms Compensation) Act 1991 (NSW)</i> , as relevant.
BU2	Specific consultation should be carried out with businesses potentially impacted during construction. Consultation would aim to identify specific potential construction impacts for individual businesses.
BU3	Based on consultation with businesses, specific feasible and reasonable measures to maintain business access, visibility, parking and address other potential impacts as they arise through the construction process should be identified and implemented. A phone hotline that enables businesses to find out about the project or register any issues should be maintained.

9.0 REFERENCES

ABS (2020) 8165.0 - Counts of Australian Businesses, including Entries and Exits June 2015 to June 2019 (Released Feb 2020) ABS (2016). Census 2016

ABS place of work – SA2 level

ABS place of work and Forecast ID – Greater Sydney Worker Productivity

Bureau of Transport, Infrastructure and Regional Economics, 2015 p.1

ERM (2020). Technical working paper: Air quality (Appendix I of the environmental impact statement)

Greater Sydney Commission (2018) Greater Sydney Region Plan

Hoisington, Caroline – Centre for Policy Development (2015). Our Harbour Our Asset

Jacobs (2020). Technical Working Paper: Socio-Economic Assessment (Appendix V of the environmental impact statement))

Jacobs (2020). Technical Working paper: Traffic and transport (Appendix F of the environmental impact statement))

NSW Government (2000). Determination of compensation following the acquisition of a business

Renzo Tonin & Associates (2020). Technical working paper: Noise and vibration (Appendix G of the environmental impact statement))

Transport for NSW (2013). NSW Freight and Port Strategy

Transport for NSW (2018). NSW Freight and Ports Plan

Transport for NSW (2017). Transport Performance and Analytics

Transport for NSW (2018). Future Transport Strategy

Transport for NSW (2020). Socio-economic Assessment Practice Note EIA-N05

WSP & Arup (2020). Technical Working Paper: Urban design, landscape character and visual impact assessment. (Appendix W of the environmental impact statement))

ATTACHMENTS

ATTACHMENT A. BUSINESS SURVEY

Western Harbour Tunnel and Beaches Link

Business survey

1. Are you aware of the Project?

- Yes
 No

2. Once complete the Project would be positive for businesses within the area?

- Strongly agree
 Agree somewhat
 About the same
 Disagree somewhat
 Strongly disagree
 Not Sure

3. Where is the closest competing business centre?

4. Where do the majority of your customers travel from?

- Suburb
 Local Government Area
 District (i.e Inner West)
 Greater Sydney (or wider)

5. Is your business sensitive to any of the following?

	Not at all	Slightly	Moderately	Majorly
Noise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Vibration	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Air quality (construction dust)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unpleasant odours	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Congestion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Travel time delays	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. How dependent is your business any of the following:

	Not at all	Slightly	Moderately	Majorly
Other businesses in the area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Recreation and community facilities in the area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Passing trade (Motor vehicle)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Passing trade (Pedestrian and cyclist)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pleasant visual amenity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Convenient customer parking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business exposure (visibility)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Identity and character of business area	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On-street parking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Loading zones	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. During the construction phase, what effect would the project have on the following?

	Positive	Neutral	Negative
Business revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Passing trade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employee and customer access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Servicing and deliveries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business amenity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visibility of business to customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demand for services/products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

8. During the operation phase, what effect would the project have on the following?

	Positive	Neutral	Negative
Business revenue	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Passing trade	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Employee and customer access	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Servicing and deliveries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Business amenity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Visibility of business to customers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Demand for services/products	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

Western Harbour Tunnel and Beaches Link

Business information

9. Are you an owner occupier or a tenant?

- Owner
- Tenant
- Unsure

10. How long have you been operating in the area?

- Less than 1 year
- 1-3 years
- 3-5 years
- More than 5 years

11. Do you plan to be here in five years?

- Yes
- No
- Unsure

12. What are your main trading days?

- Weekdays (Monday to Friday)
- Monday to Saturday
- Seven days
- Other (please specify)

13. When are you open?

- Before 10am
- 10am - 5pm
- 5pm - 9pm
- After 9pm

14. Number of staff?

- 0-10
- 11-20
- 21-50
- 50+

15. How do your staff usually travel to your business?

- Private car
- Walk/Cycle
- Public transport
- Other (please specify)

16. How do your clients/customers usually travel to your business?

- Private car
- Walk/Cycle
- Public transport
- Other (please specify)

17. Do you have parking, if so how many spaces?

18. Approximate number of customers per day?

19. Average dollar spend per customer

- 0-50
- 50-100
- 100 +

20. Do you have any other feedback or comments you would like to provide? (Surveyor to record feedback/comments provided at any point during the survey)

Western Harbour Tunnel and Beaches Link

Survey facilitator to fill out

21. Name of business

22. Business type?

- Retail
- Food / Beverage
- Recreational services / tourism
- Professional services / finance
- Construction
- Health care
- Education
- Wholesale
- Other (please specify)

23. Project area

- Western Harbour Tunnel
- Beaches Link

24. Address of business

ATTACHMENT B. BUSINESS SURVEY REPORT

In order to identify potential impacts associated with the project, a snapshot survey of 218 businesses located along the proposed route was carried out. These surveys were completed between Monday 13th to Thursday 30th November 2017. This attachment provides an overview of the core themes and responses to the business surveys. The implications of the findings and how they relate to the project have been discussed in sections 4.0 and 5.0.

The survey methodology is discussed in Section 2.0 and the business survey itself can be found in Attachment A of this report.

Businesses surveyed were located in nine locations. The number of surveys carried out in each location was as shown in Table B-0-1.

Table B-0-1: Number of business surveys conducted

Survey location	Number businesses surveyed
Artarmon Industrial	33
Austlink Business Park	15
Balgowlah	26
Frenchs Forest	18
Manly Vale	26
Military Road	30
Seaforth/Spit Bridge	28
Spit Junction	18
Warringah Mall	24

The number of surveys in each precinct varied slightly depending on the precinct's size and number of businesses present. Every effort was made to survey a range of business types across the study area. Warringah Mall and Austlink Business Park, while included in the survey, were not included further as part of the specific centre analysis for the impact assessment. While they may experience indirect network effects from the road project, they are unlikely to experience direct impacts.

Business types

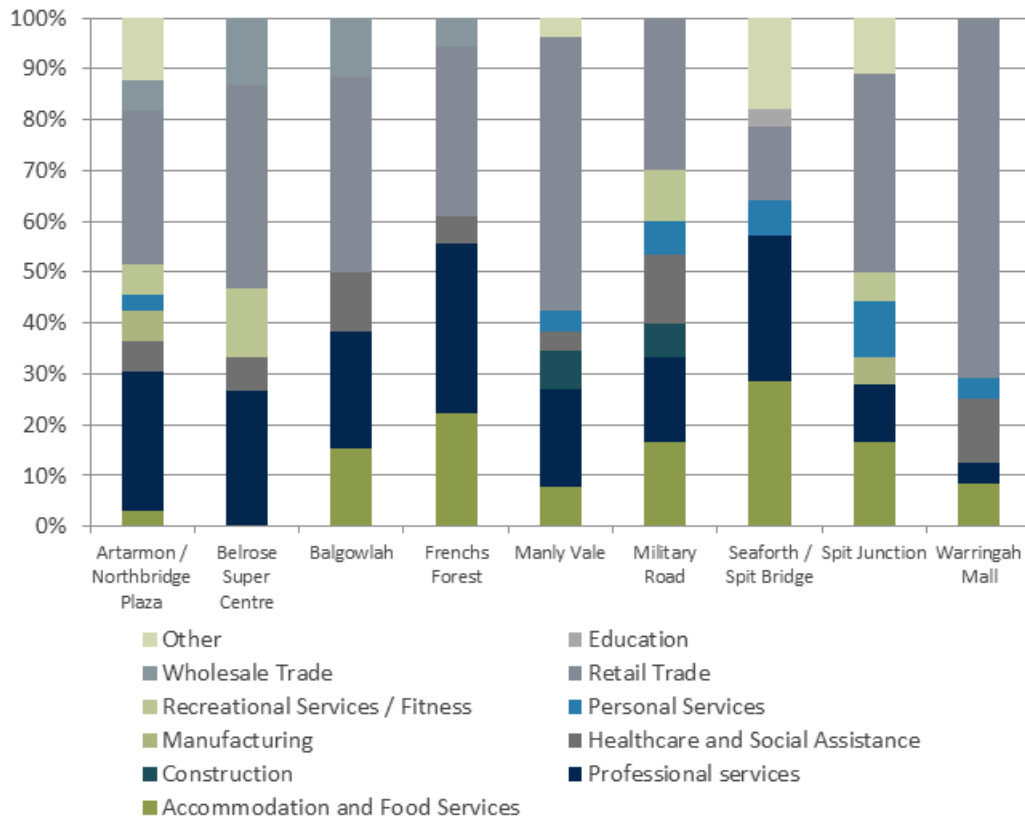
Of the businesses surveyed, 38 per cent were classified as retail operations with the greatest number located in Warringah Mall and Manly Vale. Retail businesses were present in every location surveyed. This was followed by 20 per cent classified as professional services (eg real estate agents and lawyers) and 13 per cent were classified as accommodation and food services. Accommodation and food services were present in all locations surveyed except Austlink Business Park.

Businesses classified as healthcare and social services made up seven per cent of businesses surveyed and other business types made up six per cent. These included many specialist businesses such as marinas, an Olympic training centre and an auction business.

Businesses classified as personal services, recreational services/fitness and wholesale trade made up four per cent respectively of those surveyed. Manufacturing businesses made up one per cent, and one education business was surveyed, making up less than one per cent.

The breakdown of business types across each location can be found in Figure B-0-1.

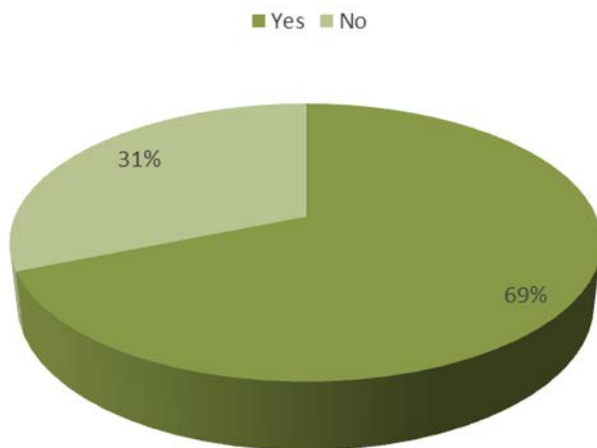
Figure B-0-1: Location and business type



Question 1: Were you aware of the project?

As can be seen in Figure B-0-2, 69 per cent of the businesses surveyed were previously aware of the project.

Figure B-0-2: Previous awareness of the project

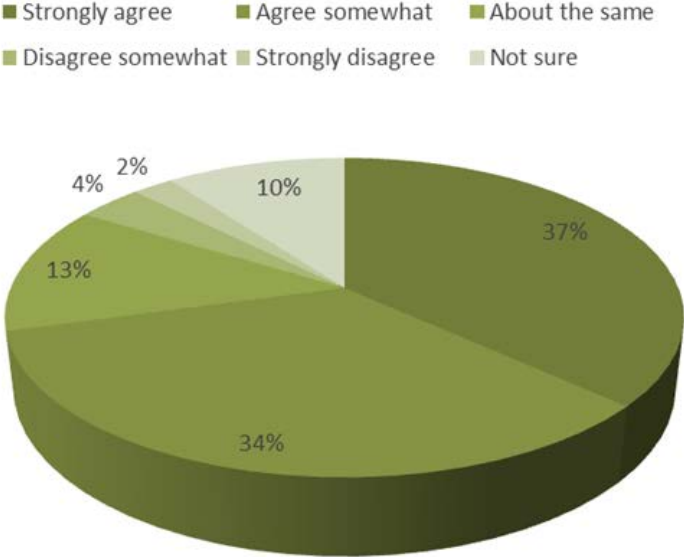


Question 2: Do you agree that, once complete, the project would be positive for businesses within the area?

The majority of respondents indicated they thought the project would be positive for businesses in the area, with 37 per cent strongly agreeing and 34 per cent agreeing somewhat. A small minority of respondents thought the project would be negative for businesses in the area, with four per cent disagreeing somewhat and two per cent disagreeing strongly.

Some respondents did not agree or disagree with the statement with 13 per cent stating business would remain unchanged by the project and 10 per cent being unsure

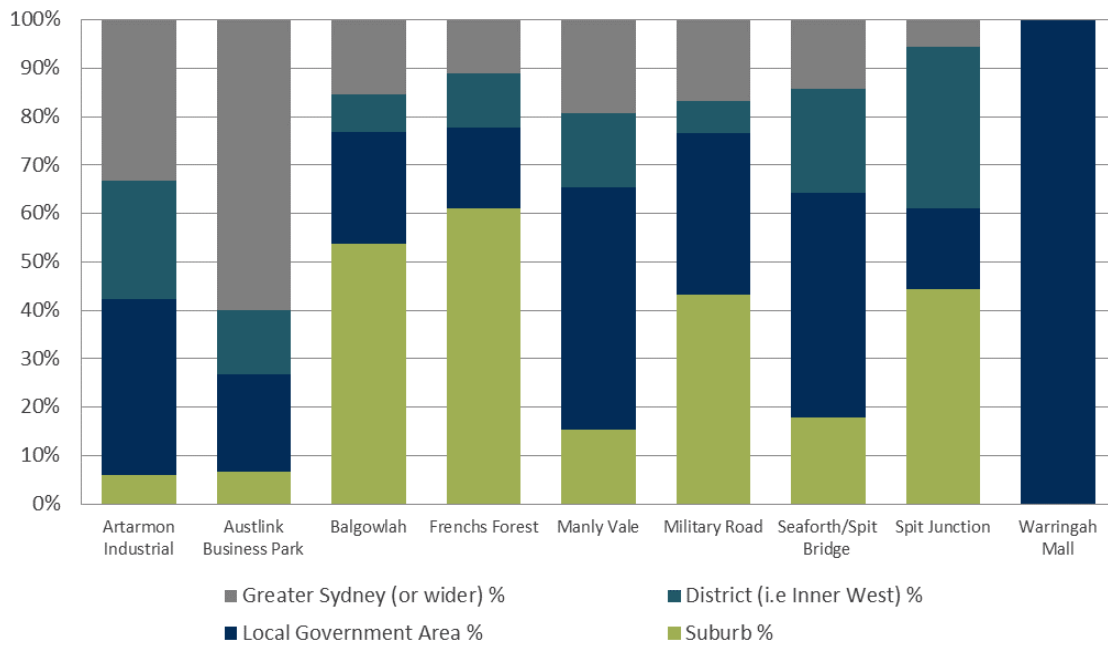
Figure B-0-3: Agreement that project would be positive for businesses in the area



Question 3: Where do the majority of your customers travel from?

This question asked respondents to identify where their customers travelled from (local suburb, Greater Sydney or wider) in order to gauge how far customers travelled to reach the business (see Figure B-0-4). The different survey locations provided a variety of responses, ranging from businesses in Warringah Mall attracting only customers from the local government area to Austlink Business Park, where businesses attracted mostly customers from Greater Sydney or wider.

Figure B-0-4: Location of customers



Question 4: Is your business sensitive to any of the following?

Businesses surveyed were asked how sensitive their operations were to a range of factors with the option to indicate a response ranging from ‘not at all’ to ‘majorly’. These are represented in the tables on a scale from 0 (not at all) to 100 (majorly).

The factors businesses were asked to consider were:

- Noise
- Vibration
- Air quality
- Odours
- Congestion
- Travel time delays.

Sensitivity by location

Sensitivity by business location has been recorded in Table B-0-2. Numbers in bold reflect the highest sensitivity for the particular location. When measuring sensitivity from 0 to 100, in most instances business survey responses recorded low to moderate sensitivity. Business locations overall were fairly consistent in their responses with businesses less sensitive to noise and vibration while being more sensitive to congestion and travel time delays. There was a mixed level of sensitivity to air quality and odours with Seaforth/Spit Bridge and Spit Junction being notably more sensitive than other locations.

Table B-0-2: Sensitivity by location

Location	Noise	Vibration	Air quality	Odours	Congestion	Travel time delays
Artarmon Industrial	15	12	13	13	43	49
Austlink Business Park	0	0	0	0	64	64
Balgowlah	15	12	13	9	49	49
Frenchs Forest	6	6	19	0	87	89
Manly Vale	24	12	23	8	54	54
Military Road	32	19	29	6	64	64
Seaforth/Spit Bridge	32	26	42	44	77	77
Spit Junction	30	30	56	46	59	69
Warringah Mall	1	0	10	7	61	56

Sensitivity by business type

Sensitivity by business type has been recorded in Table B-0-3. When measuring sensitivity from 0 to 100, in most instances business types recorded low to moderate sensitivity. Business types overall were fairly consistent in their responses with businesses less sensitive to noise, vibration, air quality and odours while being more sensitive to congestion.

Table B-0-3: Sensitivity by business type

Business type	Noise	Vibration	Air quality	Odours	Congestion	Travel time delays
Accommodation and food services	37	22	36	29	61	64
Commercial	17	17	23	14	70	71
Construction	17	17	17	0	75	75
Healthcare and social assistance	16	13	18	9	47	49
Manufacturing	0	0	0	0	11	11
Personal services	37	30	33	33	78	78
Recreational services/fitness	8	17	21	17	63	67
Retail trade	15	7	19	12	56	57
Wholesale	4	4	8	0	63	63
Education	0	0	67	0	100	100
Other	21	21	26	19	64	64

Question 5: How dependent is your business on any of the following?

Businesses surveyed were asked how dependent their operations were on a range of factors with the option to indicate a response ranging from 'not at all' to 'majorly'. These are represented in the tables on a scale from 0 (not at all) to 100 (majorly).

The factors businesses were asked to consider were:

- Other businesses in the area
- Recreation and community facilities in the area
- Passing trade (motor vehicles)
- Passing trade (pedestrian and cyclist)
- Pleasant visual amenity
- Convenient customer parking
- Business exposure (visibility)
- Identity and character of business area
- On-street parking
- Loading zones.

Dependency by location

The dependency of a business to factors influencing trade and performance varied across the various business locations. All business locations were most dependent on parking; there was a high dependency on convenient customer parking. Of the businesses in locations that did not show high dependencies on on-street parking (Artarmon Industrial, Balgowlah, Frenchs Forest and Warringah Mall), many made use of large mall carparks or large private parking areas.

Different locations showed a range of dependencies on the different factors with Warringah Mall reporting the highest dependency across all factors. The factors with lowest dependencies were on other businesses and recreation and community facilities in the area.

Table B-0-4 below identifies the dependencies for each of the locations with the highest dependencies highlighted in bold.

Table B-0-4: Dependency by location

Location	Other businesses in the area	Recreation and community facilities in the area	Passing trade (motor vehicle)	Passing trade (pedestrian and cyclist)	Pleasant visual amenity	Convenient customer parking	Business exposure (visibility)	Identity and character of business area	On-street parking	Loading zones
Artarmon Industrial	39	19	44	39	21	49	34	18	35	39
Austlink Business Park	27	0	16	11	2	40	16	11	49	69
Balgowlah	10	3	41	42	1	53	26	8	28	51
Frenchs Forest	13	0	67	57	17	98	81	63	15	54
Manly Vale	29	0	72	64	4	87	54	9	67	62
Military Road	26	20	66	72	29	60	76	43	76	31
Seaforth/Spit Bridge	37	50	46	46	54	82	70	64	87	49
Spit Junction	19	15	50	69	56	94	81	63	93	46
Warringah Mall	17	19	96	91	25	100	96	83	14	81

Dependency by business type

The dependency of a business to factors influencing trade and performance varied across the various business types. All business types were most dependent on parking; there was a high dependency on convenient customer parking. Of the business types that did not show high dependencies on on-street parking, many manufacturing and wholesale businesses had large private parking areas and many retail businesses made use of mall carparks.

Education reported the highest number of dependencies, with major dependencies on convenient customer parking, on-street parking and recreation and community facilities in the area. Education was the only business type to show a high level of dependency on other businesses in the area. Personal services and accommodation and food services also reported high dependencies.

Commercial, manufacturing and wholesale businesses reported the lowest levels of dependency.

Table B-0-5 below identifies the dependencies for each of the business types.

Table B-0-5: Dependency by business type

Business type	Other businesses in the area	Recreation and community facilities in the area	Passing trade (motor vehicle)	Passing trade (pedestrian and cyclist)	Pleasant visual amenity	Convenient customer parking	Business exposure (visibility)	Identity and character of business area	On-street parking	Loading zones
Accommodation and food services	31	23	71	80	43	77	75	62	57	48
Commercial	17	16	33	30	18	69	51	33	64	38
Construction	25	0	50	50	0	42	50	8	83	17
Healthcare and social assistance	27	13	56	62	13	60	47	42	33	44
Manufacturing	33	0	67	56	33	44	67	33	33	33
Personal services	19	26	70	63	33	89	74	44	78	22
Recreational services/fitness	21	25	50	54	25	83	71	42	75	50
Retail trade	29	11	73	69	24	84	68	42	46	70
Wholesale trade	17	0	8	4	0	17	4	4	17	63
Education	67	100	0	0	67	100	33	67	100	0
Other	31	33	41	46	23	72	44	26	59	51

Question 6: During the construction phase, what effect would the project have on the following?

Businesses surveyed were asked to indicate how they believed certain aspects of their businesses would be affected during the construction phase of the project.

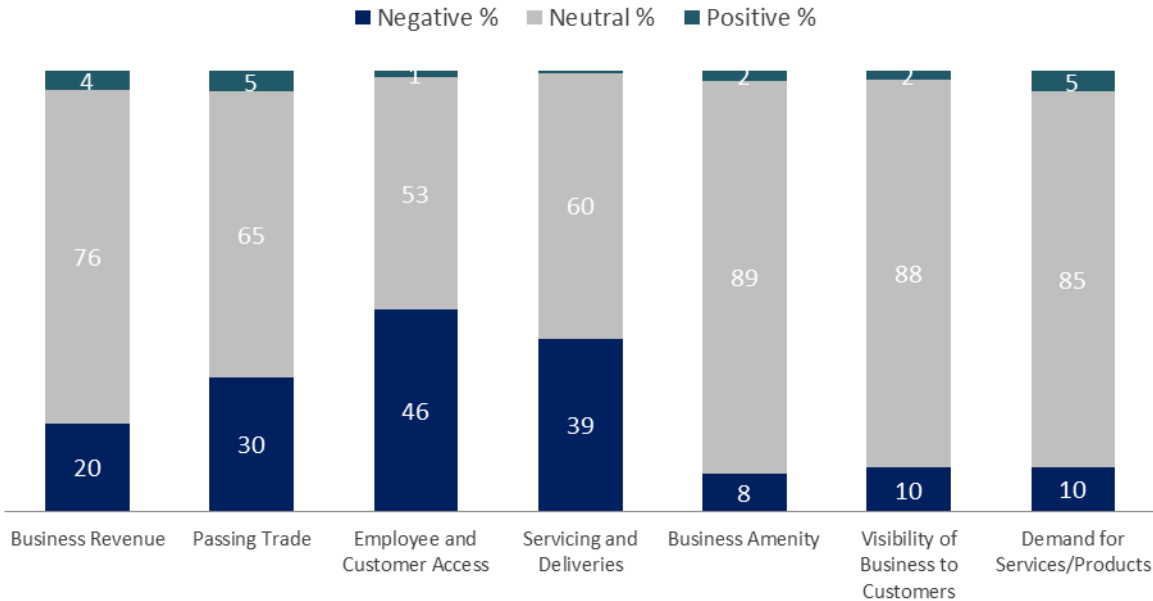
The aspects businesses were asked to consider were:

- Business revenue
- Passing trade
- Employee and customer access
- Servicing and deliveries
- Business amenity
- Visibility of business to customers
- Demand for services/products.

Most businesses believed there would be neither a positive nor negative impact during the constructions phase. There were instances where businesses thought that construction would negatively affect operations.

A breakdown of responses to question six can be seen in Figure B-0-5 to Figure B-0-12.

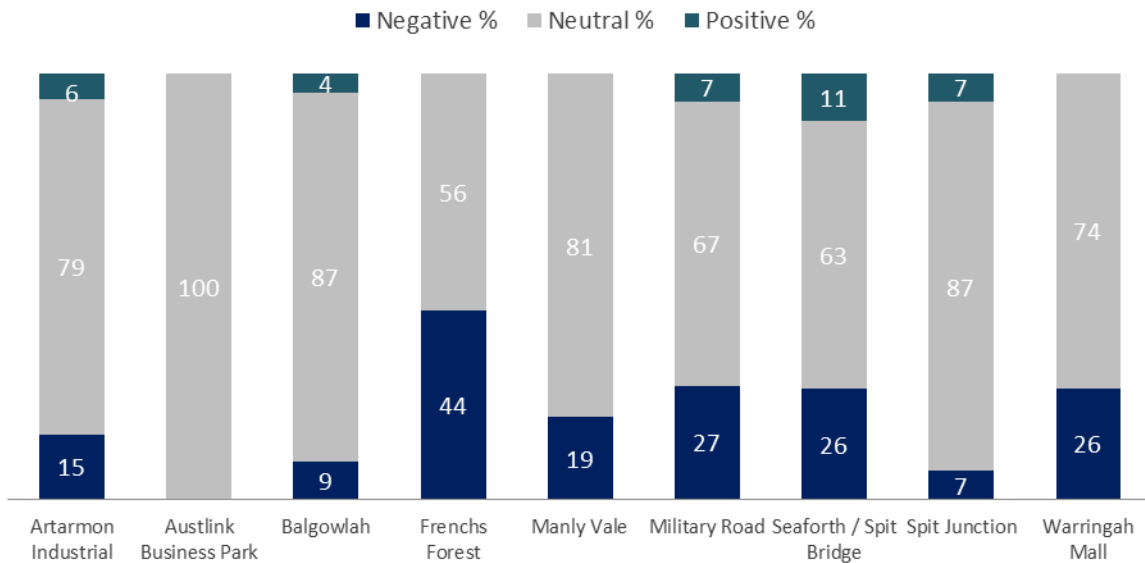
Figure B-0-5: Anticipated construction effects on business elements across all locations



Business revenue

Although most responses were neutral, they varied somewhat by location. Responses ranged from 100 per cent neutral in Austlink Business Park to 56 per cent neutral and 44 per cent negative in Frenchs Forest. Responses from other locations were a mix of neutral and negative and a very small numbers of positive responses.

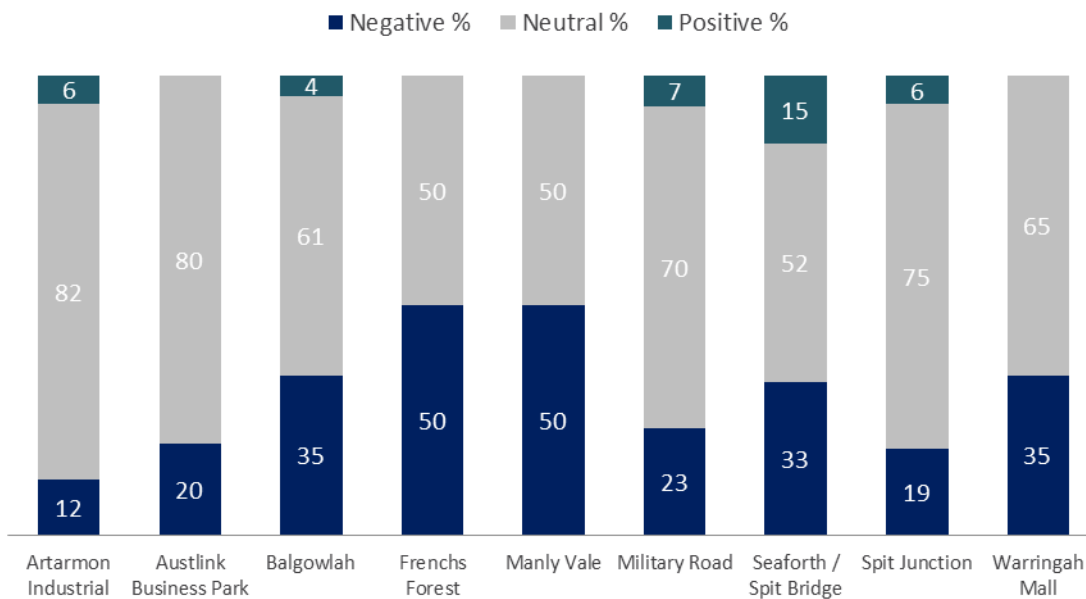
Figure B-0-6: Anticipated construction effect on business revenue by location



Passing trade

Businesses in Frenchs Forest and Manly Vale both returned equal numbers of neutral and negative responses. Many responses from other locations were neutral to the issue of how passing trade would be affected during the construction phase of the project. Businesses in some locations returned small numbers of positive responses, most notably Seaforth/Spit Bridge of which 15 per cent of businesses thought passing trade would be positively affected. Some cafes in this location commented that the increased number of construction workers working on the project would increase passing trade.

Figure B-0-7: Anticipated construction effect on passing trade by location

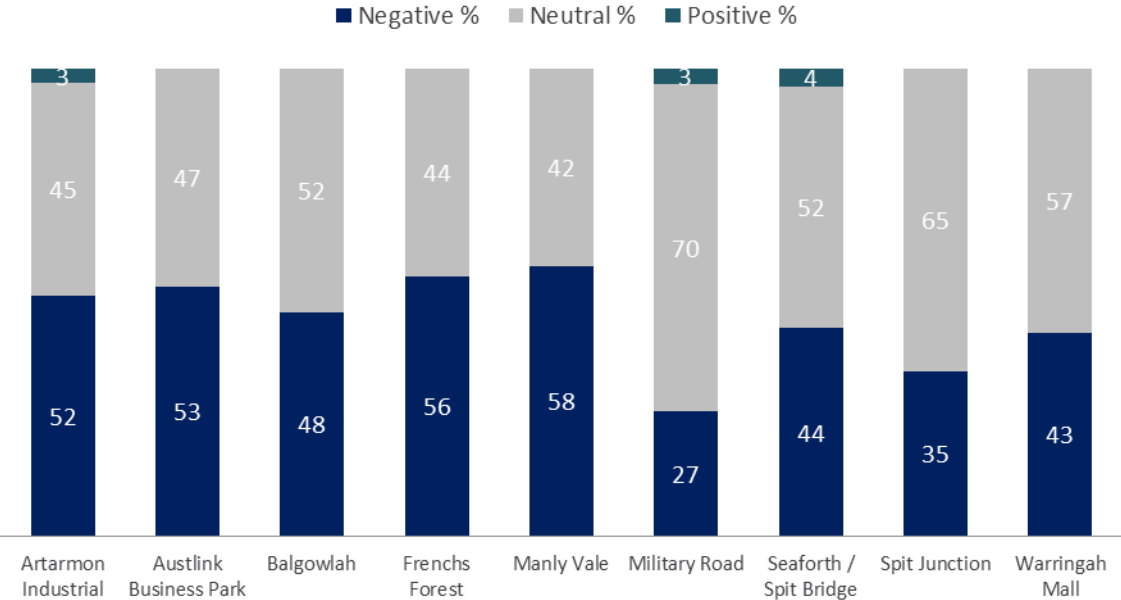


Employee and customer access

Most businesses in Artarmon Industrial, Austlink Business Park, Frenchs Forest and Manly Vale answered that employee and customer access would be negatively affected during construction. Most

businesses in other locations answered that the effect would be mostly neutral. This question returned the most negative responses and fewest positive responses.

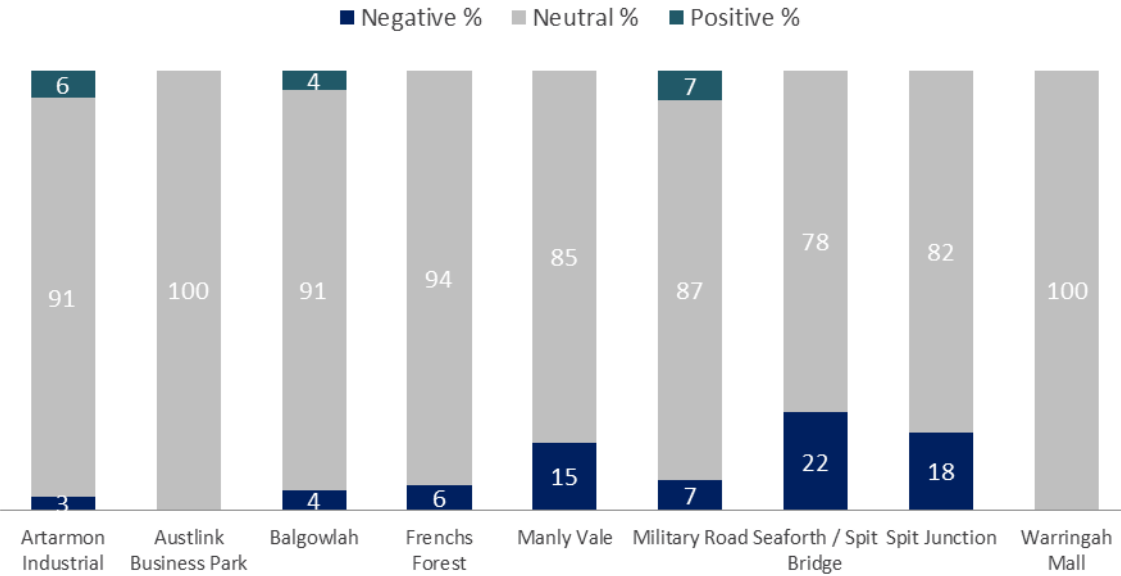
Figure B-0-8: Anticipated construction effect on employee and customer access by location



Business amenity

One hundred per cent of businesses in Austlink Business Park and Warringah Mall responded that construction would have a neutral effect on business amenity. Most businesses in other locations also responded neutrally with very small numbers replying positively. The largest proportion of businesses to answer that business amenity would be negatively affected was in Seaforth/Spit Bridge (22 per cent).

Figure B-0-9: Anticipated construction effect on business amenity by location

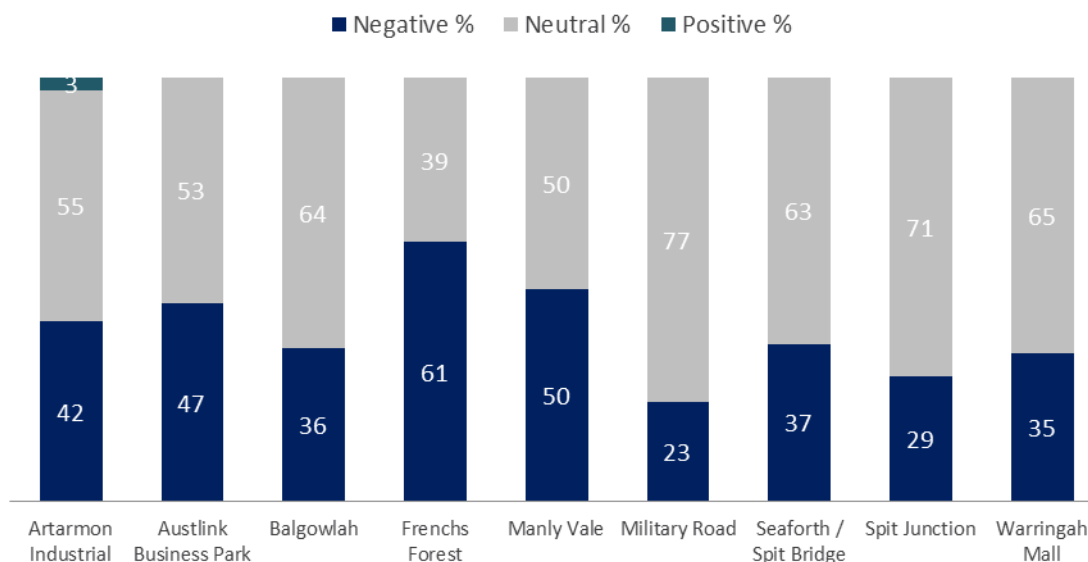


Servicing and deliveries

Artarmon Industrial was the only location where businesses answered that servicing and deliveries would be affected positively during construction (three per cent). At least half of all businesses in Frenchs

Forest and Manly Vale responded negatively while all other locations returned a majority of neutral responses.

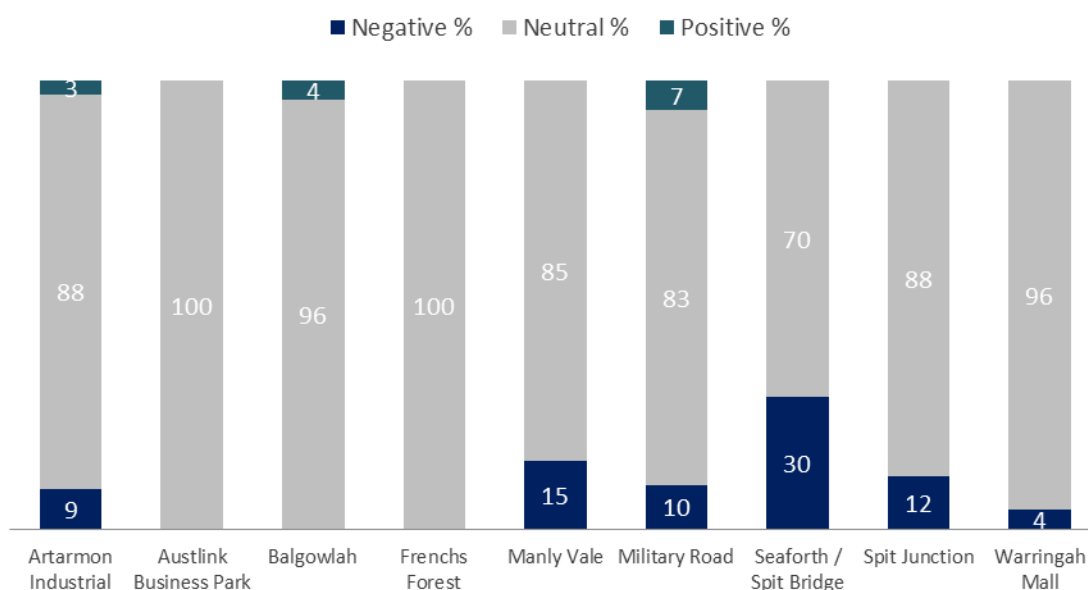
Figure B-0-10: Anticipated construction effect on servicing and deliveries by location



Visibility of business to customers

Small numbers of businesses in three locations answered that the visibility of their business would be affected positively by construction of the project (three per cent in Artarmon Industrial, four per cent in Balgowlah and seven per cent in Military Road). Most businesses in all locations responded neutrally. A portion of businesses in six locations responded negatively, most notably 30 per cent of businesses in Seaforth/Spit Bridge.

Figure B-0-11: Anticipated construction effect on business visibility by location

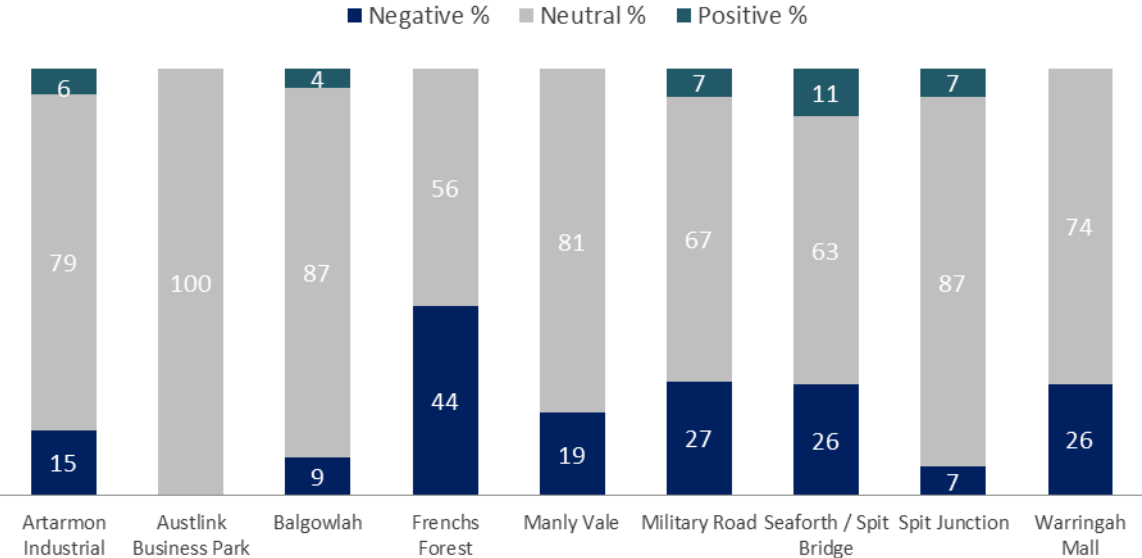


Demand for services/products

Most businesses in all areas answered that construction would have a neutral effect demand for services and products. Some businesses commented that they would suffer from customers avoiding the area

due to the construction support sites while others stated they would benefit from increased trade from construction workers in the area.

Figure B-0-12: Anticipated construction effect on demand for services/products by location



Question 7: During the operation phase, what effect would the project have on the following?

Businesses surveyed were asked to indicate how they believed certain aspects of their businesses would be affected during the operation phase of the project.

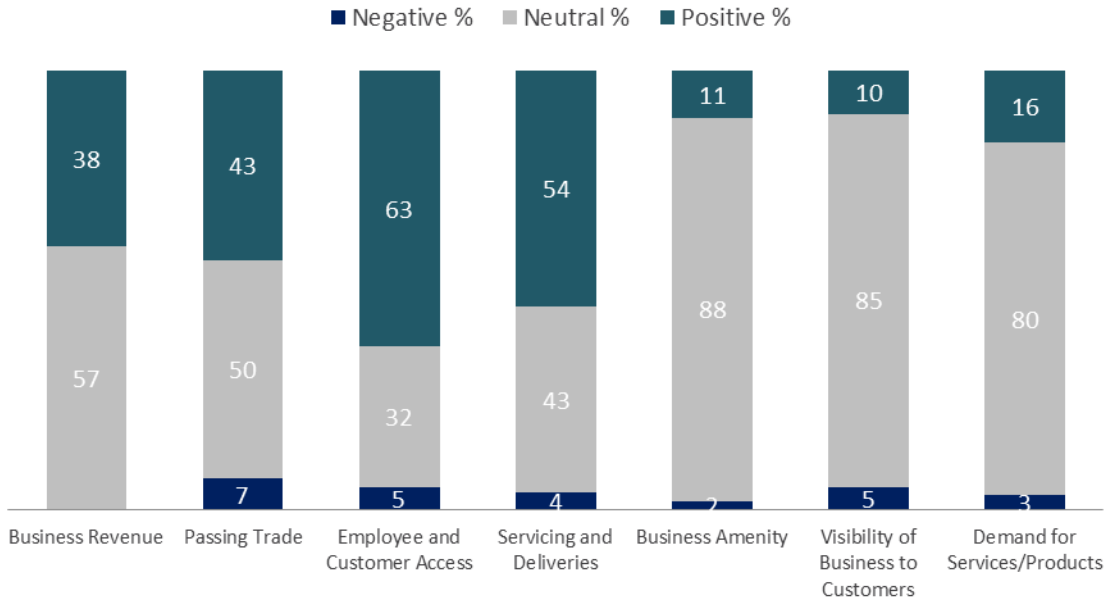
The elements businesses were asked to consider were:

- Business revenue
- Passing trade
- Employee and customer access
- Servicing and deliveries
- Business amenity
- Visibility of business to customers
- Demand for services/products.

All locations indicated a strong trend toward either a neutral or positive perception of the effect the project would have once in operation. Very few businesses indicated a negative impact of the project during the operation phase.

A breakdown of responses to question seven can be seen in Figure B-0-13 to Figure B-0-20.

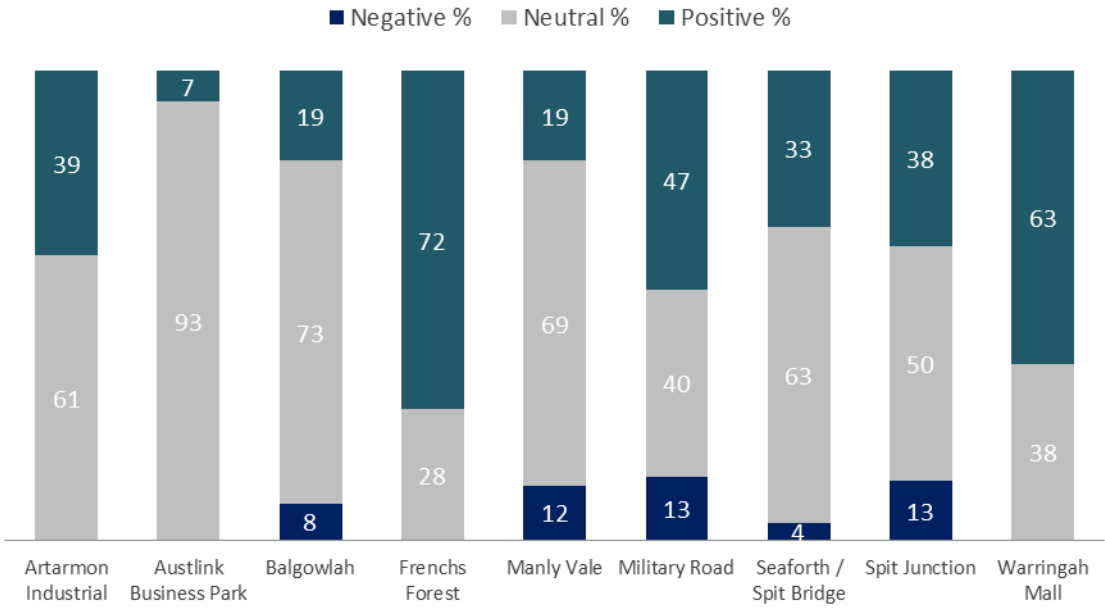
Figure B-0-13: Anticipated operation effect on business elements across all locations



Business revenue

Most businesses in Artarmon Industrial, Austlink Business Park, Balgowlah, Manly Vale and Seaforth/Spit Bridge answered that the operation of the project would have a neutral effect on their revenue. Businesses in Frenchs Forest and Warringah Mall returned a majority of positive responses with no negative responses. Other locations returned mixed responses with a strong trend toward a neutral or positive perception of the effects of operation on business revenue.

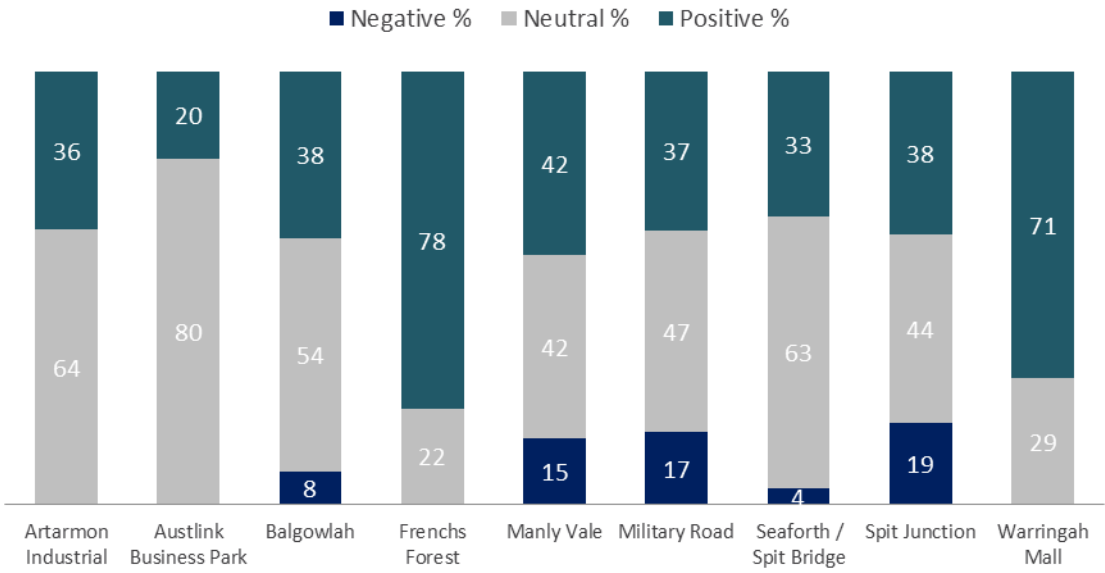
Figure B-0-14: Anticipated operation effect on business revenue by location



Passing trade

Most businesses in Artarmon Industrial, Austlink Business Park, Balgowlah and Seaforth/Spit Bridge answered that the operation of the project would have a neutral effect on passing trade. Businesses in Frenchs Forest and Warringah Mall returned a majority of positive responses with no negative responses. Other locations returned mixed responses with a strong trend toward a neutral or positive perception of the effects of operation.

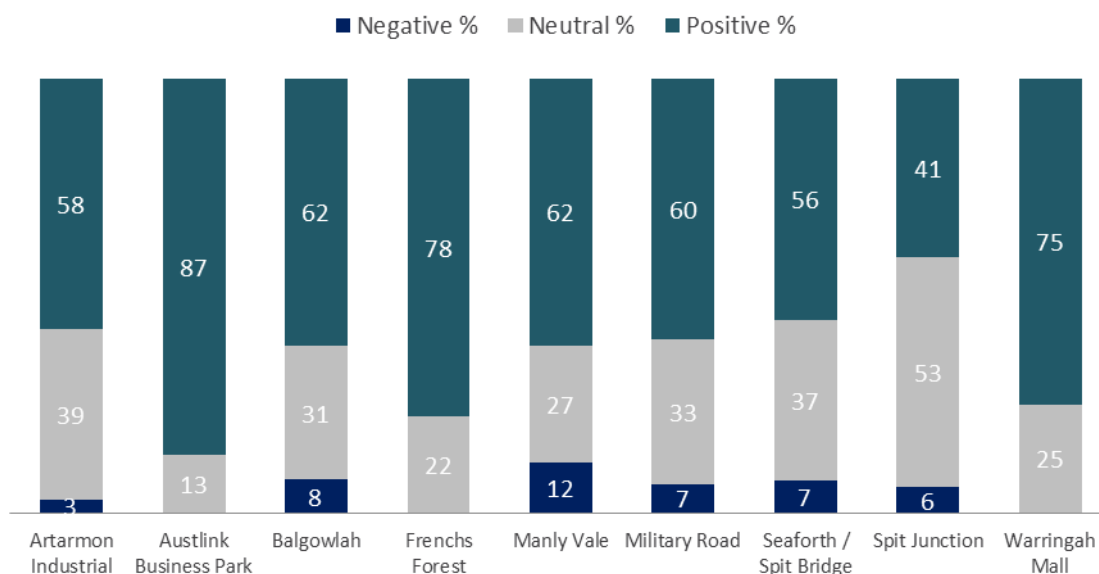
Figure B-0-15: Anticipated operation effect on passing trade by location



Employee and customer access

Most businesses in all locations answered that operation of the project would have a positive effect on employee and customer access with the exception of Spit Junction. Businesses in Spit Junction offered a mixed response which was mostly neutral (53 per cent) and 41 per cent positive. Across all locations, very few businesses responded that operation of the project would affect access negatively.

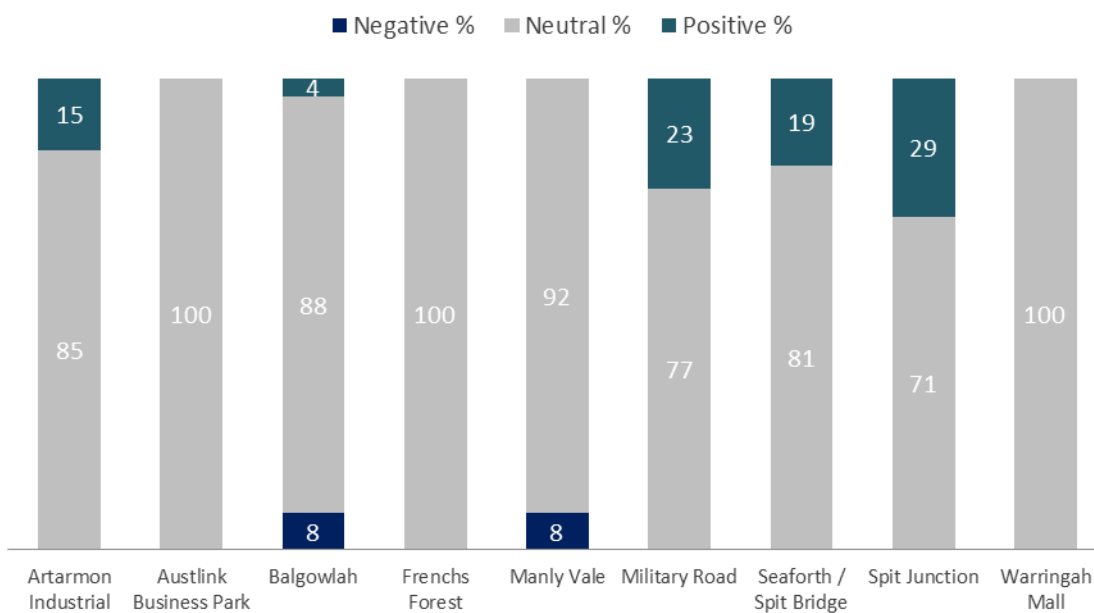
Figure B-0-16: Anticipated operation effect on employee and customer access by location



Business amenity

Most businesses across all locations believed there would be a neutral effect on business amenity during operation of the project. Two locations returned negative responses, with eight per cent of businesses in both Balgowlah and Manly Vale answering that business amenity would be affected negatively.

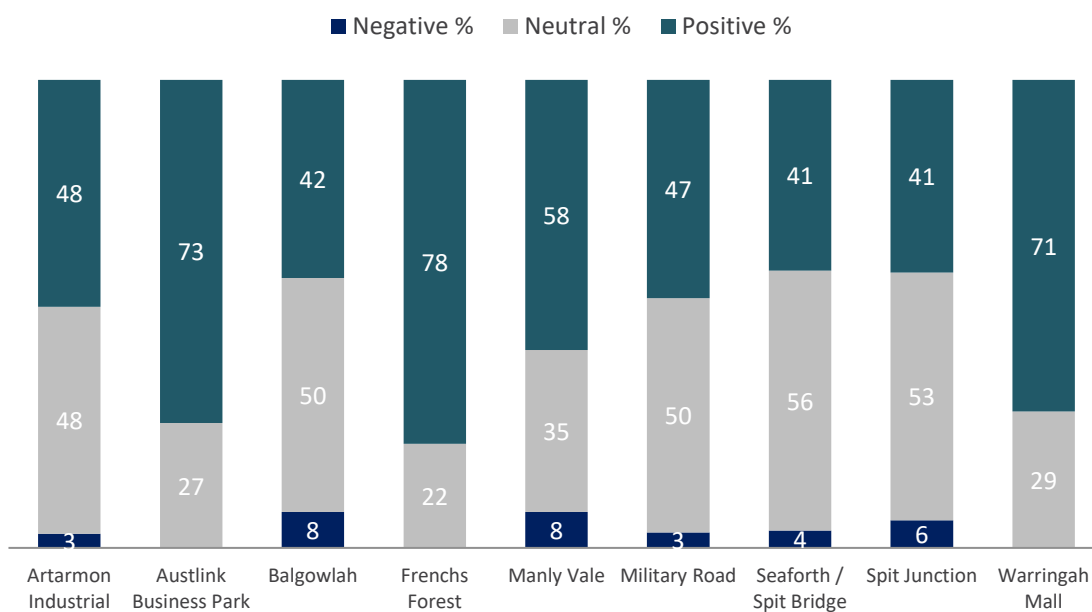
Figure B-0-17: Anticipated operation effect on business amenity by location



Servicing and deliveries

Most businesses in four of the nine locations (Austlink Business Park, Frenchs Forest, Manly Vale and Warringah Mall) believed that operation of the project would positively impact on servicing and deliveries. Other locations produced a strong trend towards a mixed neutral and positive response.

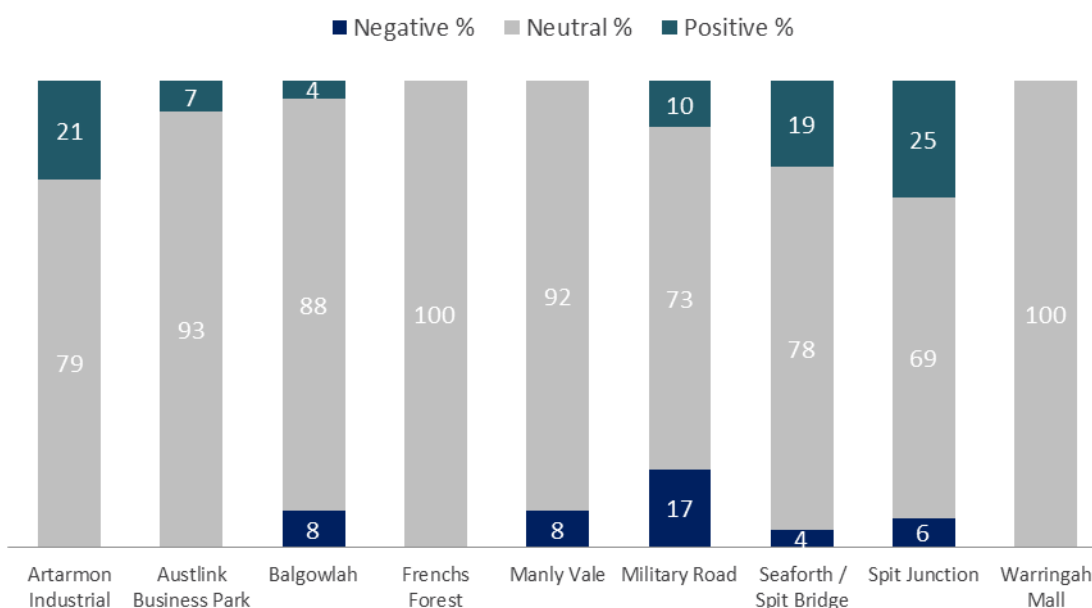
Figure B-0-18: Anticipated operation effect on servicing and deliveries by location



Visibility of business to customers

Most businesses across all locations answered that the operation of the project would have a neutral effect on their visibility to customers, including a 100 per cent neutral response in two locations (Frenchs Forest and Warringah Mall).

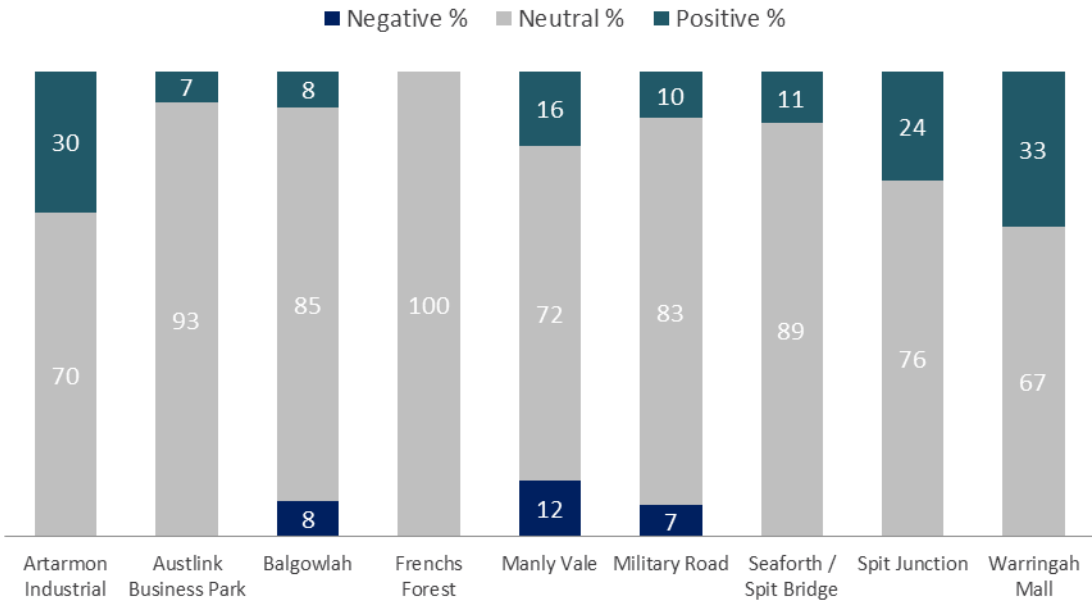
Figure B-0-19: Anticipated operation effect on business visibility to customers by location



Demand for services/products

Most businesses across all locations answered that the operation of the project would have a neutral effect on demand for services and products, including a 100 per cent neutral response in Frenchs Forest.

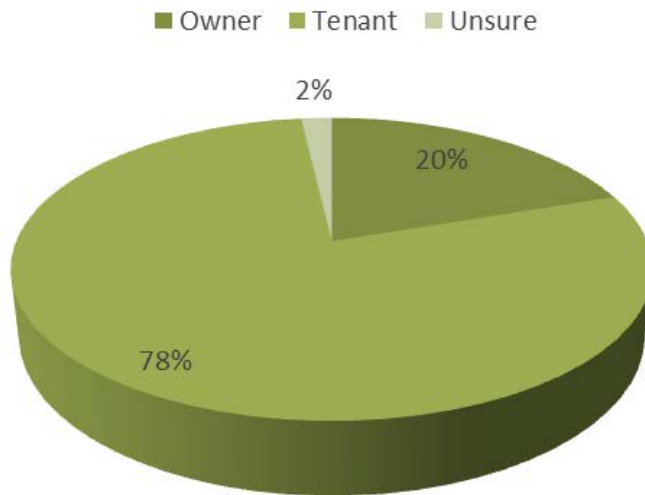
Figure B-0-20: Anticipated operation effect on demand for services/products by location



Question 8: Are you an owner occupier or tenant?

As can be seen in Figure B-0-21, 78 per cent of the businesses surveyed leased their premises while 20 per cent were owner occupiers. Two per cent of respondents were unsure as to whether the business owned the premises or leased.

Figure B-0-21: Owning or leasing premises

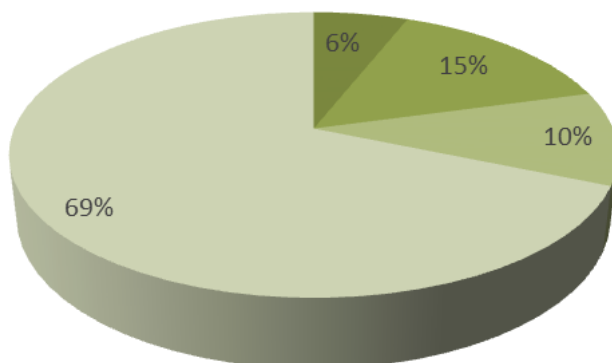


Question 9: How long have you been operating in the area?

From the businesses surveyed, 69 per cent have been in operation for more than five years, 10 per cent between three and five years, and 15 per cent between one and three years. Finally, six per cent of businesses had been in operation for less than a year.

Figure B-0-22: Years in operation

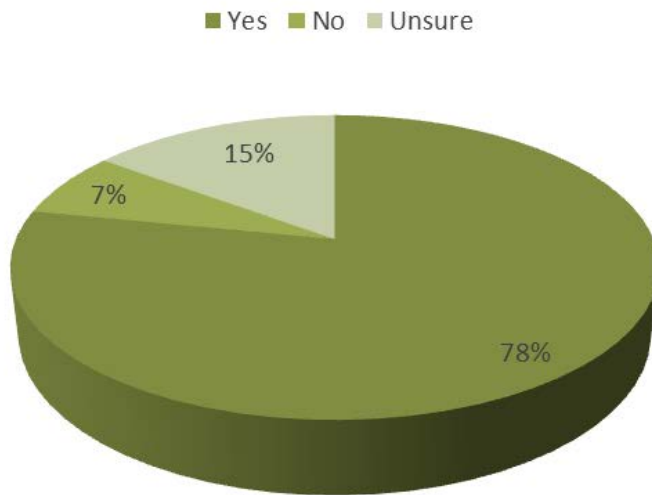
■ Less than 1 year ■ 1-3 years ■ 3-5 years ■ More than 5 years



Question 10: Do you plan to be here in five years?

Most businesses surveyed (78 per cent) planned to be at the same premises in five years. Seven per cent of businesses surveyed did not intend to be at the same premises in five years and 15 per cent were unsure.

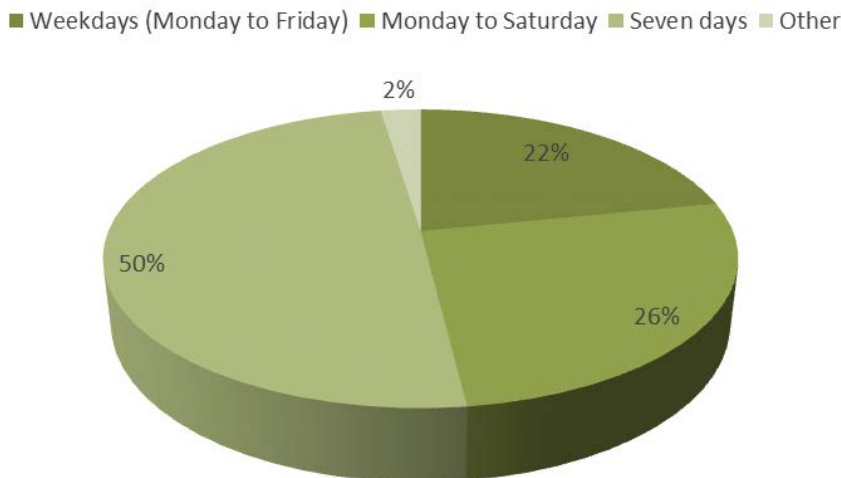
Figure B-0-23: Intention to stay in same location



Question 11: What are your main trading days?

Half of the businesses surveyed were open seven days a week followed by 26 per cent of businesses open six days a week, from Monday to Saturday. Businesses which operated Monday to Friday made up 22 per cent of those surveyed and two per cent responded with other operating days. Most businesses which responded with 'other' were restaurants and bars which were open Tuesday to Saturday or Tuesday to Sunday.

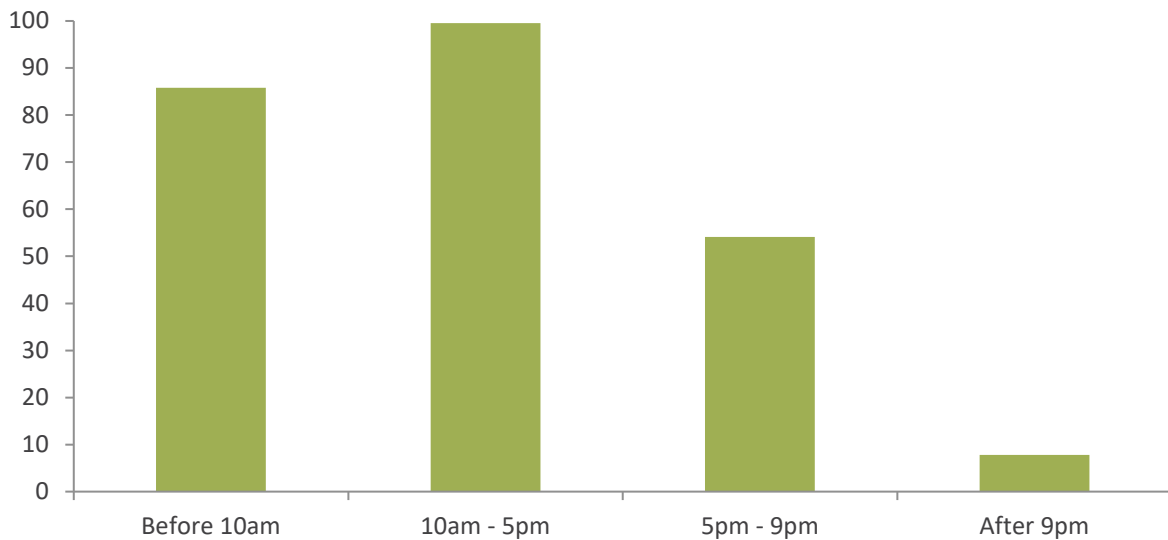
Figure B-0-24: Main trading days



Question 12: When are you open?

As can be seen in the figure below, 86 per cent of the businesses surveyed were open before 10am and all reported being open between 10am and 5pm. The number of businesses open dropped in the evening with 54 per cent open between 5pm and 9pm and eight per cent open after 9pm.

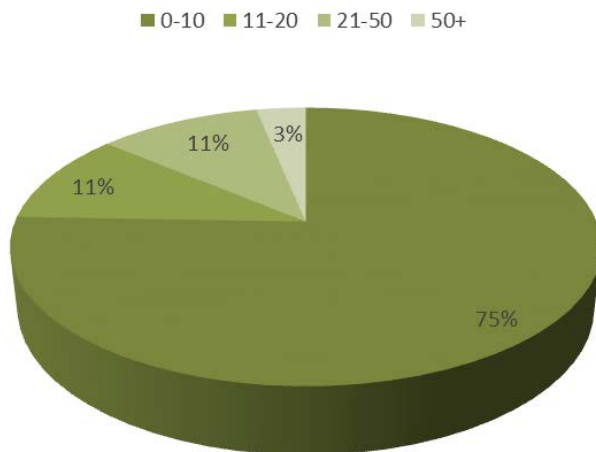
Figure B-0-25: Hours of operation



Question 13: Number of staff?

Most businesses (75 per cent) employ 10 members of staff or less with 11 per cent employing between 11 and 20. Making up a small number of businesses surveyed were businesses employing between 21 and 50 members of staff (11 per cent) and businesses employing more than 50 (three per cent).

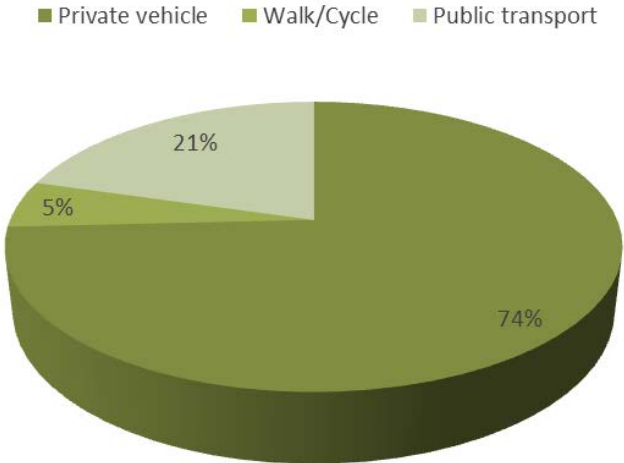
Figure B-0-26: Number of staff employed



Question 14: How does your staff usually travel to your business?

As can be seen in the figure below, the most popular method of transport for staff commuting to and from work was by private vehicle at 74 per cent followed by public transport at 21 per cent. The least common method of transportation was walking and cycling at five per cent.

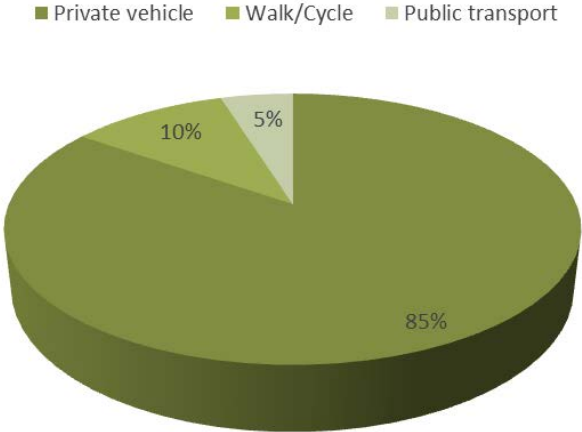
Figure B-0-27: Employee travel to work method



Question 15: How do your clients/customers usually travel to your business?

As can be seen in the figure below, the vast majority (85 per cent) reported that most of their customers travelled to the business by private vehicle. This was followed by walking and cycling at 10 per cent and public transport at five per cent.

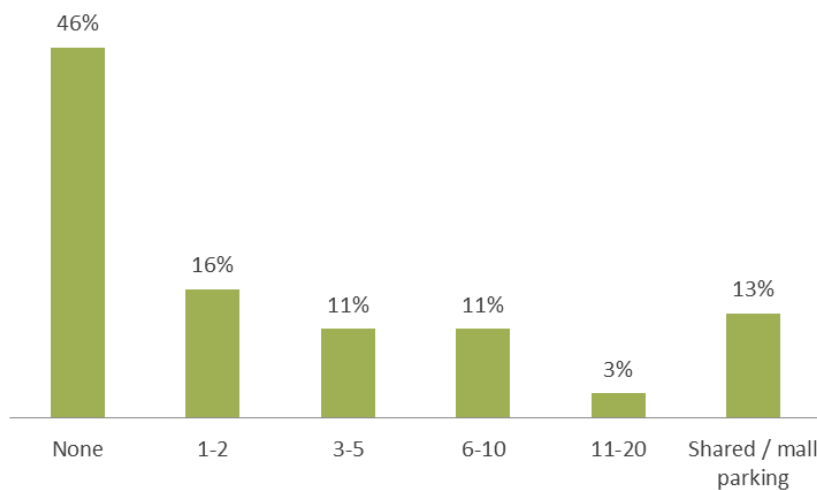
Figure B-0-28: Client/customer travel method



Question 16: Do you have parking? If so, how many spaces?

As can be seen in the figure below, 46 per cent of businesses do not have any parking. This was followed by businesses which have one or two spaces at 16 per cent, with 11 per cent having between three and five spaces. Businesses which have between six and 10 spaces also made up 11 per cent of respondents and three per cent of businesses had between 11 and 20 spaces. Those which make use of a large, shared parking area, such as in a shopping mall, made up 13 per cent of businesses surveyed.

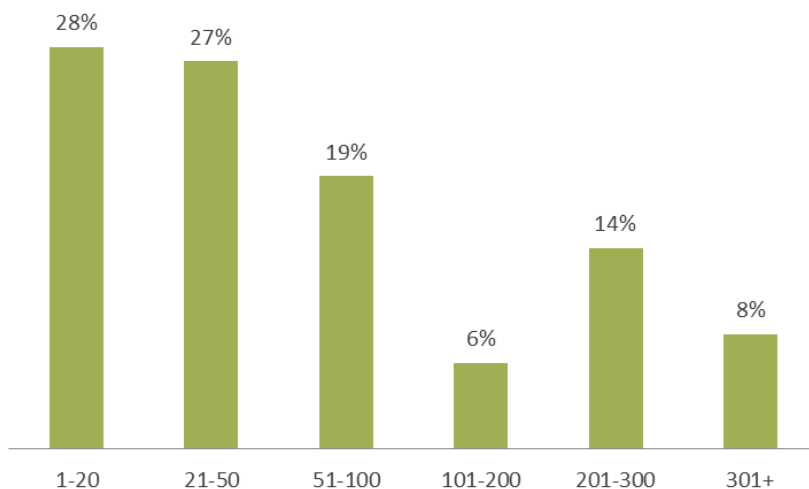
Figure B-0-29: Parking configuration



Question 17: Approximate number of customers per day?

Of the businesses surveyed, 28 per cent have between one and 20 customers per day and 27 per cent have between 21 and 50 customers per day. These businesses made up most responses, followed by businesses which have between 51 and 100 customers per day at 19 per cent and those with between 101 and 200 customers per day at six per cent. A minority of businesses have a larger number of customers per day with 14 per cent of businesses having between 201 and 300 and eight per cent having more than 301.

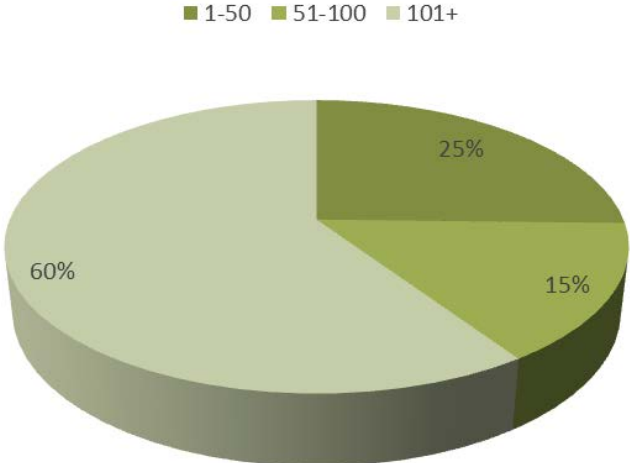
Figure B-0-30: Number of customers per day



Question 18: Average dollar spend per customer?

As can be seen in the figure below, 60 per cent of the businesses surveyed indicated that, on average, their customers spend more than 101 dollars. The second largest category was businesses whose customers spend between one and 50 dollars at 25 per cent. Businesses whose customers spend between 51 and 100 dollars made up 15 per cent of those surveyed.

Figure B-0-31: Average dollar spend



Annexure B: Demographic information

Table B-1 Population growth, 2009 to 2019

Locality	2009	2014	2019	Population change (average annual growth) (per cent)	
				2014-2019	2009-2019
Chatswood (East)-Artarmon	25,206	27,750	31,778	2.7	2.3
St Leonards-Naremburn	9396	10,426	11,973	2.8	2.5
Willoughby-Castle Cove-Northbridge	25,001	26,306	27,181	0.7	0.8
Cremorne-Cammeray	18,676	19,797	20,781	1.0	1.1
Mosman	28,761	29,846	30,981	0.7	0.7
Western Precinct	107,040	114,125	122,694	1.5	1.4
Balgowlah-Clontarf-Seaforth	19,557	20,821	21,597	0.7	1.0
Forestville-Killarney Heights	12,600	13,107	13,527	0.6	0.7
Frenchs Forest-Belrose	25,093	25,846	26,443	0.5	0.5
Manly Vale-Allambie Heights	16,137	17,241	18,271	1.2	1.2
Eastern Precinct	73,387	77,015	79,838	0.7	0.8
Study area	180,427	191,140	202,532	1.2	1.2
Greater Sydney	4,492,380	4,841,349	5,312,163	1.9	1.7

Source: Based on 2019 ABS Regional Population Growth, Australia. Cat. 3218.0.

Table B-2 Age profile, 2016

Locality	0-14 years (per cent)	15-24 years (per cent)	25-44 years (per cent)	45-64 years (per cent)	+ 65 years (per cent)
Chatswood (East)- Artarmon	17.5	12.7	37.2	20.4	12.2
St Leonards- Naremburn	15.2	8.0	47.2	20.3	9.3
Willoughby-Castle Cove-Northbridge	22.8	10.9	22.8	27.5	16.0
Cremorne- Camberay	16.0	7.2	36.5	24.6	15.8
Mosman	17.6	10.0	26.3	26.9	19.1
Western Precinct	18.3	10.2	32.0	24.4	15.2
Balgowlah- Clontarf-Seaforth	23.7	10.8	23.9	27.6	13.9
Forestville- Killarney Heights	23.0	11.7	20.7	25.7	18.9
Frenchs Forest- Belrose	21.7	12.0	20.6	25.9	19.8
Manly Vale- Allambie Heights	23.0	10.1	27.1	24.7	15.2
Eastern Precinct	22.8	11.2	23.0	26.1	17.0
Study area	20.1	10.6	28.4	25.0	15.9
Greater Sydney	18.7	13.0	30.5	23.9	13.9

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-3 Cultural diversity, 2016

Locality	Indigenous (per cent)	Born overseas (per cent)	Speaks a language other than English (per cent)
Chatswood (East)-Artarmon	0.2	57.8	56.5
St Leonards-Naremburn	0.2	44.7	33.9
Willoughby-Castle Cove-Northbridge	0.2	32.0	23.8
Cremorne-Cammeray	0.2	34.7	18.1
Mosman	0.2	33.4	15.1
Western Precinct	0.2	40.6	29.9
Balgowlah-Clontarf-Seaforth	0.3	31.2	13.0
Forestville-Killarney Heights	0.4	32.1	23.7
Frenchs Forest-Belrose	0.4	28.0	16.0
Manly Vale-Allambie Heights	0.5	29.3	15.6
Eastern Precinct	0.4	29.8	16.4
Study area	0.3	36.3	24.5
Greater Sydney	1.5	36.8	35.8

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-4 English proficiency, 2016

Locality	Speaks English only (per cent)	Speaks English not well or not at all (per cent)
Chatswood (East)-Artarmon	38.1	12.2
St Leonards-Naremburn	59.3	4.4
Willoughby-Castle Cove-Northbridge	72.2	3.4
Cremorne-Cammeray	75.4	1.8
Mosman	69.8	2.6
Western Precinct	61.4	5.6
Balgowlah-Clontarf-Seaforth	82.6	1.1
Forestville-Killarney Heights	73.6	2.5
Frenchs Forest-Belrose	80.7	1.6
Manly Vale-Allambie Heights	80.0	1.9
Eastern Precinct	79.8	1.7
Study area	69.2	3.9
Greater Sydney	58.4	6.5

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-5 Core activity need for assistance, 2016

Locality	Has need for assistance (per cent)
Chatswood (East)-Artarmon	3.5
St Leonards-Naremburn	1.9
Willoughby-Castle Cove-Northbridge	3.4
Cremorne-Cammeray	1.9
Mosman	3.1
Western Precinct	3.0
Balgowlah-Clontarf-Seaforth	2.3
Forestville-Killarney Heights	4.0
Frenchs Forest-Belrose	4.3
Manly Vale-Allambie Heights	4.4
Eastern Precinct	3.7
Study area	3.3
Greater Sydney	4.9

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-6 Household composition, 2016

Locality	Family household (per cent)	Lone person household (per cent)	Group household (per cent)	Number of households
Chatswood (East)-Artarmon	69.6	23.2	7.1	10,392

St Leonards- Naremburn	63.7	29.6	6.7	4367
Willoughby-Castle Cove-Northbridge	80.5	17.4	2.0	8412
Cremorne- Camberay	61.2	33.8	5.0	8185
Mosman	67.7	29.4	2.9	11,022
Western Precinct	69.0	26.4	4.6	42,378
Balgowlah- Clontarf-Seaforth	80.0	17.5	2.7	6738
Forestville- Killarney Heights	81.2	17.5	1.2	4140
Frenchs Forest- Belrose	84.4	14.3	1.3	7889
Manly Vale- Allambie Heights	76.2	21.0	2.8	5654
Eastern Precinct	80.8	17.3	2.0	24,421
Study area	73.3	23.0	3.6	66,799
Greater Sydney	73.6	21.6	4.7	1,623,872

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-7 Dwelling structure, 2016

Locality	Separate house (per cent)	Semi-detached house (per cent)	Flat, unit or apartment (per cent)	Total dwellings	Occupancy rate (per cent)
Chatswood (East)-Artarmon	23.5	5.7	61.3	11,450	90.8
St Leonards-Naremburn	17.7	9.4	62.2	4,864	89.8
Willoughby-Castle Cove-Northbridge	69.2	7.9	15.1	9,045	93.0
Cremorne-Cammeray	18.6	11.1	61.2	8,977	91.2
Mosman	31.5	10.8	46.0	12,398	88.9
Western Precinct	32.9	8.9	48.4	46,734	90.7
Balgowlah-Clontarf-Seaforth	59.7	12.9	18.4	7,333	91.9
Forestville-Killarney Heights	81.1	5.8	7.3	4,379	94.5
Frenchs Forest-Belrose	84.5	9.6	1.2	8,271	95.4
Manly Vale-Allambie Heights	60.5	5.2	27.0	6,078	93.0
Eastern Precinct	71.4	8.9	13.1	26,061	93.7
Study area	46.7	8.9	35.7	72,795	91.8
Greater Sydney	52.5	12.9	25.9	1,759,927	92.3

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-8 Tenure type, 2016

Locality	Owned outright (per cent)	Owned with a mortgage (per cent)	Rented (per cent)
Chatswood (East)-Artarmon	25.9	21.5	49.4
St Leonards-Naremburn	20.6	26.5	50.6
Willoughby-Castle Cove-Northbridge	42.3	34.5	21.0
Cremorne-Cammeray	29.5	24.8	43.3
Mosman	36.3	26.5	34.3
Western Precinct	32.0	26.5	38.8
Balgowlah-Clontarf-Seaforth	38.7	37.4	21.7
Forestville-Killarney Heights	42.0	38.2	16.3
Frenchs Forest-Belrose	42.4	43.2	10.5
Manly Vale-Allambie Heights	30.5	40.5	25.6
Eastern Precinct	38.5	40.1	18.1
Study area	34.4	31.5	31.2
Greater Sydney	29.1	33.2	34.1

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-9 Vehicle ownership, 2016

Locality	Households with no vehicle (per cent)	Households with one vehicle (per cent)	Households with two or more vehicles (per cent)
Chatswood (East)-Artarmon	21.0	50.4	26.0
St Leonards-Naremburn	21.5	50.7	25.7
Willoughby-Castle Cove-Northbridge	5.4	35.8	56.4
Cremorne-Cammeray	10.5	53.3	34.1
Mosman	10.1	45.8	42.0
Western Precinct	13.1	46.9	37.7
Balgowlah-Clontarf-Seaforth	4.7	36.2	57.3
Forestville-Killarney Heights	4.7	28.6	64.4
Frenchs Forest-Belrose	2.6	24.8	69.9
Manly Vale-Allambie Heights	6.7	37.7	53.1
Eastern Precinct	4.5	31.6	61.6
Study area	9.9	41.3	46.5
Greater Sydney	11.1	37.1	48.5

Source: 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table B-10 Household income, 2016

Locality	Median total income (\$/ week)		Weekly household income (%)	
	Personal income	Household income	<\$650/ week	>\$2,000/ week
Chatswood (East)- Artarmon	\$804	\$1950	11.4	59.5
St Leonards- Naremburn	\$1345	\$2399	5.3	76.3
Willoughby-Castle Cove-Northbridge	\$1061	\$2857	4.6	76.2
Cremorne- Camberay	\$1357	\$2385	3.7	77.9
Mosman	\$1295	\$2522	3.6	79.8
Western Precinct	\$1172	\$2423	6.0	73.2
Balgowlah- Clontarf-Seaforth	\$1090	\$2803	4.0	77.1
Forestville-Killarney Heights	\$788	\$2287	5.8	67.4
Frenchs Forest- Belrose	\$828	\$2398	5.0	68.5
Manly Vale- Allambie Heights	\$875	\$2187	4.9	68.4
Eastern Precinct	\$895	\$2419	4.8	70.6
Study area*	\$1049	\$2421	5.5	72.2
Greater Sydney	\$719	\$1750	8.9	54.9

*Average of median incomes for SA2s in the study area

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics

Table B-11 Labour force, 2016

Locality	Labour force	Labour force participation (per cent)	Unemployment (per cent)
Chatswood (East)-Artarmon	14,509	61.3	6.2
St Leonards-Naremburn	6586	74.0	3.9
Willoughby-Castle Cove-Northbridge	12,467	63.4	4.1
Cremorne-Cammeray	11,273	70.3	3.8
Mosman	14,575	62.1	3.9
Western Precinct	59,410	64.8	4.5
Balgowlah-Clontarf-Seaforth	10,283	66.8	3.6
Forestville-Killarney Heights	6118	62.2	3.8
Frenchs Forest-Belrose	12,638	64.1	3.9
Manly Vale-Allambie Heights	8800	67.7	3.7
Eastern Precinct	37,839	65.3	3.8
Study area	97,249	65.0	4.2
Greater Sydney	2,418,899	61.6	6.0

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Table C-12 Travel to work, 2016

Locality	One method (per cent)								Two methods (per cent)					Three methods (per cent)			Worked at home (per cent)	Worked at home (per cent)	Did not go to work (per cent)
	Train only	Bus only	Other public transport	Car only (as driver or passenger)	Walked or cycled	Truck	Motorbike/scooter	Other one method	Train and car (as driver or passenger)	Train and one other method (excluding)	Bus and car (as driver or passenger)	Bus and one other method (excluding)	Other two methods	Train and two other methods	Bus and two other methods (excl train)	Other three methods			
Chatswood (East)-Artarmon	32.6	5.5	0.2	31.2	11.6	0.1	0.4	0.6	0.9	3.5	0.2	0.0	0.3	0.4	0.0	0.0	4.7	6.8	0.7
St Leonards-Naremburn	27.9	10.3	0.5	29.9	12.0	0.1	0.9	0.6	0.6	2.9	0.5	0.2	0.5	0.4	0.0	0.0	4.8	7.1	0.6
Willoughby-Castle Cove-Northbridge	1.5	20.3	0.4	49.8	4.6	0.2	0.9	0.5	0.7	2.2	0.9	0.2	0.6	0.3	0.3	0.0	8.2	7.8	0.7
Cremorne-Cammeray	0.9	25.4	2.2	40.9	7.2	0.1	1.2	0.6	0.2	4.0	0.5	0.8	0.6	0.9	0.9	0.1	6.6	7.2	0.5
Mosman	0.5	21.0	3.7	43.3	5.4	0.1	1.0	0.7	0.2	2.7	0.6	1.7	0.9	0.9	0.9	0.1	8.8	7.5	0.7
Western Precinct	11.6	16.8	1.5	39.8	7.8	0.1	0.8	11.6	0.5	3.0	0.5	0.6	0.6	0.6	0.1	0.0	6.8	7.3	0.6
Balgowlah-Clontarf-Seaforth	0.2	16.6	1.6	50.3	4.0	0.3	1.5	0.7	0.1	1.7	1.1	1.1	1.1	0.8	0.2	0.1	8.8	9.0	0.8
Forestville-Killarney Heights	0.9	12.6	0.2	59.7	2.9	0.5	1.0	0.5	0.8	1.9	1.4	0.1	0.6	0.5	0.1	0.0	7.3	8.2	0.8
Frenchs Forest-Belrose	0.4	10.1	0.1	63.8	2.3	0.8	1.1	0.5	0.7	1.4	1.2	0.0	0.5	0.4	0.0	0.0	6.9	9.1	0.8
Manly Vale-Allambie Heights	0.2	15.9	0.6	53.5	5.2	0.7	1.7	0.4	0.1	1.8	1.0	0.5	0.8	0.6	0.3	0.1	6.5	9.1	0.9

Locality	One method (per cent)								Two methods (per cent)					Three methods (per cent)			Worked at home (per cent)	Worked at home (per cent)	Did not go to work (per cent)
	Train only	Bus only	Other public transport	Car only (as driver or passenger)	Walked or cycled	Truck	Motorbike/scooter	Other one method	Train and car (as driver or passenger)	Train and one other method (excluding)	Bus and car (as driver or passenger)	Bus and one other method (excluding)	Other two methods	Train and two other methods	Bus and two other methods (excl train)	Other three methods			
Eastern Precinct	0.4	13.6	0.7	57.0	3.6	0.6	1.3	0.5	0.4	1.7	1.2	0.4	0.8	0.5	0.2	0.0	7.4	8.9	0.8
Study area	7.2	15.6	1.2	46.6	6.1	0.3	1.0	0.6	0.5	2.5	0.8	0.6	0.6	0.6	0.1	0.0	7.0	7.9	0.7
Greater Sydney	10.9	5.5	0.7	56.6	4.8	0.9	0.7	0.5	1.8	2.9	0.4	0.1	0.6	0.6	0.0	0.0	4.4	7.8	0.9

Source: Based on 2016 Census of Population and Housing, Australian Bureau of Statistics.

Annexure C: Social infrastructure near the project

Type of facility	Facility	Location	Description
Western Precinct			
Places of worship	St Mary's Catholic Church	Miller Street, North Sydney	
	St Leonard's Catholic Church	Donnelly Road, Naremburn	The church provides regular services on Saturday, Tuesday and Thursday mornings, and Sunday morning and evening. The church also holds regular monthly services for various language groups.
	Naremburn Cammeray Anglican Church	Willoughby Road, Naremburn	The church provides regular services on Sunday morning.
	The Catholic Community of North Harbour	Wanganella Street, Balgowlah	The church holds regular services on Wednesday and Sunday mornings.
	Armenian Evangelical Brethren Church	Sailors Bay Road, Northbridge	The church provides regular services on Sunday morning, in both Armenian and English.
	St Mark's Anglican Church	Tunks Street, Northbridge	The church provides regular services on Sunday morning and evening.
	St Phillip Neri's Catholic Church Northbridge	Sailors Bay Road, Northbridge	The church provides regular services during the week and on weekends.
Education and childcare facilities	Guardian Early Learning (Arthur Street)	Arthur Street, North Sydney	The centre includes nursery, toddler, kindergarten and preschool programs and is open 8am to 6pm Monday to Friday.
	Walker Street Early Learning Centre	Walker Street, North Sydney	The centre provides childcare for children aged between six weeks and six years of age. The centre operates between 7am and 6pm, Monday to Friday.
	Wenona School	Walker Street, North Sydney	The private girls school offers primary and secondary education to students in Kindergarten to Year 12. In 2019, the school had an enrolment of 1138 students. The school also provides accommodation for up to 50 boarders. In 2019, the school had 191 staff members, including teaching and non-teaching staff (My School, 2020b). The school also offers an after-school care service for students in Kindergarten to Year 6, which operates from 2.50pm to 6pm on school days.

Type of facility	Facility	Location	Description
	Jacaranda Cottage	Miller Street, North Sydney	Centre based day care centre for children aged from six weeks to five years
	Camergal Montessori School – Forsyth Park Preschool Campus	Forsyth Park, Montpelier Street, Neutral Bay	The centre provides two preschool classes for children aged three to six years and afternoon care programs. The classes operate between 8.30am and 12pm, Monday to Friday, with the afternoon care program held between 12pm and 3pm.
	KU Grandstand Kids Care	Fig Tree Lane, North Sydney	The facility provides a kindergarten after school program for children attending North Sydney Demonstration School. The facility operates between 3pm and 6pm, Monday to Friday.
	ANZAC Park Public School	Corner of Ernest Street and ANZAC Avenue, Cammeray	Provides primary school education to students in Kindergarten to Year 6. The school opened in January 2016 and in 2019 had an enrolment of 619 students, with 40 staff members, including teaching and non-teaching staff (My School, 2020a).
	KU Cammeray Preschool	Warwick Avenue, Cammeray	The centre is open from 8:15am to 3:45pm Monday to Friday.
	Only About Children Cammeray Campus	Miller Street, Cammeray	The centre is open from 7am to 6pm Monday to Friday.
	Happy Kids Family Day Care Cammeray	Massey Street, Cammeray	The centre provides day care services and is open Monday to Thursday 8am to 6pm.
	Naremburn Early Learning Centre	Donnelly Road, Naremburn	The centre provides day care services for children aged from six weeks to five years.
	White Rabbit Childcare Centre	Merrenburn Avenue, Naremburn	The centre provides long day care services and is open Monday to Friday 7:30am to 6:00pm.
	Willoughby Community Preschool	Central Street, Naremburn	Provides education and care for children aged three to five years. The center operations between 8am and 4pm, Monday to Friday.
	Innovative Early Learning	George Place Artarmon	The facility provides childcare services for children up to six years old. The facility is open Monday to Friday (7.30am to 6pm).
	Artarmon Public School	McMillan Road, Artarmon	The school provides primary school education for students in Kindergarten to Year 6. In 2019, the

Type of facility	Facility	Location	Description
			school had an enrolment of 1248 students, with 58 teaching staff and seven non-teaching staff members (My School, 2020c).
	Little Lion Early Learning Artarmon	Dickson Avenue, Artarmon	The centre provides childcare and early learning services for children up to six years old. The centre is open Monday to Friday (7.00am to 6.30pm) and includes outdoor learning and play areas.
	Butterflies Early Learning Childcare Centre	Waltham Street, Artarmon	Offers long day care and preschool. Open Monday to Friday (7am to 6pm).
	Creative Acorn Early Learning Centre	Herbert Street, St Leonards	Early learning and childcare centre. The centre is open 8am to 6pm, Monday to Friday.
	SBS Childcare	Herbert Street, Artarmon	Provides long day care facilities for children aged between six weeks and six years.
	Ella Bache College	Lambs Road, Artarmon	The site provides accredited training and diploma level courses for domestic and international students.
	Tree of Life Early Learning School – Willoughby and Koala Cottage	Artarmon Road, Willoughby	Provides long day care facilities for up to 20 children aged two years to six years. The centre is open between 7.30am and 6pm, Monday to Friday.
	Northbridge School of Visual Arts	Sailors Bay Road, Northbridge	The school provides part time and recreational vocations visual art courses, workshops for both children and adults, and holiday programs.
	Sue’s Childcare Castlevale	Artarmon Road, Willoughby	The facility provides long day care services for children between two and six years.
	Northside Baptist Preschool	Sailors Bay Road, Northbridge	The facility provides day care and education services for children aged between three to six years.
	St Mark’s Northbridge Preschool	Malacoota Road, Northbridge	Provides childcare facilities for up to 53 children aged between three and six years old.
	Shore Preparatory School’s Early Learning Centre	Sailors Bay Road, Northbridge	Provides early learning programs for children aged three to five years.
Aged care	Pathways Sailors Bay	Sailors Bay Road, Northbridge	Pathways Sailors Bay provides aged car facilities for up to 116 residents.

Type of facility	Facility	Location	Description
Health, medical and emergency services	Miller Street Medical Practices	Walker Street, North Sydney	General medical practice.
	Harbour Radiology	Walker Street, North Sydney	Medical practice specialising in radiology, women’s health imaging and other sub-specialty examinations.
	Walker Street Doctors	Walker Street, North Sydney	General medical practice open from 8am to 5.30pm Monday to Friday.
	Cammeray Medical Practice	Miller Street, Cammeray	General medical practice open Monday to Friday (8am to 5.30pm) and Saturdays (8am to 12.30pm).
	Artarmon Ambulance Superstation	Reserve Road, Artarmon	NSW Ambulance superstation.
	Willoughby-Lane Cove State Emergency Services	Station Street, Naremburn	Volunteer emergency and rescue service.
	Northbridge Medical Practice	Sailors Bay Road, Northbridge	General medical practice which is open Monday to Friday (8am to 6pm) and Saturdays (8am to 11am).
	Sailors Bay Dentistry	Strathallen Avenue, Northbridge	Provides dental care for the local community. The dentist is open Monday, Wednesday and Thursday (8am to 8pm); Tuesday (8am to 5pm); and Fridays and Saturdays (8am to 4pm).
	Northbridge Health Clinic	Sailors Bay Road, Northbridge	General medical practice.
	Marine Rescue NSW – Middle Harbour	Spit Road, Mosman	Rescue service for recreational boaters in Middle Harbour, Sydney Harbour and other nearby offshore waterways.
Sport, recreation and leisure facilities	Doris Fitton Park	Little Walker Street, North Sydney	Provides an area of open space.
	Merlin Street Reserve	Merlin Street, North Sydney	A small area of open space near residential properties
	Rose Avenue Reserve	Rose Avenue, North Sydney	A small area of open space near residential properties
	St Leonards Park (including North Sydney Oval and Bon Andrews Oval)	Corner of Falcon Street and Miller Street, North Sydney	St Leonards Park provides informal and formal recreation opportunities, including a children’s playground. North Sydney Oval is located within the park, which provides sports facilities, such as netball courts, cricket nets and wicket, and Bon Andrews Oval. The oval hosts a range of amateur and professional matches during the

Type of facility	Facility	Location	Description
			cricket season as well as an outdoor cinema during the summer months. The North Sydney Oval also contains a function centre and childcare facility. The North Sydney War Memorial is located at St Leonards Park.
	North Sydney Bowling Club	Ridge Street, North Sydney	Provides social and club bowls for the local community. The venue also hosts functions and other social events.
	Forsyth Park	Montpelier Street, Neutral Bay	The park includes sporting fields and areas of remnant bushland. The park also includes a community garden, walking track, playground and amenities.
	Jeaffreson Jackson Reserve	Moodie Lane, Cammeray	Provides an area of open space
	Cammeray Park	Park Avenue, Cammeray	The park provides for formal recreational opportunities, including synthetic turf for soccer and football.
	Cammeray Tennis Club	Corner of Ernest Street and Park Avenue, Cammeray	The club includes four tennis courts and hosts club tennis, competitions, coaching and other social activities.
	Cammeray Croquet Club	Corner of Ernest Street and Park Avenue, Cammeray	Provides croquet facilities, including a number of playing sessions on the weekend and during the week. Friday morning hosts handicap croquet games.
	Cammeray-Neutral Bay Skate Park	Ernest Street, Neutral Bay	Provides skate park facilities for the local community.
	Cammeray Golf Course	Corner of Ernest Street and Park Avenue, Neutral Bay	The golf course is a private nine-hole golf course. The facility also includes a function room which caters for corporate activities, conferences, weddings and other private events.
	ANZAC Park	Corner of Ernest Street and ANZAC Avenue, Cammeray	The park consists of open space and provides for informal recreational opportunities. A community garden was opened in March 2019, which covers an area of 600 square metres.
	St Thomas Rest Park	West Street, Crows Nest	The park has social and historical significance and is the site of the first European cemetery on the North Shore (North Sydney Council, 2014).

Type of facility	Facility	Location	Description
	Green Park (including Green Park Scout Hall)	Cammeray Road, Cammeray	A local park with tennis courts, basketball hoop, playgrounds, Kendal Community Centre, picnic facilities and amenities. The Cammeray Scout Group operate out of the Green Park Scout Hall on Monday and Friday evenings during school terms.
	Grand Slam Tennis – Wheatleigh Street	Wheatleigh Street, St Leonards	Comprises five tennis courts available for hire by the public. The courts are also used for coaching and school holiday tennis clinics. Opening hours vary but are generally between 6.00am to 10.00pm on weekdays, 8.00am to 8.00pm on Saturday, and 12.00pm to 7.00pm on Sunday.
	Bicentennial Reserve	Willoughby Road, Willoughby	The park provides the opportunity for formal and informal recreational activities. The park, which includes Hallstrom Park, provides a baseball diamond, netball courts, sports oval, children’s playground, barbeque facilities and picnic tables.
	Willoughby Leisure Centre	Small Street, Willoughby	The centre includes a swimming pool, and sports hall which provides basketball, volleyball, netball and badminton facilities.
	Flat Rock baseball diamond	Small Street, Willoughby	Flat Rock baseball diamond hosts club baseball matches and State competitions and is home ground to North Sydney Leagues Baseball Club.
	Flat Rock Reserve	Flat Rock Drive, Willoughby	The reserve covers an area of about 22.3 hectares inclusive of a portion of Bicentennial Reserve, and comprises areas of remnant bushland, cultural heritage sites, bush walking tracks and shared paths, barbeque facilities and amenities.
	Northern Suburbs Netball Association	Small Street, Willoughby	A number of netball courts are located near Willoughby Leisure Centre. The courts host coaching and competition netball matches.
	Dawson Playground	Dawson Street, Naremburn	The playground includes play equipment, park bench and picnic tables. The park is located next to Flat Rock Reserve.

Type of facility	Facility	Location	Description
	Shore Playing Fields	Sailors Bay Road, Northbridge	Sydney Church of England Grammar School War Memorial playing fields. The facility includes playing fields of cricket and football, tennis courts, and tennis and football pavilion. The site also accommodates an early learning centre and preparatory school for students in Kindergarten to Year 2.
	Jersey Road Reserve	Broughton Road, Artarmon	The park includes an area of open space, children’s playground, barbeque facilities, and picnic tables. The park is located next to Artarmon Kids Cottage Community Centre.
	Thomson Park	Reserve Road, Artarmon	The park provides for a range of formal and informal recreation activities. The park includes a children’s playground and sandpit, basketball court and soccer field.
	Cleland Park	Hampden Road and Barton Road, Artarmon	An area of open space including barbeque facilities, seats and picnic tables.
	Artarmon Chatswood Tennis Academy	Hampden Road, Artarmon	Provides eight tennis courts and offers coaching, social tennis, clinics and holiday classes.
	Artarmon Park	Parkes Road, Artarmon	An area of open space which provides seats and off-leash dog areas.
	Artarmon Reserve	Burra Road, Artarmon	The reserve provides the opportunity for informal and formal recreation opportunities. The reserve includes walking and cyclist tracks around the perimeter, barbeque facilities and picnic tables, off-leash dog areas, a children’s playground, cricket nets, basketball court and a sports field.
	Duck and Dive Baby Swim School	Lambs Road, Artarmon	Swim school offering classes for babies up to three years and children aged three years to nine years. Classes are held daily.
	Clive Park	Sailors Bay Road, Willoughby	The park is a 5.4-hectare foreshore bushland reserve located on Middle Harbour. The park contains the only easily accessible sandy beach within the Willoughby local government area. It includes picnic areas with tables and barbeque facilities, playground equipment, toilet,

Type of facility	Facility	Location	Description
			parking, views of Middle Harbour and walking tracks. The park is also the location of Northbridge Sailing Club, Sea Scouts and a commercial boat shed (Willoughby City Council, 2016).
	Northbridge Sailing Club	Clive Park	The sailing club is a local club located at Middle Harbour. The club races dinghy classes during the sailing season from September to April. The club also hosts regular social events for members, junior and adult sailing schools, and a five-day live-in camp each January for about 70 participants aged between eight and 17 years (Northbridge sailing club, undated).
	Seaforth Moth Sailing Club	Seaforth	The sailing club is a local club with its clubhouse located at Seaforth in Middle Harbour. Seaforth Moth Sailing Club has effectively merged its sailing activities with Northbridge Sailing Club and partake in racing organised by Northbridge Sailing Club. However, the club has retained its own premises at Sangrado Park.
	Mosman Rowing Club	Spit West Reserve	Provides a club for competition rowers, as well as adults learning to row and rowing for fitness. The club services the rowing needs of members and five Sydney schools, with facilities including two sheds, twin pontoons, gymnasium and storage areas. The main course routes used by rowers extend from the rowing club along Middle Harbour to beyond Roseville Bridge, and also into Long Bay (Mosman Rowing Club, undated).
	Parriwi Park and lookout	Spit Road, Mosman	An area of bushland located on the eastern side of Spit West Reserve. Freeston Hall is located within Parriwi Park, which is used by the 1st Mosman Scout Group. The Scout Group caters for cubs, scouts and venture scouts held on Saturday afternoons.
	Spit West Reserve	Spit Road, Mosman	The reserve provides the opportunity for formal and informal recreational activities, such as

Type of facility	Facility	Location	Description
			running, swimming, sailing and kayaking. The park offers views of Middle Harbour and comprises a range of facilities such as bushland walking track, cycleway, playground, cricket facilities, fitness equipment, boat storage and picnic and barbeque facilities. The Mosman Rowing Club is located at the reserve (Mosman Council, undated). The reserve includes the Pearl Bay Reserve.
	Middle Harbour Yacht Club	Lower Parriwi Road, Mosman	The yacht club is located at The Spit and has a membership of more than 1700 people. The club offers restaurant, bar, function and boardroom facilities. The yacht club provides school holiday sailing camps, learn to sail and training programs, weekly racing competitions and other annual events, including regattas and national championships (Middle Harbour Yacht Club, undated).
	Middle Harbour 16 ft Skiff Club	Spit Road, Mosman	The sailing club operates from The Spit and provides junior and skiff sailing. The club hosts club competitions between August and April. The club also includes bistro, bar and function facilities.
	Ellery Park	Spit Road, Mosman	Small area of open space located on the southern side of Spit Bridge. The park is a used by fishers.
Community centre	Naremburn Library and Community Centre	Central Street, Naremburn	The centre provides rooms which can be hired by members of the community.
	CatholicCare Naremburn Family Centre	Merrenburn Avenue, Naremburn	The centre provides family and community support programs. The centre is open between 8am and 6pm, Monday to Friday.
	Artarmon Guide Hall	Thomson Lane, Artarmon	Hosts girl guide activities.
	Artarmon Kids Cottage Community Centre and Noah's Ark Toy Library	Broughton Road, Artarmon	The community centre is available for hire by community groups and cultural organisations for children's activities such as playgroup. The centre hosts weekly family day care and play sessions open to the community on Wednesday mornings. The centre also includes the Noah's Ark Toy Library, which

Type of facility	Facility	Location	Description
			provides services for children with special needs. The community centre is available on Saturday's for activities related to children with additional needs.
	Willoughby Community Men's Shed	Sailors Bay Road, Northbridge	A community woodwork and metal workshop where skilled and unskilled men can work on a range of personal, shed and community projects. The shed operates Monday to Thursday, between 10am and 3pm.
	Freeston Scout Hall	Upper Spit Road, Mosman	Home of the 1st Mosman Scout Group and community hall available for hire.
Eastern Precinct			
Places of worship	St Cecilia's Church	Wanganella Street and White Street, Balgowlah	The church provides regular Sunday and weekday services, as well as other services throughout the year.
	Frenchs Forest Anglican Church	Bantry Bay Road, Frenchs Forest	The church provides regular services on Sunday morning and evening.
Education and childcare	The Seaforth Kindergarten	Panorama Parade, Seaforth	Provides early childhood education.
	Harbour View Children's Centre	Ross Street, Seaforth	Provides long day care services Monday to Friday (7.30am to 5.45pm).
	Northside Preschool	Whittle Avenue, Balgowlah	Provides long day care and preschool for up to 29 children (aged between three to six years).
	Seaforth Public School	Kempbridge Avenue, Seaforth	The school offers primary education for students in Kindergarten to Year 6. In 2019, the school had an enrolment of 520 students, with 31 staff members, including teaching and non-teaching staff (My School, 2020).
	Northern Beaches Secondary College Balgowlah Boys	Maretimo Street, Balgowlah	The school provides secondary education to students in Year 7 to Year 12. In 2019, the school had 1039 enrolments, with 57 teaching staff and 12 non-teaching staff members (My School, 2020).
	Balgowlah Kinder Haven Childcare and Early Learning Centre	Sydney Road, Balgowlah	The centre provides childcare and early learning services for children aged from birth to five years. The centre operates between 7.30am and 6.00pm on Monday to Friday,

Type of facility	Facility	Location	Description
			and outdoor play and learning areas.
	St Cecilia's Catholic Primary School	Seaview Street, Balgowlah	The school provides primary education for students in Kindergarten to Year 6. In 2019, the school had an enrolment of 281 students, with 25 staff members (My School, 2020).
	Punchinello Kindergarten	Wanganella Street, Balgowlah	Provides long day care services Monday to Friday (8am to 6pm).
	Little Bloomers Early Learning Centre	Gratten Crescent, Frenchs Forest	This centre provides care and early learning programs for children aged 3-4 years. The centre operates 7.30am to 6.00pm, Monday to Friday. This centre is located next to Ararat Reserve.
	Kindalin Early Childhood Learning Centre	Aquatic Drive, Frenchs Forest	The centre provides childcare, early learning and preschool programs for up to 100 children aged up to five years. The centre operates from 7.00am to 6.30pm on Monday to Friday and includes outdoor play and learning areas.
	The Forest High School	Frenchs Forest Road, Frenchs Forest	The school provides secondary education to students in Year 7 to Year 12. In 2019, the school had 775 enrolments, with 69 staff members, including teaching and non-teaching staff (My School, 2020).
Aged care	Eurobodalla Homes Frenchs Forest	Aquatic Drive, Frenchs Forest	Retirement living facility.
	Bupa Aged Care Seaforth	Sydney Road, Seaforth	Aged care facility for up to 76 residents.
Health, medical and emergency services	Occupational Therapy Helping Children	Wanganella Street, Balgowlah	The practice offers occupational therapy for children and adolescents with developmental challenges, including one-on-one consultations and group sessions.
	Warringah Road Family Medical centre	Hilmer Street, Frenchs Forest	General medical practice which is open Monday-Friday (8am to 5pm), Saturday (9am to 5pm) and Sunday (8am to 12pm).
	Northern Beaches Hospital	Frenchs Forest	The hospital provides 488 beds, a 50-space emergency department and other medical and surgical services

Type of facility	Facility	Location	Description
Sport, recreation and leisure facilities	Ellery's Punt Reserve	The Spit Bridge, Seaforth	Located on the north eastern side of the Spit Bridge, the park includes a grassed area, seating and shaded areas and is used by fishers. The reserve is the first stop on the Spit to Manly Walk.
	Clontarf Beach and Reserve	Sandy Bay Road, Clontarf	Clontarf Beach and Reserve is located on Middle Harbour. The reserve includes the beach, netted swimming area, playground, and picnic and barbeque facilities. The beach and reserve form part of the Spit to Manly coastal walk. The reserve is also used for wedding ceremonies (Northern Beaches Council, undated).
	Balgowlah Golf Course and Balgowlah Golf Club	Sydney Road, Balgowlah	The course provides a nine-hole course for both competition and social golf. The club offers membership for golfers and social members and includes clubhouse and function facilities.
	Balgowlah Oval	Sydney Road, Balgowlah	The oval provides a sports field, including cricket pitch and synthetic practice wickets.
	1st Balgowlah Scout Hall	Pickworth Avenue, Balgowlah	Hosts scout activities, including meetings on Monday, Tuesday and Thursday evenings, and can be hired for use by the public.
	Seaforth Oval	Wakehurst Parkway, Seaforth	The oval provides a number of formal sports facilities, such as for cricket, soccer and oztag, as well as a children's playground. A formal car park is provided at the oval off Wakehurst Parkway, which also provides access to the Timber Getters Track and Engravings Track located within the Garigal National Park.
	Seaforth Bowling Club	Kirkwood Street, Seaforth	Provides a facility for social and competition bowls.
	Bantry Reserve	Reserve Street, Seaforth	Provides for formal and informal recreational opportunities and includes a sports oval and seating.
	Garigal National Park	Wakehurst Parkway, Frenchs Forest	The national park covers over 2000 hectares and offers a range of recreation and leisure activities including bike riding, horse riding, boating, canoeing and fishing. The park also includes picnic and

Type of facility	Facility	Location	Description
			barbeque facilities and boat ramps. The park has Aboriginal and historic heritage sites and is an important wildlife corridor between Sydney Harbour and the Blue Mountains (NPWS, 2013).
	Wakehurst Golf Course and Wakehurst Golf Club	Upper Clontarf Street, Seaforth	The club provides an 18-hole course for both competition and social golf for members and visitors and individual and group lessons. The club offers membership for playing non-playing members and includes bistro, bar and function facilities.
	Ararat Reserve	Bantry Bay Road, Frenchs Forest	Ararat Reserve includes formal playing fields and sporting areas. A small area of bushland is located south of the playing fields, which forms part of the Bantry Bay Bushland Reserves. This provides important habitat for local native fauna and major wildlife corridor connecting to Manly Dam and Forestville Park. The reserve is also used for community festivals and events.
	Frenchs Forest Scout Hall	Utyana Place, Frenchs Forest	Hosts scout activities and can be hired for use by the public.
	Frenchs Forest Guide Hall	Grattan Crescent, Frenchs Forest	Hosts Guide activities on Monday evenings, including junior guides for children aged seven to nine years and 10 years to 13 years.
	The Austrian Club	Grattan Crescent, Frenchs Forest	Member based community club next to Ararat Reserve. The Club is used by a range of sporting clubs.
	Sokol Sydney	Grattan Crescent, Frenchs Forest	Member based community club offering sport, cultural, entertainment and educational events for members and general public.
	Forestville Park	Grattan Crescent, Frenchs Forest	Sporting field and home of the Forestville Ferrets Junior Rugby League Club
	Manly Warringah War Memorial State Park (Manly Dam)	King Street, Allambie Heights	Manly Dam covers an area of about 375 hectares, the majority of which is covered by bushland. The park offers a range of recreation and leisure activities including mountain biking, water skiing, swimming, fishing, kayaking and bush walking.

Type of facility	Facility	Location	Description
			The park also includes Aboriginal and historic heritage sites. Remembrance Day and Anzac Day ceremonies are also held at the Cenotaph within the park (Warringah Council, 2014).
	Warringah Aquatic Centre	Aquatic Drive, Frenchs Forest	The centre includes indoor swimming pools, including 50-metre Olympic pool and diving pool, and outdoor lap pool and splash pool, with barbeque and picnic facilities. The centre runs swim programs, swim clubs and school holiday programs and also hosts children’s parties. The centre is open 5.30am to 9.00pm weekdays, and 7.00am to 6.00pm on weekends (Northern Beaches Council, undated).
	Aquatic Reserve	Aquatic Drive, Frenchs Forest	Located near the aquatic centre, the reserve includes two baseball fields.
	Brick Pit Reserve	Bantry Bay Road, Frenchs Forest	The reserve provides for informal recreation opportunities and includes a children’s playground and picnic area.
Other	Seaforth Community Centre	Baringa Avenue, Seaforth	Includes a basketball court and is available for public hire.
	Balgowlah Seaforth Library	Frenchs Forest Road, Seaforth	Community library which is open Monday to Friday (2pm to 4.45pm) and Thursdays and Saturdays (9.30am to 11.30am).