



Transport for NSW

Beaches Link and Gore Hill Freeway Connection

Chapter 21

Socio-economics

21 Socio-economics

This chapter considers the potential impacts of the project on socio-economic issues from the construction and operation of the project and identifies management measures which address these impacts.

A detailed socio-economic assessment has been carried out for the project and is included in Appendix U (Technical working paper: Socio-economic assessment).

The Secretary's environmental assessment requirements as they relate to socio-economic issues and where in the environmental impact statement these have been addressed, are in Table 21-1.

Avoiding or minimising impacts has been a key consideration throughout the design and development process for the Beaches Link and Gore Hill Freeway Connection project. A conservative approach has generally been used in the assessments, with potential impacts presented before implementation of environmental management measures. The environmental management measures proposed to minimise the potential impacts in relation to socio-economics are included in Section 21.6.

Table 21-1 Secretary's environmental assessment requirements – Socio-economic

Secretary's requirement	Where addressed in EIS
Socio-economic, Land Use and Property	
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 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 as a result of the project are presented in Section 21.4 and Section 21.5 . Chapter 27 (Cumulative impacts) assesses the cumulative construction and operational impacts of the project and major projects in the vicinity of the project. A summary of consultation conducted for the project is provided in Chapter 7 (Stakeholder and community engagement) and Section 21.2.3 .
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.	Impacts to properties, including property acquisitions and future land uses during construction and operation, is discussed in Chapter 20 (Land use and property). Section 21.4 and Section 21.5 present the socio-economic impacts as a result of the project. Chapter 27 (Cumulative impacts) assesses the cumulative construction and operational impacts of the proposal and major projects in the vicinity of the project.
3. Where an immersed tube method (IMT) of construction is proposed for use in Middle Harbour, the Proponent must: <ul style="list-style-type: none"> a. provide details of how reductions to current Harbour depths will be avoided; 	Section 5.2.3 of Chapter 5 (Project description) describes how, due to the profile of the harbour bed of Middle Harbour, the immersed tube tunnel units would sit both partially within a trench and above the bed of the Middle Harbour. Section 9.4.4 of Chapter 9 (Operational traffic and transport) indicates that shallow water depths at the entrance to Middle Harbour control

Secretary's requirement	Where addressed in EIS
	navigation in the vicinity of the proposed tunnel crossing. The tops of the immersed tube tunnels would not interfere with or restrict maritime activities.
b. provide details confirming the level of protection for the IMTs will be similar to or better than that of the existing Sydney Harbour Tunnel;	As discussed in Chapter 6 (Construction work), an additional concrete layer would be provided to protect the top of the completed tunnel units from marine activities during operation, including falling or dragging anchors. Section 23.3.4 of Chapter 23 (Hazards and risks) details the risks associated with interactions between maritime traffic and the immersed tube tunnels. Chapter 4 (Project development and alternatives) provides a justification for selection of the immersed tube tunnel method for the crossing of Middle Harbour.
c. identify impacts to ship scheduling in consultation with the Harbour Master; and	Due to depths constraints at the entrance to Middle Harbour, shipping does not occur in locations where construction works are proposed. Chapter 8 (Construction traffic and transport) and Chapter 9 (Operational traffic and transport) outline impacts related to the construction and operation of the immersed tube tunnel respectively. Chapter 8 (Construction traffic and transport) specifies the consultation requirements with the Harbour Master to minimise impacts during construction. Impacts of closures in Middle Harbour on businesses are discussed in Section 21.4, Section 21.5.6 and Appendix U (Technical working paper: Socio-economic assessment), including Annexure B.
d. provide details of full mission simulation which takes in account, movement of tunnel units past the Spit Bridge and within Middle Harbour.	Outcomes of the simulation report are outlined in Section 8.4.3 of Chapter 8 (Construction traffic and transport).
4. The Proponent must assess potential impacts on utilities (including communications, electricity, gas, fuel and water and sewerage) and the relocation of these utilities.	Chapter 5 (Project description) outlines utilities and services management for the project and Appendix D (Utilities management strategy) provides a detailed description of utilities likely to be impacted and a framework for utility installations, relocations, adjustments and protection.
5. Where the project is predicted to impact on utilities the Proponent must undertake a utilities management strategy, identifying management options, including relocation or adjustment of the utilities.	Appendix D (Utilities management strategy) provides a detailed description of utilities likely to be impacted and a framework for utility installations, relocations, adjustments and protection.

Secretary's requirement	Where addressed in EIS
<p>6. A draft Community Consultation Framework must be prepared identifying relevant stakeholders, procedures for distributing information and receiving/responding to feedback and procedures for resolving stakeholder and community complaints during construction and operation. Key issues that must be addressed in the draft Framework include, but are not limited to:</p> <ul style="list-style-type: none"> a. traffic management (including property access, pedestrian access); b. landscaping/urban design matters; c. construction activities including out of hours work; and d. noise and vibration mitigation and management. 	<p>Chapter 7 (Stakeholder and community engagement) summarises the content of the Community consultation framework. A Community consultation framework is provided in Appendix E (Community consultation framework).</p>

21.1 Legislative and policy framework

The socio-economic assessment has been prepared to assess the impacts of the project in accordance with the *Environmental Impact Assessment Practice Note – Socio-economic assessment (EIA-N05)* (Practice Note) (Transport for NSW, 2020e). The Practice Note guides the assessment level and process for socio-economic impact assessments and outlines the requirements for establishing the socio-economic baseline.

Chapter 3 (Strategic context and project need) provides a description of national and state strategic planning and transport policies which are relevant to the project. Local council policies relevant to the socio-economic impacts of the project include:

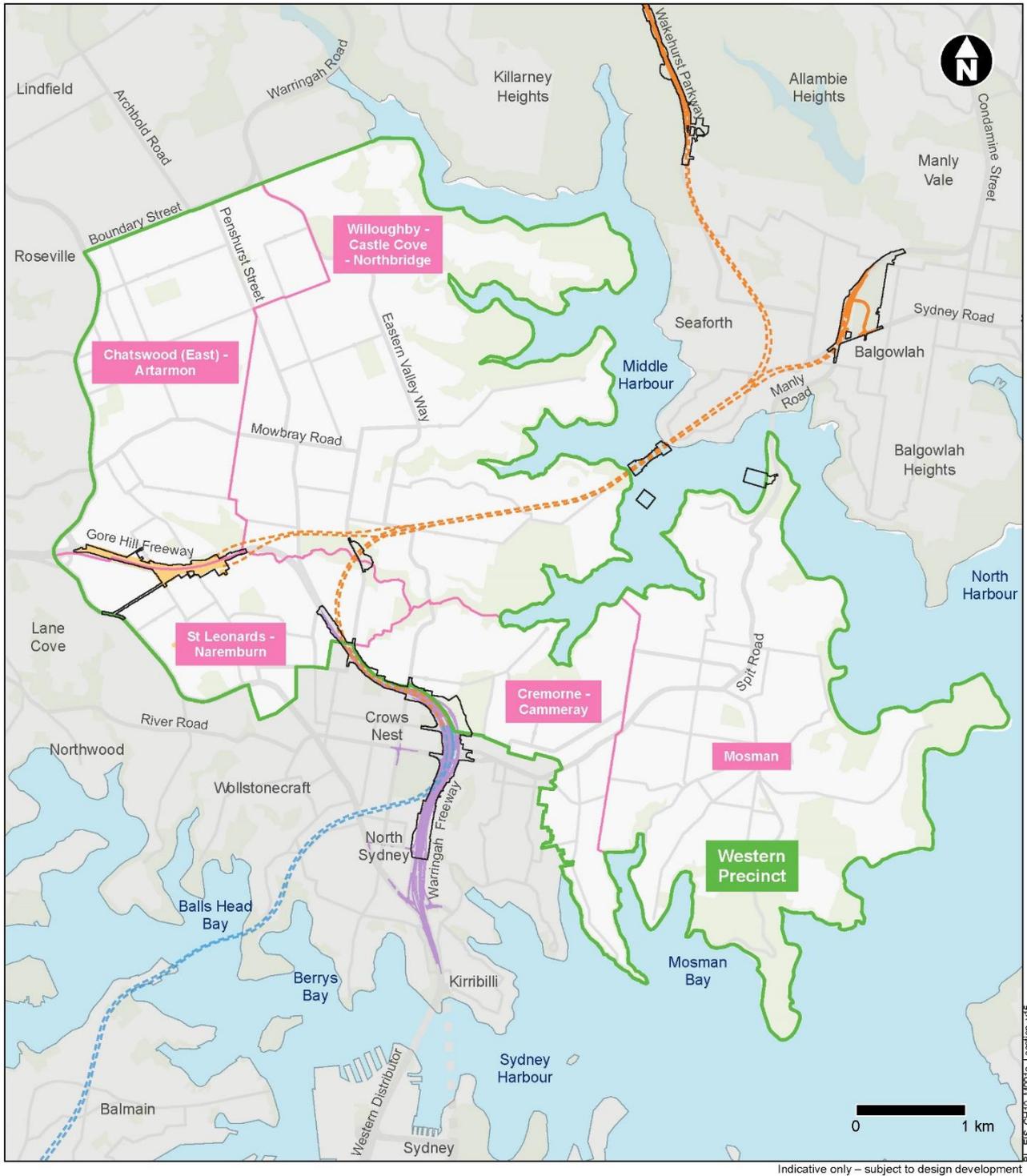
- *North Sydney Community Strategic Plan 2013-2023* (North Sydney Council, 2013)
- *Willoughby City Strategy* (Willoughby City Council, 2013)
- *Shape 2028 Northern Beaches Draft Community Strategic Plan 2017-2028* (Northern Beaches Council, 2018b)
- *Mosman Council Community Strategic Plan 2013-2023* (Mosman Council, 2013).

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 and from the north, north-east and north-west of Sydney.

21.2 Assessment methodology

21.2.1 Precinct areas

The socio-economic assessment considers precincts including adjacent waterways, and comprises the Australian Bureau of Statistics (ABS) geographic boundaries (referred to as Statistical Area Level 2s) (SA2s). For the purposes of this assessment, two 'precincts' have been identified located to the north-east and south-west of Middle Harbour, referred to as the Western Precinct (Figure 21-1) and Eastern Precinct (Figure 21-2) Broader regional impacts were also considered, where relevant.



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 21-1 Western Precinct

Note: Apart from the motorway facilities, cut and cover 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.

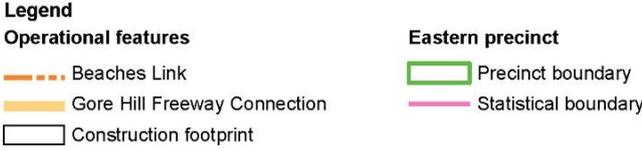
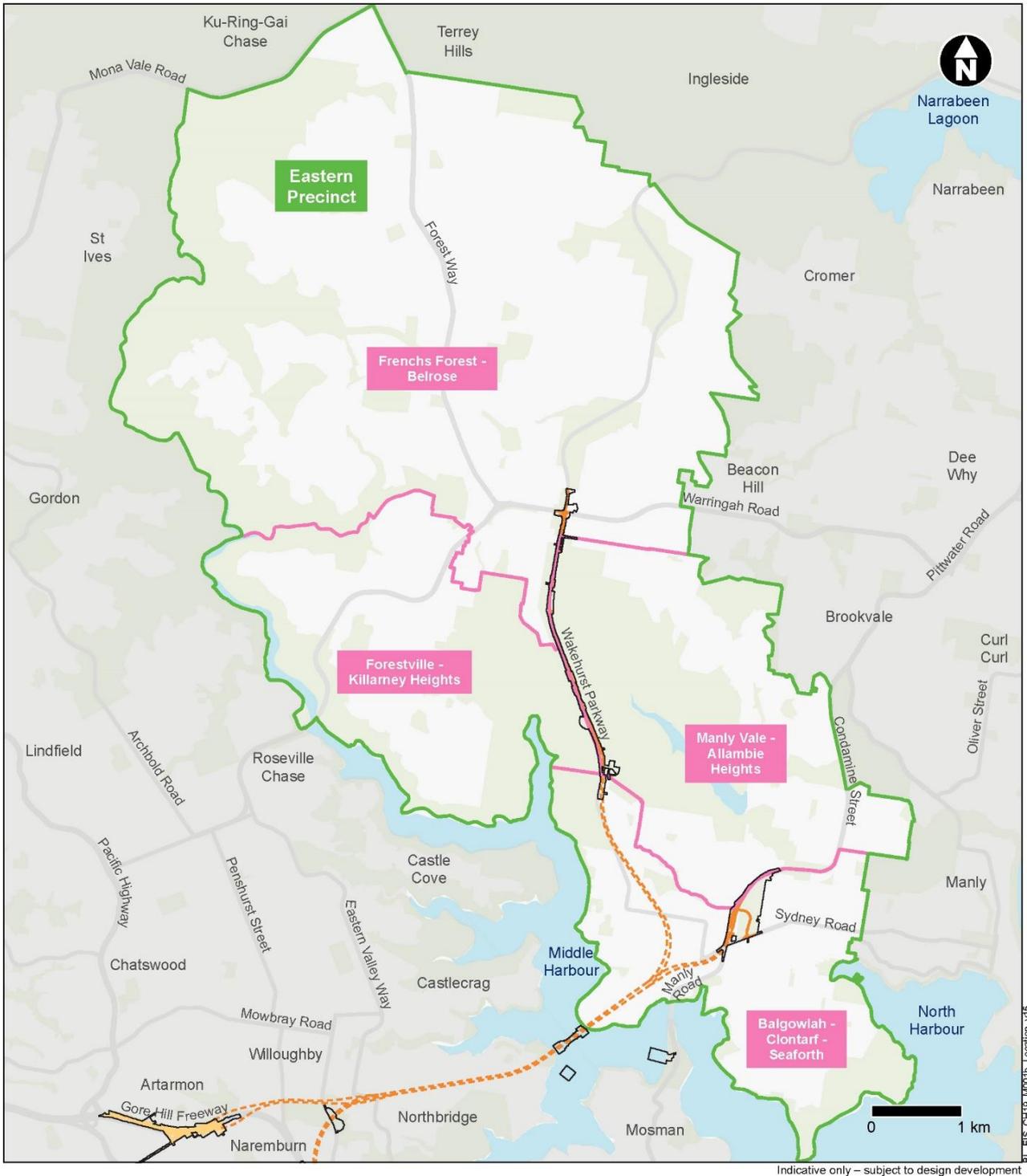


Figure 21-2 Eastern Precinct

21.2.2 Business surveys

A business impact survey was used to inform the business impact assessment to gain a better understanding of the main issues, perceptions and concerns of businesses regarding the project during both construction and operation. The business surveys were conducted in business centres that may be more susceptible to direct or indirect effects of construction and/or operation. All information gathered as part of the business surveys was collated into a database, analysed and summarised in a survey report. Further details are provided within the business impact assessment in Annexure A of Appendix U (Technical working paper: Socio-economic assessment). Further engagement with business stakeholders will be carried out during the environmental impact assessment exhibition period.

21.2.3 Stakeholder consultation

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

Further details regarding consultation carried out for the project (up to exhibition of the environmental impact statement) is provided in Chapter 7 (Stakeholder and community engagement).

21.2.4 Assessment approach

The socio-economic impact assessment involved identifying, assessing and evaluating changes to, or impacts on, communities, businesses and industry that are likely to occur as a result of the project. The assessment involved:

- Scoping the likely range of potential socio-economic impacts and identifying businesses and communities likely to be affected by the project
- Describing existing socio-economic and business characteristics, values and conditions in the study area. The description of existing socio-economic conditions principally draws on information from the ABS Census of Population and Housing 2016, supplemented with information and data from other publicly available sources and project specialist investigations
- 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. Positive and negative social and economic impacts are discussed; however, only negative impacts are assigned a level of significance, in accordance with the process outlined in the Practice Note. The level of significance of potential negative impacts was assessed by considering the sensitivity of the receptor and the magnitude of the proposed works. An evaluation matrix was used to identify the level of significance of the negative impact. Further information on the evaluation matrix is provided in Section 21.2.5. Positive impacts are qualitatively discussed but have not been assigned a level of significance using the evaluation matrix. 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 access and connectivity, including for pedestrians, cyclists, public transport users, maritime transport users, and motorists
- Identifying measures to avoid, minimise or mitigate impacts on communities and community infrastructure and business and industry arising from the project.

21.2.5 Evaluation of significance

Potential negative impacts during project construction and operation have been considered using Table 21-2. The level of significance was determined with consideration of the sensitivity of the existing environment and magnitude of impact compared to the baseline condition. For the methodology adopted, a level of significance has only been assigned to potential negative impacts. Appendix U (Technical working paper: Socio-economic assessment) outlines what qualities contribute to the level of sensitivity for a receiver. The magnitude of an impact is dependent on its scale, intensity, duration and scope of works. When assessing the level of significance of negative impacts, consideration was given to:

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

Table 21-2 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

21.3 Existing environment

This section provides an overview of the socio-economic characteristics of the two precinct areas assessed with regards to demographic profiles and housing, social infrastructure, community values, employment centres, and access and connectivity.

The existing environment with regard to traffic and transport, noise and vibration, air quality, human health, land use and property and urban design and visual amenity are outlined in 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) and Chapter 22 (Urban design and visual amenity).

21.3.1 Demographic profile

Table 21-3 provides a summary of the demographic profile of the precinct areas. This information has been sourced from the Australian Bureau of Statistics Census 2016.

Table 21-3 Demographic information for precincts

Characteristics	Western Precinct	Eastern Precinct
Population size and growth	<ul style="list-style-type: none"> Population of about 122,694 in 2019 Annual average growth of 1.5 per cent (2014-2019). 	<ul style="list-style-type: none"> Population of about 79,838 in 2019 Annual average growth of 0.7 per cent (2014-2019).
Age profile	<ul style="list-style-type: none"> Slightly higher proportion of residents 65 years and older (about 15 per cent) when compared to Greater Sydney (about 14 per cent) An equal proportion of residents within the young working family of 15-64 years (about 67 per cent) when compared to Greater Sydney (about 67 per cent) A slightly lower proportion of residents under the age of 14 years (about 18 per cent) when compared to Greater Sydney (about 19 per cent). 	<ul style="list-style-type: none"> Higher proportion of residents 65 years and older (about 17 per cent) when compared to Greater Sydney (about 14 per cent) A lower proportion of residents within the young working family of 15-64 years (about 60 per cent) when compared to Greater Sydney (about 67 per cent) A higher proportion of residents under the age of 14 years (about 23 per cent) when compared to Greater Sydney (about 19 per cent).
Cultural diversity	<ul style="list-style-type: none"> About 40.6 per cent of residents were born overseas and 29.9 per cent of people spoke a language other than English Greater Sydney recorded a lower proportion of people born overseas (about 36.8 per cent) and a higher proportion of people who spoke a language other than English (about 35.8 per cent). 	<ul style="list-style-type: none"> About 29.8 per cent of residents were born overseas and 16.4 per cent of people spoke a language other than English Greater Sydney recorded a higher proportion of people born overseas (about 36.8 per cent) and a higher proportion of people who spoke a language other than English (about 35.8 per cent).
Vulnerability/ need for assistance	In 2016, about three per cent of residents needed assistance, compared to about five per cent for Greater Sydney.	In 2016, about 3.7 per cent of residents needed assistance, compared to about five per cent for Greater Sydney.
Dwellings	<ul style="list-style-type: none"> In 2016, there were about 46,734 private dwellings, 48.4 per cent of which were apartment style dwellings, which was higher than the Greater Sydney average (25.9 per cent) Apartment style dwellings were the primary form of housing. 	<ul style="list-style-type: none"> In 2016, there were about 26,061 private dwellings, 13.1 per cent of which were apartment style dwellings, which was lower than the Greater Sydney average (25.9 per cent) Separate houses were the primary form of housing, contributing 71.4 per cent compared to Greater Sydney's 52.5 per cent.

Characteristics	Western Precinct	Eastern Precinct
Vehicle ownership	<p>Of occupied private dwellings:</p> <ul style="list-style-type: none"> About 13.1 per cent did not own a vehicle About 46.9 per cent owned one vehicle About 37.7 per cent owned two or more vehicles. 	<p>Of occupied private dwellings:</p> <ul style="list-style-type: none"> About 4.5 per cent did not own a vehicle About 31.6 per cent owned one vehicle About 61.6 per cent owned two or more vehicles.
Income	Higher personal (\$1172 per week) and household median (\$2423 per week) incomes compared to Greater Sydney (\$719 per week and \$1750 per week respectively).	Higher personal (\$895 per week) and household median (\$2419 per week) incomes compared to Greater Sydney (\$719 per week and \$1750 per week respectively).
Employment	<ul style="list-style-type: none"> Lower rate of unemployment (4.5 per cent) compared to Greater Sydney (6.0 per cent) In 2016, the top four employment industries within the precinct areas included: <ul style="list-style-type: none"> Health care and social assistance Professional, scientific and technical services Retail trade Education and training. 	<ul style="list-style-type: none"> Lower rate of unemployment (3.8 per cent) compared to Greater Sydney (6.0 per cent) In 2016, the top four employment industries, within the precinct areas included: <ul style="list-style-type: none"> Health care and social assistance Professional, scientific and technical services Retail trade Education and training.
Travel to work	<p>For employed residents within the precinct:</p> <ul style="list-style-type: none"> About 39.8 per cent drove to work in a car as either driver or passenger About 28.4 per cent used public transport to get to work (via rail or bus) About 7.8 per cent used active transport (walked and/or cycled). 	<p>For employed residents within the precinct:</p> <ul style="list-style-type: none"> About 57 per cent drove to work in a car as either driver or passenger About 14 per cent used public transport to get to work (via rail or bus) About 3.6 per cent used active transport (walked and/or cycled).

21.3.2 Social infrastructure

Social infrastructure in the precinct areas

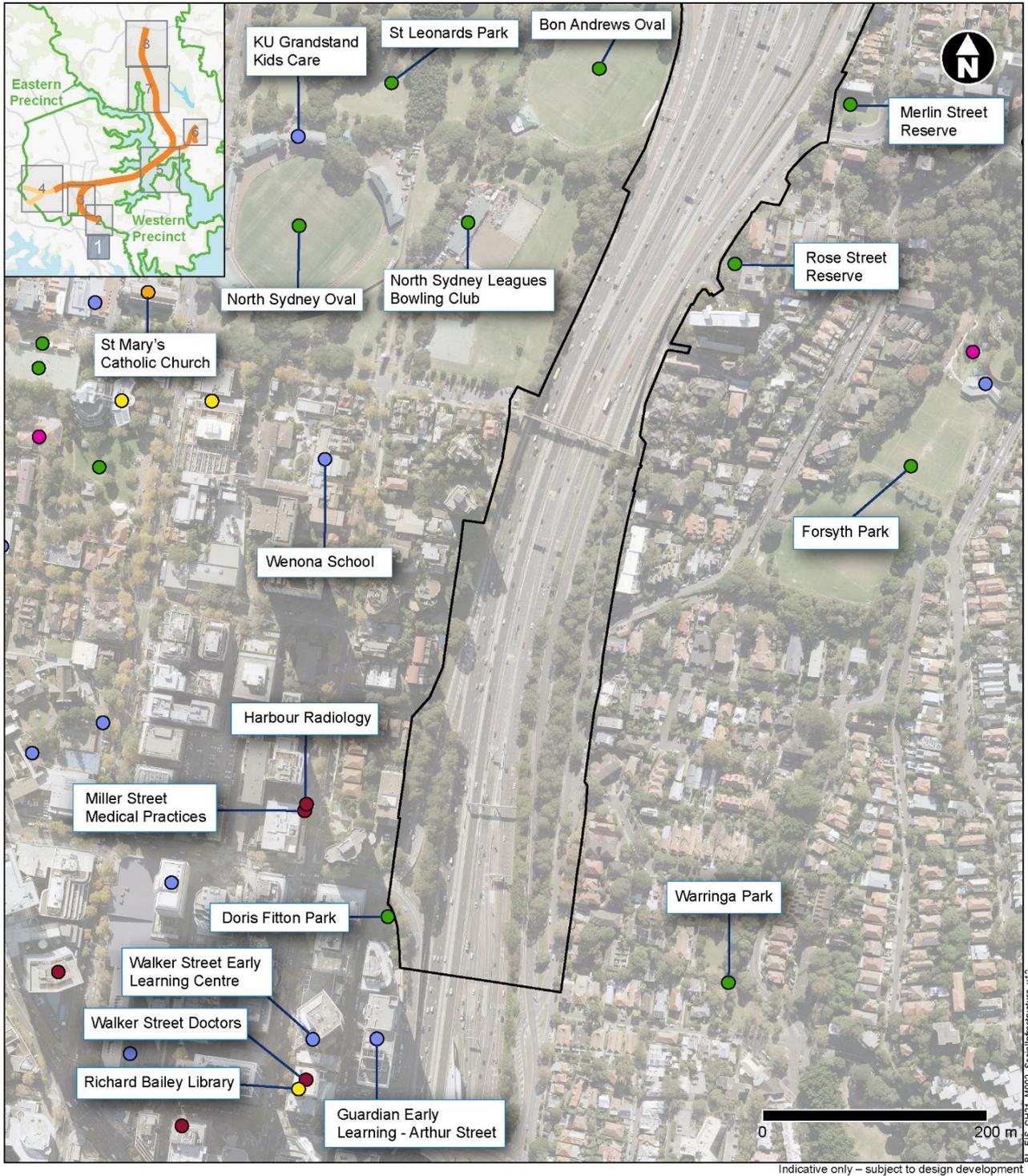
The precinct areas accommodate a wide range of community services and facilities of local and regional importance including education facilities; health, medical and emergency services; sport, recreation, cultural and leisure facilities; and community facilities. Consideration has also been given to social infrastructure within local government areas where required. These include, but are not limited to:

- Major hospitals such as the Mater Hospital at North Sydney, Royal North Shore and North Shore Private hospitals at St Leonards and the Northern Beaches Hospital at Frenchs Forest
- Tertiary education facilities, including TAFE NSW (at St Leonards and Brookvale) 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, Gore Hill Park, Naremburn Park, Flat Rock Reserve, Bicentennial Reserve and golf courses, including Cammeray Golf Course, Wakehurst Golf Course, Northbridge Golf Course and Balgowlah Golf Course
- Major retail, commercial uses, cultural and community support facilities located within the North Sydney, Mosman, Willoughby and Northern Beaches local government areas.

Social infrastructure near the project

Social infrastructure located near surface works and construction activities is shown in Figure 21-3 to Figure 21-10.



Legend

Construction features

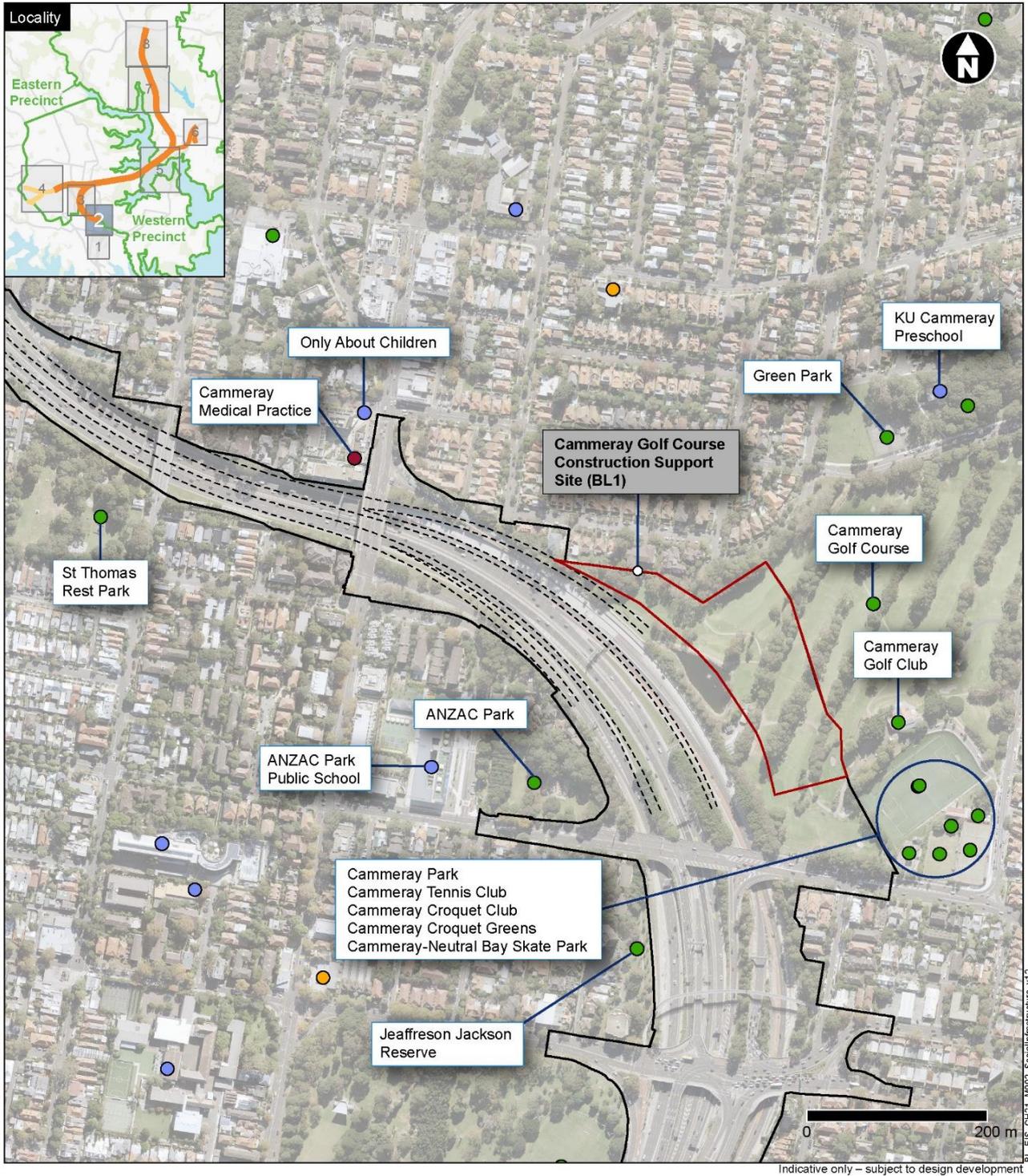
- Tunnel section
- ▭ Construction footprint

Social infrastructure

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

Figure 21-3 Social infrastructure near the project (map 1)

Note: The Beaches Link construction footprint within this area extends to include low impact construction activities that would be associated with traffic control and management, line marking, tie-in works, and utility and cable works.



Legend

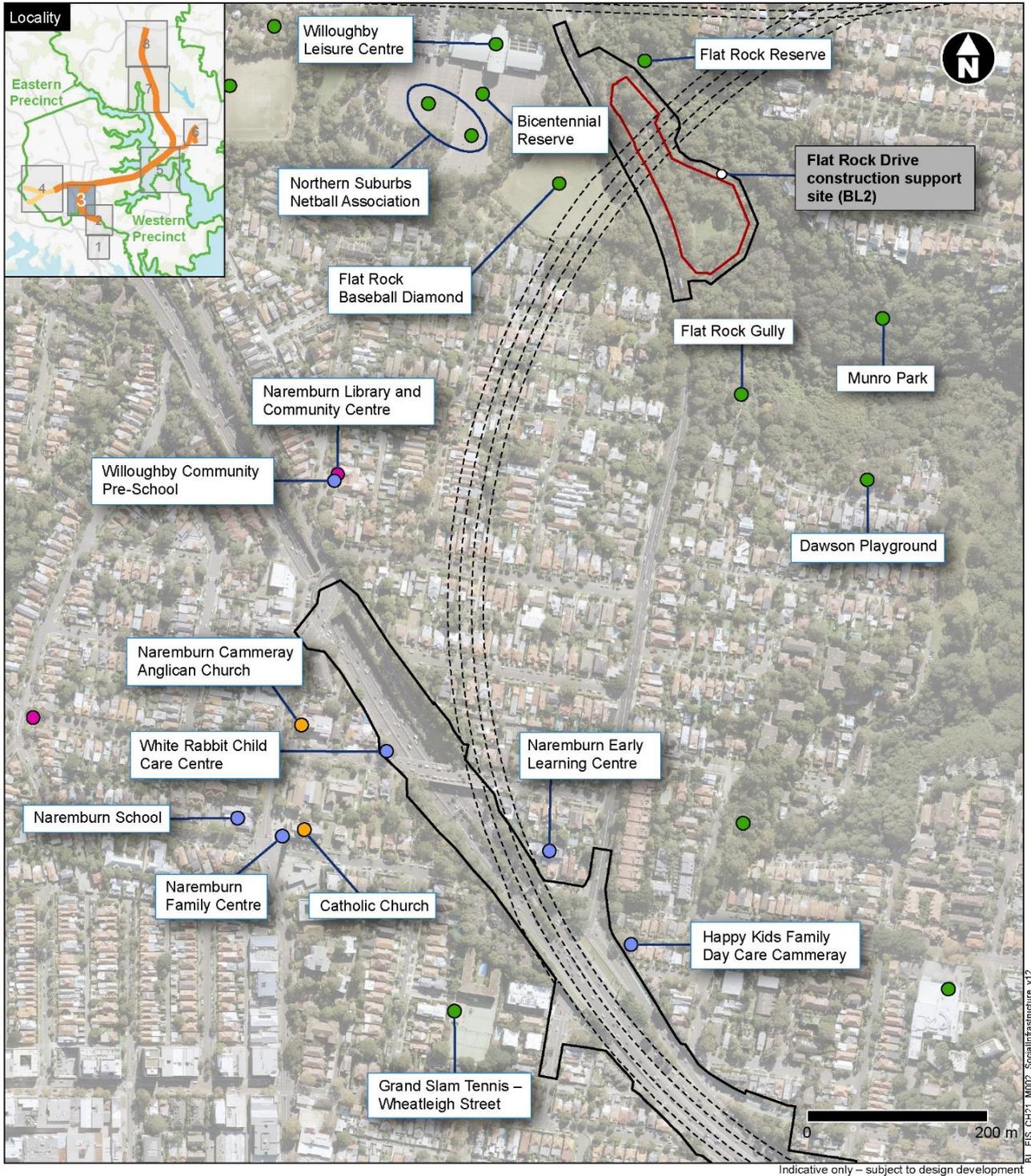
Construction features

- 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 21-4 Social infrastructure near the project (map 2)



Legend

Construction features

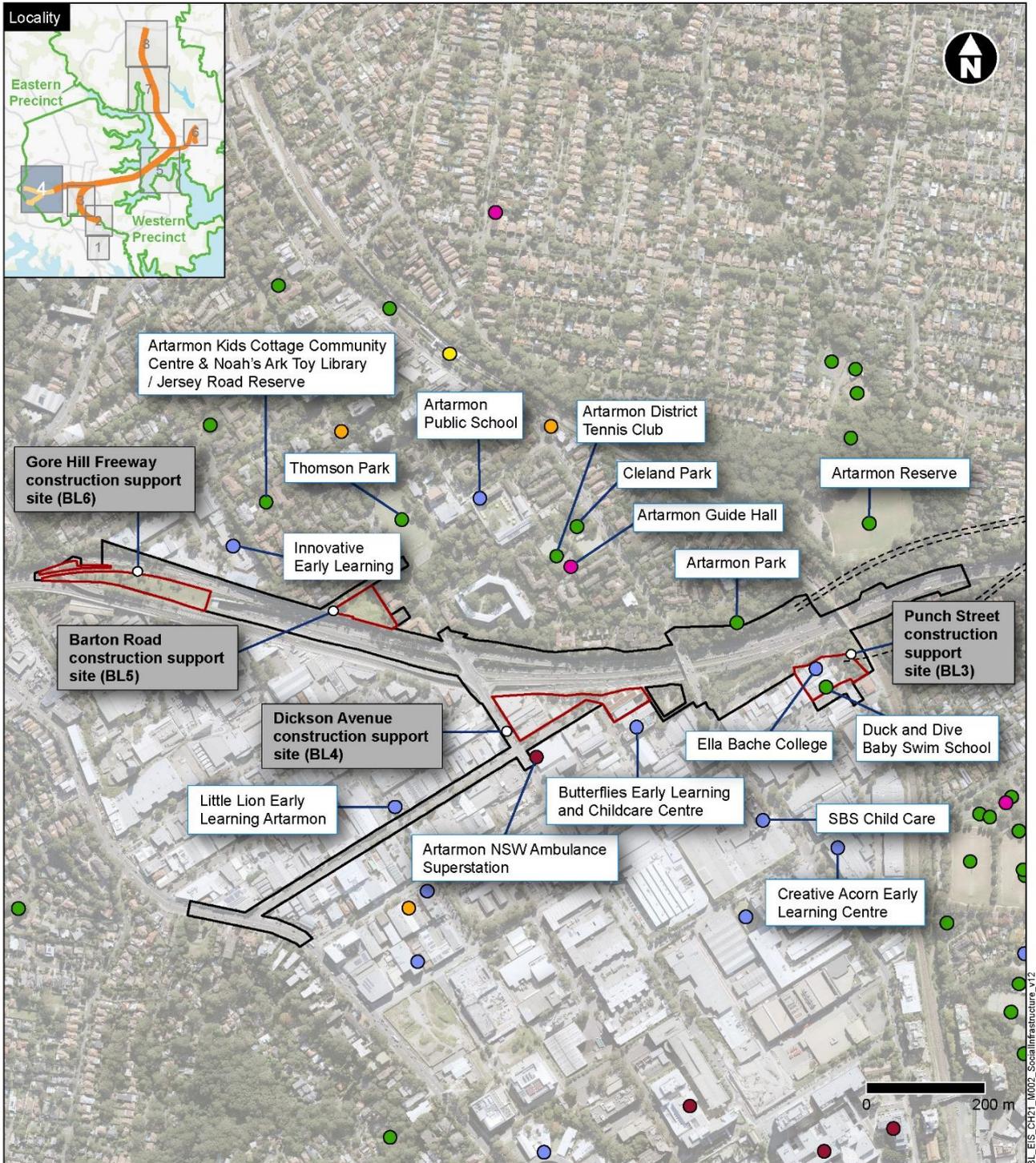
- Tunnel section
- ▭ Construction footprint
- ▭ Construction support site

Social infrastructure

- Community centre
- Library and performing arts
- Education and child care
- Places of worship
- Sport, recreation and leisure facilities

Figure 21-5 Social infrastructure near the project (map 3)

Note: The Beaches Link construction footprint shown on Warringah Freeway within this area extends to include construction activities that would be associated with traffic control and management, line marking, tie-in works and utility and cable works.



Legend

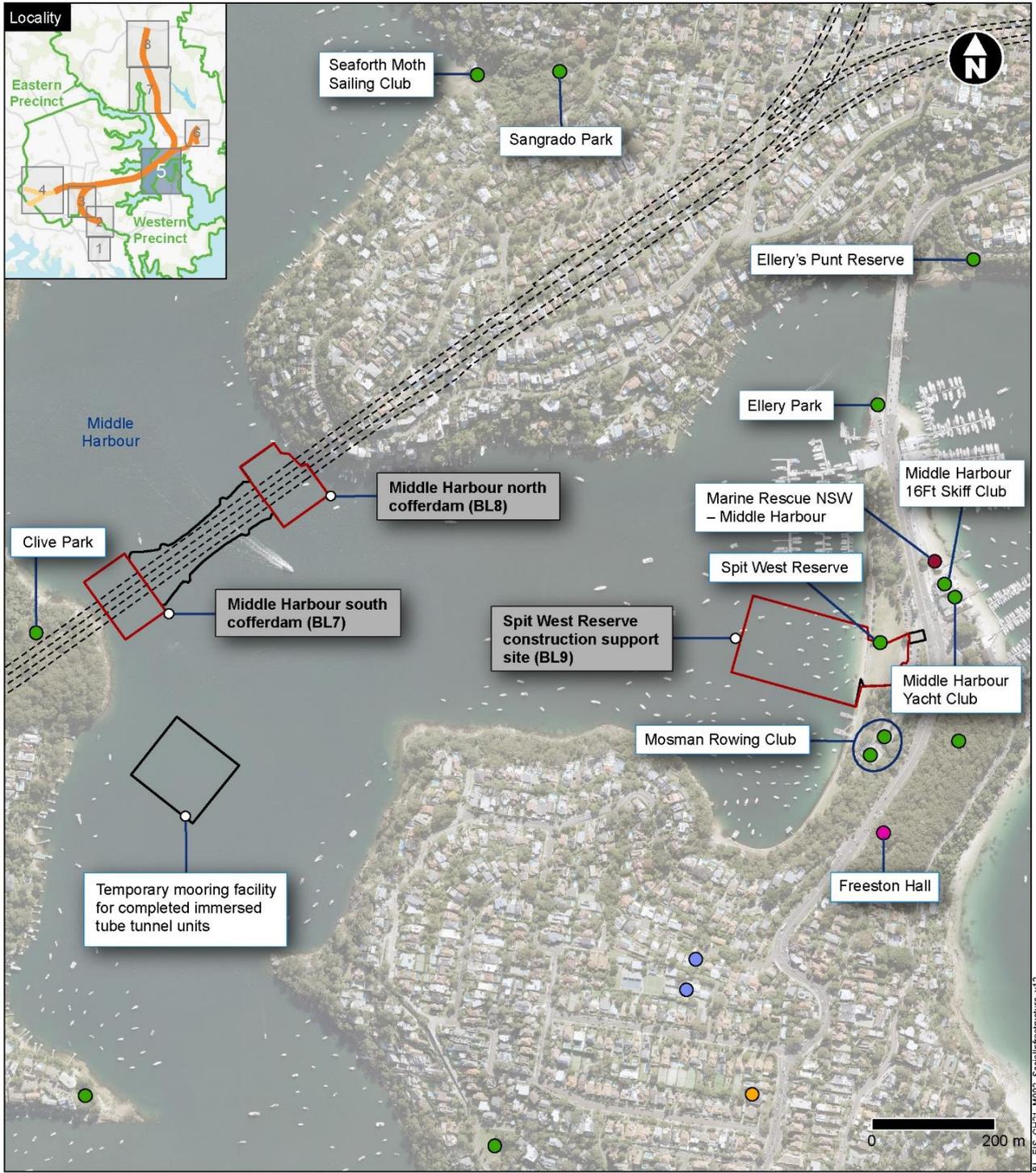
Construction features

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

Social infrastructure

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

Figure 21-6 Social infrastructure near the project (map 4)



Indicative only – subject to design development

Legend

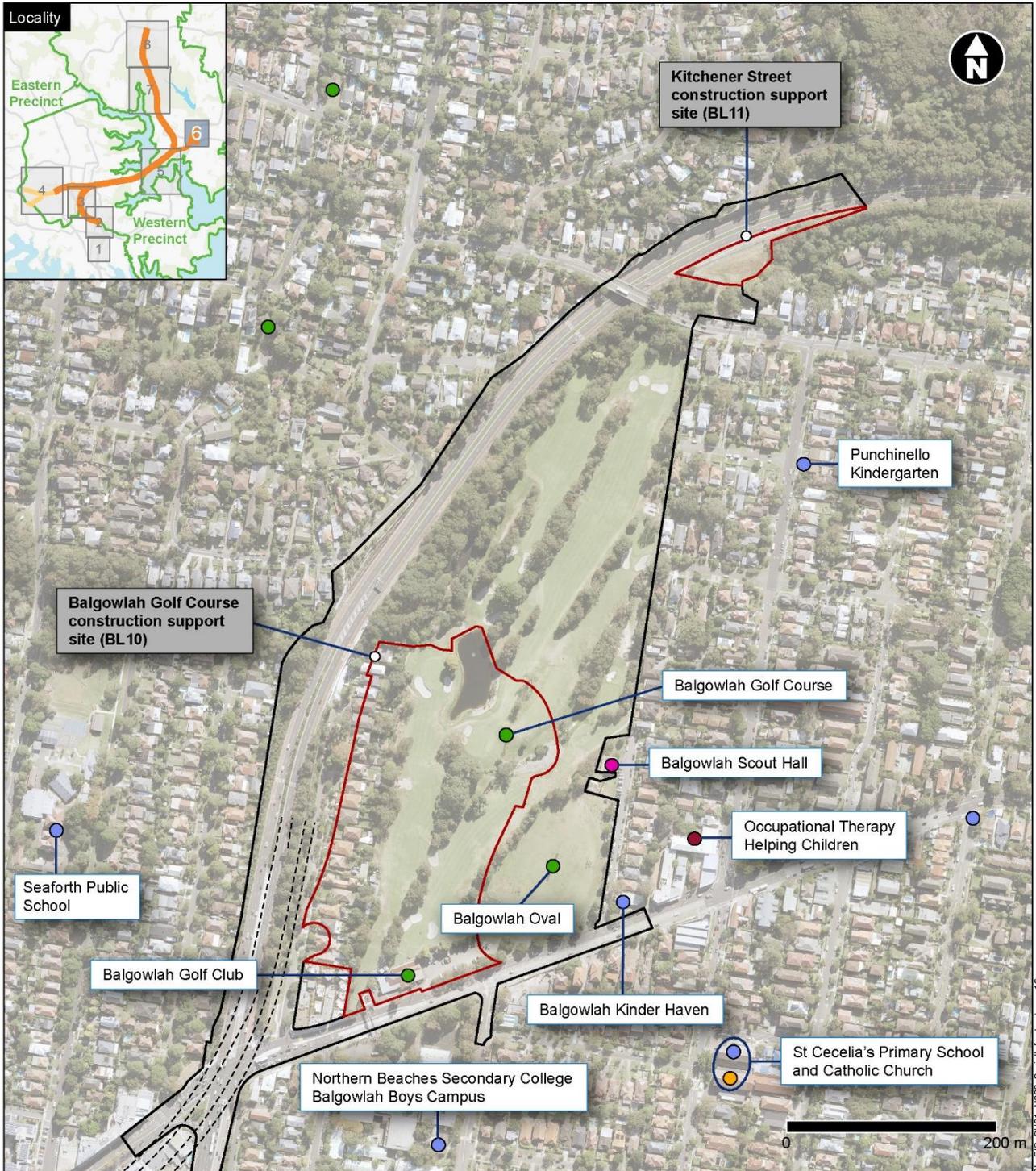
Construction features

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

Social infrastructure

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

Figure 21-7 Social infrastructure near the project (map 5)



Legend

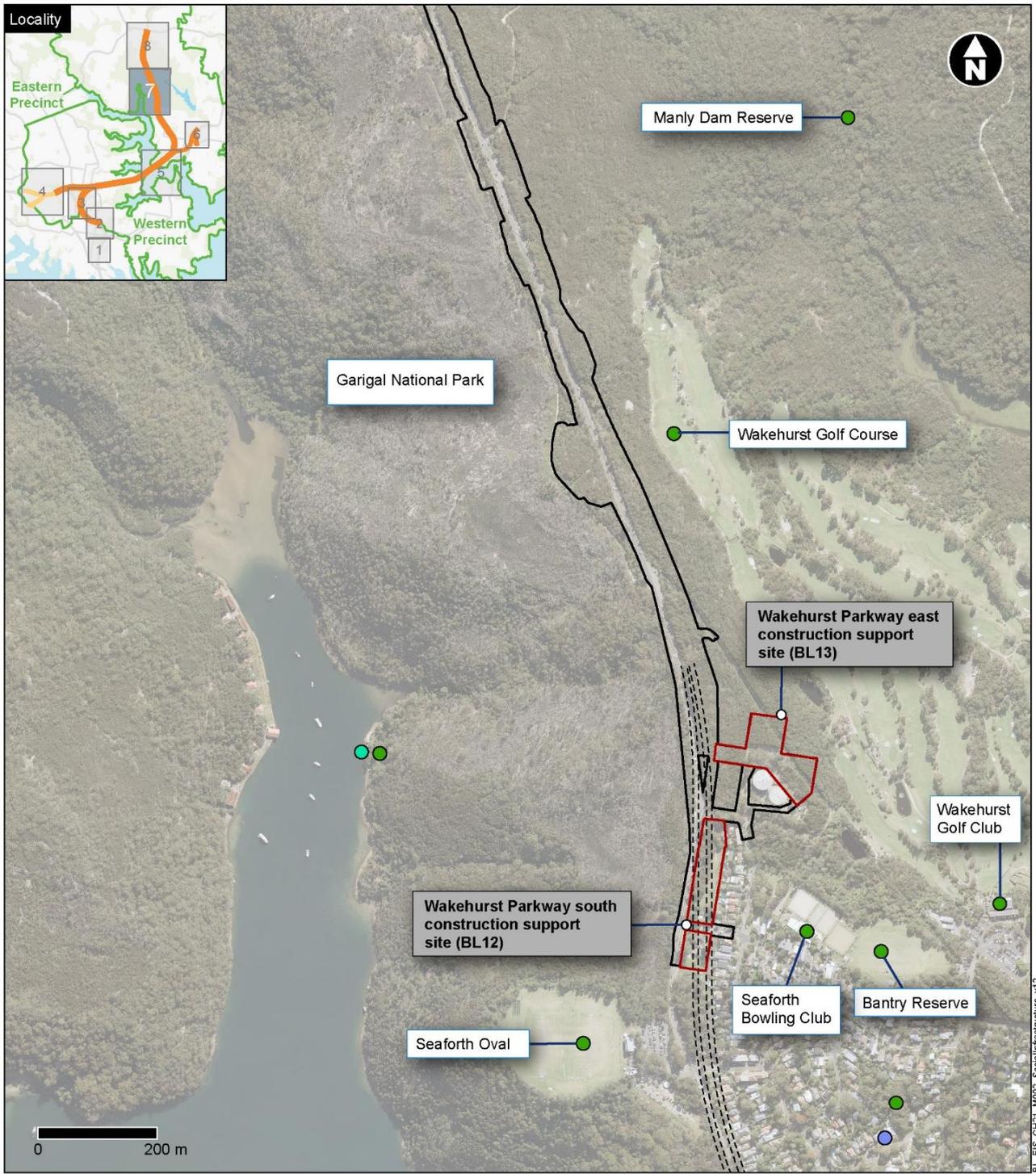
Construction features

- 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 21-8 Social infrastructure near the project (map 6)



Legend

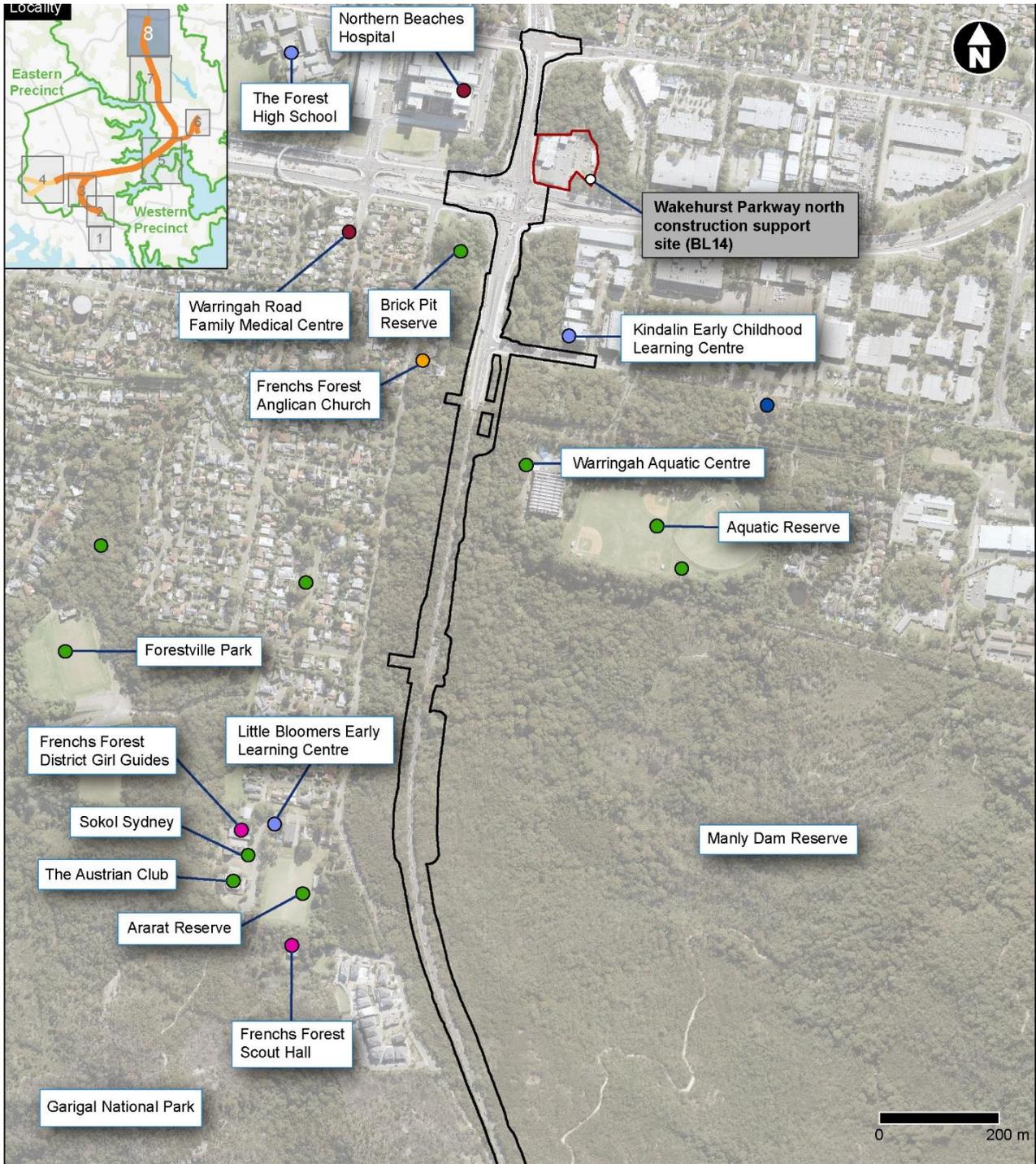
Construction features

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

Social infrastructure

- Education and child care
- Sport, recreation and leisure facilities
- Wharf

Figure 21-9 Social infrastructure near the project (map 7)



Indicative only – subject to design development

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 21-10 Social infrastructure near the project (map 8)

Middle Harbour community uses

The Middle Harbour accommodates a wide range of community users, community groups and clubs. These are described in Section 8.3.4 of Chapter 8 (Construction traffic and transport).

21.3.3 Community values

This section provides an overview of those values or features within the precinct areas that are likely to be important to local and regional communities within Greater Sydney. This has been informed by the review of existing literature (including 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 precinct areas.

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 (such as existing noise levels and air quality), and heritage and cultural features.

Local amenity and character in the precinct areas are generally characterised by a diversity of land and water-based 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 adjacent to the Gore Hill Freeway and Pacific Highway
- Local centres and shopping precincts within both precincts, including major shopping centres at Chatswood
- Tourist attractions, such as Taronga Zoo in Mosman
- Parks and recreational facilities such as Cammeray Golf Course, Northbridge Oval, Bicentennial Reserve, Northbridge Golf Course, Balgowlah Golf Course, Wakehurst Golf Course, Waverton Park and Seaforth Oval
- Water based recreational activities and sporting clubs based on Middle Harbour
- Major social infrastructure such as hospitals (including the Royal North Shore Hospital, North Shore Private Hospital and Northern Beaches Hospital), educational uses and cultural facilities (such as places of worship, community centres and libraries)
- Open space areas, reserves and parks that are valued by local and regional communities for their landscape amenity, heritage and recreational values. These include Sydney Harbour National Park, Bradleys Head, Middle Head, Artarmon Park, Flat Rock Reserve, Clive Park, Spit West Reserve, Clontarf Beach and Reserve, Garigal National Park, Manly Dam Reserve and Dobroyd Head.

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. Levels of community cohesion and sense of belonging in the communities surrounding the project 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 cohesion is also encouraged by connectivity or discouraged by barriers to movement as described in Chapter 20 (Land use and property). Many road corridors and arterial roads within the study area create existing 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.

Community and social networks are associated with social infrastructure such as schools, places of worship, sporting clubs, water-based clubs at Middle Harbour, and community, environmental, heritage and resident groups. 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 precinct areas host a variety of local events, including festivals, exhibitions and markets. These provide opportunities to involve local communities and for residents to connect with and participate in community life, helping to foster a sense of community and local identity. 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 Year's 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.

Community health and wellbeing

Maintaining a high level of community safety and ensuring people feel safe in public places is likely to be important to communities in the precinct areas. This is anticipated due to concerns raised during community and stakeholder engagement for the project regarding road safety and perceived safety impacts associated with locating construction works or operational infrastructure near local streets and social infrastructure. Concerns were also raised by the community regarding air quality during the operation of the project and potential impacts for local communities, schools and park users near tunnel portals and ventilation outlets. In particular, concerns in relation to the location of the tunnel portals and ventilation outlets and potential air quality impacts for school students and users of open space areas such as Artarmon Public School, Artarmon Park and Balgowlah Golf Course.

21.3.4 Business profile

Business centre profiles

A hierarchy of business centres has been applied to the precinct areas based largely on the hierarchy established in the *Greater Sydney Region Plan* by the Greater Sydney Commission, which identifies three types of centres: metropolitan city centres, strategic centres and local centres. There are no metropolitan city centres in the precinct areas. Chatswood, St Leonards and Frenchs Forest are strategic centres and there are several local centres. These are generally clustered on the main transport routes (such as rail corridors or bus routes) and provide either a specialist service to the broader area or a convenience service for the local community. Some business centres are also within the precinct areas for the Western Harbour Tunnel and Warringah Freeway Upgrade project. A summary of businesses within local centres within each precinct is provided in Table 21-4. Businesses that operate outside of business and industrial zones have not been overviewed in the existing environment description (Section 21.3); however, these have been considered in the assessment of impacts (refer to Section 21.4.7 and Section 21.5.6).

Table 21-4 Summary of business centres

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 Centre, Cremorne	Commercial offices, food and drink retailers, sports clubs and accommodation services, serving local residents as well as commuters and those visiting for work. It includes a car dealership, medical centre and mixed use building. 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.
Military Road Centre, Mosman	A wide variety of businesses including retail and commercial uses. Retail businesses include cafes and restaurants as well as boutique clothing stores. Commercial businesses include interior design and personal services businesses. There are also 'neighbourhood shops' such as convenience stores and pharmacies. The centre 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.
Spit Junction Centre	A wide variety of businesses spanning retail and commercial uses as well as Mosman Council buildings. Retail businesses include cafes and restaurants and clothing stores. Commercial businesses include medical and gym/fitness businesses. Some businesses 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 (eg allied health services, professional suites, car wash and cafes).
The Spit Centre	A number of maritime related businesses and a small number of commercial businesses. Maritime businesses using The Spit includes three marinas, cafes and restaurants, boat rentals/sales, a commercial diving operation and Middle Harbour Yacht Club. 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.
Artarmon Industrial Centre	A large number of automotive businesses (vehicle sales, rental and repair) and film related businesses as well as construction related commercial businesses (such as equipment sale and hire). It includes a gym and fitness facilities, warehouse/storage facilities and commercial businesses. Businesses located in the centre are destination stores as many customers would drive specifically to the businesses and they are unlikely to be dependent on passing trade.

Centre	General description
Eastern Precinct	
Balgowlah Centre	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, personal services businesses, and a car wash located in the underground carpark. There are cafes and restaurants, as well as some commercial offices and retail stores, located along Sydney Road. 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 including estate agents, a veterinary hospital and personal services businesses. A variety of 'neighbourhood shops' such as a post office, Bupa aged care facility and Balgowlah RSL Club are also in this area. The centre caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Manly Vale Business Centre	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.
Forestway Shopping Centre, Frenchs Forest	A large shopping centre comprising retail and commercial businesses such as clothing and homeware retail businesses, a large supermarket and food retailers, 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 centre caters primarily to a neighbourhood catchment and would have some reliance on passing trade.
Frenchs Forest Business Hub Centre	Commercial businesses including corporate offices, gym/fitness centres, sports facilities, storage facilities/warehouses, medical laboratories and distribution centres. It includes bulky goods retailers such as homeware and furniture stores. Many businesses in the centre, 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 centre.

Centre	General description
Warringah Mall Shopping Centre, Brookvale	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 cafes and restaurants located within a food court and throughout the shopping centre, and a car wash within the carpark. The centre caters primarily to a neighbourhood catchment with some customers travelling from further away, including from the wider Northern Beaches.
Austlink Business Park, Belrose	A diverse range of uses in the Austlink Business Park. Commercial businesses include corporate offices, gym/fitness centres, storage facilities/warehouses and distribution centres. It includes bulky goods retailers such as hardware, homeware and furniture stores. Many businesses in the industrial complex such as commercial offices and distribution centres would not receive customers. Those that do are destination services with customers driving specifically to the businesses. The gym/fitness centres cater mostly to employees working within the centre.

It is noted that, 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 and were not specifically profiled as part of the business impact assessment (refer to Annexure A of Appendix U (Technical working paper: Socio-economic assessment)).

Maritime businesses

Businesses that rely on the Middle Harbour for operation include:

- Maritime: boat moorings, boat ramps, boat licensing, marine rescue, boat maintenance and repairs, tow boats, marina facilities and fuel services
- Tourism: harbour cruises, outdoor recreation and sporting activity operators, and hire facilities and recreational boat hire
- Commercial: commercial fishing movements (commercial fishing is not allowed in the harbour, however, boats travel in the harbour to moor and distribute catch), charter boats, science and research, refueling and water taxis.

Middle Harbour does not accommodate any major commercial shipping operations, with most of maritime traffic associated with recreational and sporting activities.

A number of boat launching facilities are also available for commercial use throughout Middle Harbour.

Businesses assessed

Businesses within the precinct areas are generally clustered on the main transport routes and provide either a specialist service to the broader area or a convenience service for the local community. The location of the business centres in proximity to the project are shown in Figure 21-11. The locations of temporary construction support sites are also shown, as businesses within close proximity may experience impacts. The precinct areas also contain a wide variety of businesses located outside of a business centre. The top three industries of employment are health care and social assistance; professional, scientific and technical services; and retail trade.

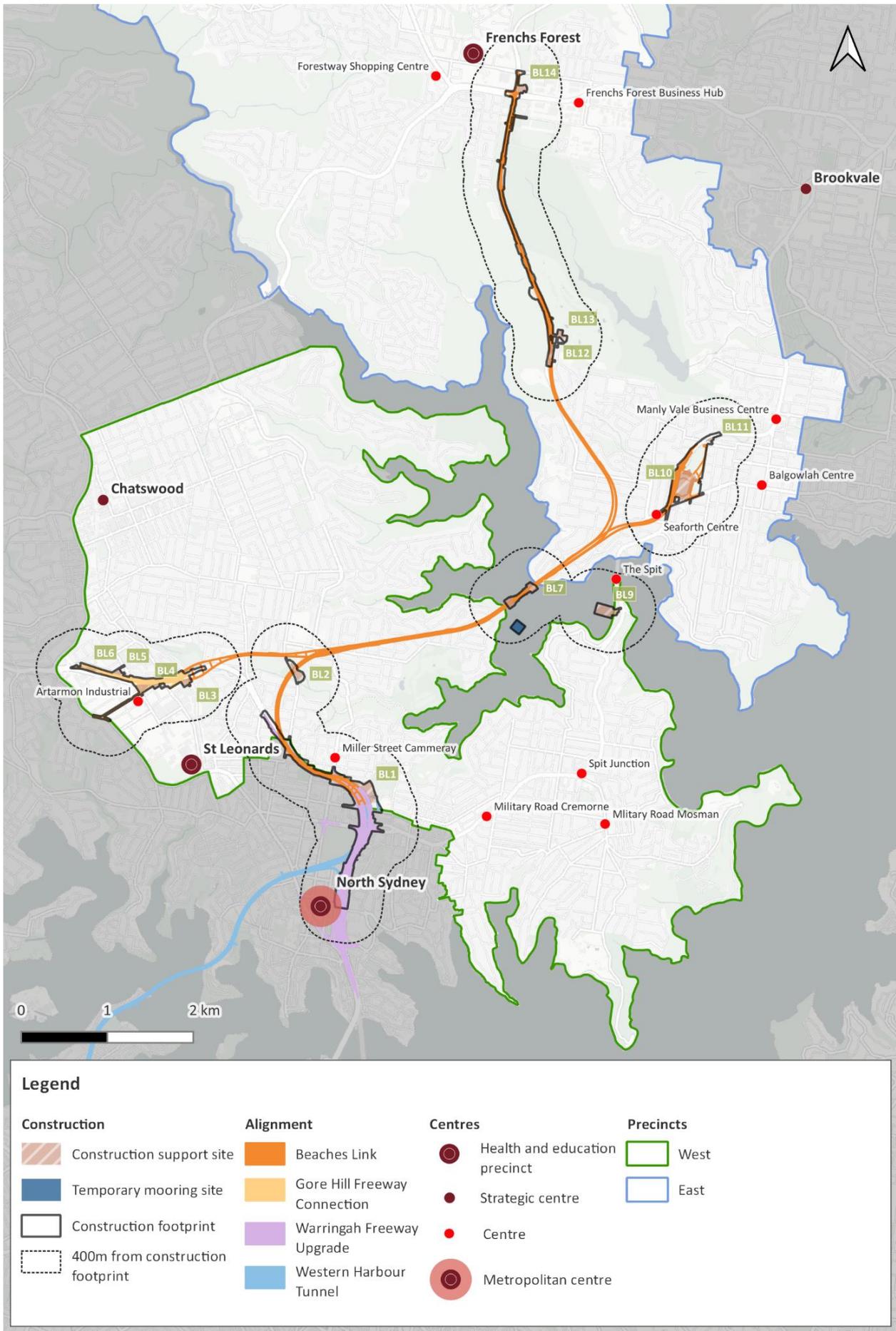


Figure 21-11 Business centres

Businesses survey results

Business survey results revealed that businesses in the area have varying degrees of sensitivity and dependency to project construction and operational aspects. Generally, there was a high perceived dependency (69 per cent) on vehicular passing trade, with 43 per cent of businesses surveyed as highly dependent. Sixty-six per cent of surveyed businesses perceived a dependency on pedestrian and cyclist passing 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 the respondents perceived to be majorly sensitive.

The majority of customers and employees surveyed use private vehicles as their primary transport mode. Fifty three per cent of businesses surveyed perceived that during the construction phase, the project would have no discernible positive or negative effects on travel time and access, with 46 per cent of respondents perceiving they would be affected negatively. However, upon operation, 63 per cent of business respondents perceived that the project would be positive for employee and customer access. The majority of businesses (65 per cent) perceived they were dependent on on-street parking, with 39 per cent of businesses recording major dependencies. The potential for the project to impact on deliveries and loading arrangements was also considered in the survey. The impact was considered by businesses to be neutral or positive with 60 per cent of businesses perceiving construction would have a neutral effect and approximately 54 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 dependent on business exposure and visibility and 47 per cent majorly dependent. Spit Junction and Frenchs Forest were the surveyed business centres that recorded the highest dependencies.

Changes to 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. 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.

Overall, the business survey indicated that the majority of businesses perceived 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.

21.3.5 Access and connectivity

A detailed description of the existing traffic and transport environment surrounding the project is provided in Chapter 8 (Construction traffic and transport).

Road network

A number of major arterial roads are located near the project that provide access for communities to employment and infrastructure within the precinct areas, as well as for communities in the Greater Sydney region. Major arterial roads near the project include:

- Warringah Freeway, which passes through Naremburn, Cammeray, St Leonards and North Sydney and provides access to the Sydney CBD
- Pacific Highway, which passes through the precinct areas at Artarmon, St Leonards, Crows Nest and North Sydney
- Military Road, which provides access from North Sydney to Spit Road in Mosman

- 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
- 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
- Willoughby Road, which passes through the Western Precinct at Naremburn and Willoughby and connects St Leonards, Crows Nest and Chatswood (via Mowbray Road)
- Spit Road, which passes through Mosman and provides access to the Northern Beaches
- A8 Manly Road, which passes through Seaforth and provides connections to Mosman, Manly, the Northern Beaches (via Condamine Street/Pittwater Road) and the Forest District (via Frenchs Forest Road/ the Wakehurst Parkway)
- A8 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.

At the 2016 Census, car travel was the predominant mode of travel to work for residents in the precinct areas, with about 46.6 per cent of people aged 15 years or over using a car for all or part of their journey to work.

Public transport

Public transport modes across the precinct areas include rail, bus and ferry services. At the 2016 Census, bus transportation was the second preferred mode of transport across the precinct areas, carrying about 15.6 per cent of residents, followed by rail with about 7.2 per cent.

Further details for public transport services in the precinct areas are included in Chapter 8 (Construction traffic and transport).

Active transport

In 2016, walking and cycling were both common forms of active transport for commuters across the precinct areas, with about 6.1 per cent of residents walking or cycling to work. A number of shared user paths are located in the precinct areas, including separated off-road dedicated cycleways and dedicated on-road cycling lanes.

The pedestrian and cycle network is varied within the precinct areas. The Western Precinct offers off-road shared user paths at the following locations:

- 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.

The Eastern Precinct offers off-road shared user paths at the following locations:

- Near Burnt Bridge Creek between Baringa Avenue and Condamine Street
- White Street, Lauderdale Avenue, The Crescent, Commonwealth Parade and Fairlight Walk between Balgowlah and Manly
- Shared user bridge connecting Karingal Crescent Reserve and Forest Way
- Between Wakehurst Parkway north of Warringah Road and Frenchs Forest Road East, to the west of Inverness Avenue
- Shared user bridge across Warringah Road west of the intersection of Forest Way
- Shared user bridge across Warringah Road on the western side of the intersection with Hilmer Street
- Shared user bridge connecting Warringah Aquatic Centre and Bantry Bay Road
- Allambie Road between Aquatic Drive and Eaton Square
- Manly Dam Bike Track within Garigal National Park.

Maritime transport

Middle Harbour maritime transport, access, users and restrictions as well as marinas, boat ramps and mooring fields are discussed in Chapter 8 (Construction traffic and transport), Section 8.3.4.

21.4 Assessment of potential construction impacts

Construction of the project would have the potential to affect the social and economic environment of the precinct areas. These potential impacts are assessed in this section.

21.4.1 Property impacts and acquisition.

The project has been designed to minimise the need for surface property acquisition. This has been done by locating road infrastructure in tunnels and, where possible, using government owned land for construction and operation of the project. Nonetheless, some property acquisition would be required to facilitate construction of the project.

Property acquisition and temporary leases

The project would require the full and partial acquisition of 46 properties. This includes temporary leases of land required for temporary construction support sites and other construction works. The tunnel alignment would also pass under numerous residential and commercial properties and social infrastructure. The nature of direct property impacts, including details of property acquisitions, temporary occupation of land is discussed further in Chapter 20 (Land use and property).

Some residents and communities near the project may experience a level of stress and anxiety due to uncertainty about potential property impacts, property acquisition and proposed changes that may be associated with the project. These concerns were raised by community members during consultation for the project.

Twenty-eight residential properties would be fully acquired for the project, requiring affected households to relocate prior to construction. 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.

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

The sensitivity of affected individuals and households are considered to be high. However, 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 high-moderate.

Other property impacts

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

Potential impacts on future development above tunnels generally only occurs 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 of development of properties at the surface along the alignment. 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 tunnels is considered negligible, with the sensitivity of affected properties considered to be moderate, and the magnitude of the change considered to be negligible.

Concerns were raised during community and stakeholder consultation 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 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 road headers. For most properties, vibration levels would generally be below levels that may cause potential risk to buildings or structures, including minor cracking. However, there is potential for cosmetic damage risks to a small number of properties, particularly more sensitive heritage buildings, closest to vibration intensive construction activities. Further discussion about potential vibration impacts on buildings and structures is provided in Chapter 10 (Construction noise and vibration).

The excavation of tunnels has potential to result in settlement at the ground surface, potentially impacting properties above or near the project. Some buildings near the project may experience very slight cosmetic damage due to settlement (for example, fine cracks that are easily treated during normal decoration), although this is not expected to impact on the serviceability or stability of buildings which is discussed in Chapter 16 (Geology, soils and groundwater). It is noted that the potential for settlement has been assessed without design measures such as tunnel linings, which would help to reduce settlement associated with groundwater drawdown. The overall significance of potential damage to properties above the tunnels (assessed conservatively without considering the installation of designed tunnel linings) during construction is considered moderate-low, with the sensitivity of affected properties being moderate and magnitude of change (that is, fine cracks that are easily treated during normal decoration) considered to be low.

The air quality impact assessment, provided in Appendix H (Technical working paper: Air quality), found that the operation of the ventilation outlets would have no adverse impacts predicted at any existing or future buildings up to a height of 30 metres in the vicinity of the ventilation outlet at the Gore Hill Freeway and 20 metres within the vicinity of the ventilation outlet at the Warringah Freeway. There are predicted impacts for potential future buildings above 30 metres in height within 300 metres of the Gore Hill Freeway ventilation outlet and for buildings above 20 metres within 300 metres of the Warringah Freeway ventilation outlet. This would not necessarily preclude such development, although consideration of the ventilation outlets would be required during the rezoning or development application stage for proposed future development.

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.

The community raised 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. The assessment concluded that 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.

21.4.2 Equity

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

During construction, it is anticipated that impacts to equity would be more acutely experienced by those communities closest to surface works, temporary construction support sites, or occupants of properties above the tunnel alignment. Potential equity impacts would mainly relate to construction noise, dust and vibration affecting the amenity and liveability of the area, as well as changes in local access and connectivity. These impacts would be relatively short-term and localised to discrete locations as construction activities at each temporary construction support site would be comparatively less than the overall construction program. 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.

21.4.3 Population and demography

The construction workforce would generally be sourced from across the Greater Sydney region and is not expected to result in an influx of workers at a scale that would impact population and demography in the precinct areas.

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.

Further information on property acquisition as a result of the project is provided in Chapter 20 (Land use and property) and discussed in Section 21.4.

21.4.4 Social infrastructure

During construction, potential impacts on social infrastructure in the precinct areas may result from:

- Loss of open space, parks and recreational facilities, due to use for temporary construction support sites and permanent project facilities
- Reduced visual amenity and increased air-borne construction noise, dust and visual environment, impacting on amenity for users of some social infrastructure
- Ground-borne noise and vibration from construction of the 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 proposed works.

Directly impacted social infrastructure

Social infrastructure would be directly impacted through the use of land for temporary construction support sites and project infrastructure. In particular, impacts would include:

- Temporary use of parks and open space areas for temporary construction support sites, resulting in the temporary loss of access to and use of land within the construction footprint
- Permanent loss of land at Cammeray Golf Course, Balgowlah Golf Course and Artarmon Park
- Direct impacts on land accommodating Ella Bache College and Duck and Dive Swim School at Artarmon, causing disruption to users of these facilities. It is likely that users of these facilities would be able to access similar services elsewhere
- Reduced amenity due to location of construction works and temporary construction support sites and changes in noise, dust and visual environment, potentially detracting from the use and enjoyment for people using the remaining parts of the social infrastructure.

Table 21-5 provides a summary of potential impacts on social infrastructure directly impacted by the construction of the project.

Table 21-5 Direct impacts on social infrastructure

Social infrastructure	Summary of potential impacts
Cammeray Golf Course	<p>Impact on land within Cammeray Golf Course would initially result from the establishment of infrastructure required to support the Western Harbour Tunnel and Warringah Freeway Upgrade project construction and operation. Part of the site would be later adjusted to support the establishment of the Cammeray Golf Course construction support site (BL1) and infrastructure required for the project.</p> <p>Impact on land within Cammeray Golf Course has been assessed as of high-moderate significance. The sensitivity of the golf course to change is considered moderate and the magnitude of the impact considered high given the project's construction would result in a permanent change to the existing golf course.</p> <p>The impacted section of the golf course adjoins the Warringah Freeway corridor and Ernest Street. Construction and longer term operation of the ventilation outlet at the Warringah Freeway and other project support infrastructure would require reconfiguration of the golf course before</p>

Social infrastructure	Summary of potential impacts
	<p>construction, including changes to some holes on the golf course (for example, reducing the length of fairways). These works would be carried out as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project, which has been designed and developed to minimise impacts to the golf course. Transport for NSW will continue its collaborative engagement with Cammeray Golf Club to allow the golf course to continue operating as a nine hole golf course during construction. Changes to the golf course during construction may impact on the use and enjoyment of the golf course for some members, potentially resulting in some members and golfers accessing alternative 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 deter some people from using the golf course during the construction phase.</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>After construction, areas of the golf course not required for permanent project infrastructure would be reinstated and rehabilitated, including replacement trees and landscaping.</p>
Flat Rock Reserve	<p>A small portion (about 10 per cent) of Flat Rock Reserve would be temporarily leased for use as the Flat Rock Drive construction support site (BL2). The construction support site would result in the temporary loss of access to and use of land within the construction footprint, temporarily disrupting the use of this land for informal recreation. Public access to areas of the reserve outside of the Flat Rock Drive construction support site (BL2) would be maintained during construction. The existing shared user path would be temporarily realigned along the western perimeter of the construction support site. Pedestrian pathways on the eastern perimeter of the site would be maintained with two minor temporary diversions required (refer to Chapter 8 (Construction traffic and transport) for further details).</p> <p>Clearing of trees would be required for the temporary construction support site establishment. However, Flat Rock Drive construction support site (BL2) is located in an area previously used as a landfill site comprising re-generated growth, and clearing of older, more established trees would be avoided where possible. The loss of trees would temporarily impact on the landscape and visual amenity of the reserve until new trees or landscaping or other recreation facilities becomes established. The clearing of trees in the reserve is also likely to be a concern for the local community. The amenity of other areas outside of the Flat Rock Drive construction support site (BL2) would be diminished during construction and may detract from the enjoyment of people visiting accessible parts of the parks or nearby facilities.</p> <p>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. Land affected by construction is therefore not expected to impact on the long-term use of Flat Rock Reserve. The rehabilitation of Flat Rock Reserve would be carried out through further consultation with Willoughby City Council and the community.</p>

Social infrastructure	Summary of potential impacts
	<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.</p>
<p>Artarmon Park</p>	<p>Construction of the project would require the temporary lease of a portion (about 12 per cent) 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 becomes established. Clearing of these trees is also likely to be a concern for the local community.</p> <p>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.</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.</p>
<p>Spit West Reserve</p>	<p>During construction, a portion of waterfront open space at Spit West Reserve would be temporarily leased for use as the Spit West Reserve construction support site (BL9). The sensitivity of the area affected by the project's construction and the magnitude of the impact are considered moderate. During construction, part of the reserve would be unavailable for public use for a period of about 48 months. The existing shared user path along the foreshore of Middle Harbour and Spit West Reserve would be temporarily 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.</p>

Social infrastructure	Summary of potential impacts
<p>Balgowlah Golf Course and Balgowlah Golf Club</p>	<p>Land currently owned by the State of NSW and occupied by the Balgowlah Golf Course would be utilised for:</p> <ul style="list-style-type: none"> • The operation of the Balgowlah construction support site (BL10), which would be re-purposed at the end of the project as new and improved open space and recreation facilities. This portion of land would be leased by Transport for NSW for the construction support site • Construction of a new access road, motorway facility and ventilation outlet. This portion of land would be acquired by Transport for NSW for the permanent facilities • Construction of new and improved open space and recreation facilities which would be constructed on residual land immediately after the dedicated consultation process is completed. <p>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 not used for construction, primarily to the east and north of the new access road, would be progressively made available as new and improved open space and recreation facilities, subject to the completion of a dedicated consultation process led by Transport for NSW and Northern Beaches Council. As part of this consultation process, a community reference group would 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. Residual land not required for operation of the project is discussed in Section 21.5.3 and in Chapter 20 (Land use and property).</p> <p>The temporary construction support site would occupy part of the land (about 28 per cent) for a period of up to five years and the golf course would be permanently closed at the start of construction, which has been assessed as of high significance. Members of the golf club would be required to use alternative facilities, including Wakehurst Golf Course, Manly Golf Course and Warringah Golf Course, all of which are located within two kilometres of Balgowlah Golf Course.</p> <p>Construction of the project, including the new and improved open space and recreation facilities, 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 visual and landscape amenity of the surrounding area.</p> <p>The sensitivity of the golf course to change is considered high and the magnitude of the impact considered high, given the project's construction would result in the golf course not being available for public use.</p>

Indirectly impacted social infrastructure

During construction, impacts on amenity may be experienced by some users of social infrastructure near the project due to the presence of construction infrastructure, increased traffic (including increased heavy vehicle movements) and construction noise and dust. Changes in amenity can affect how users interact with or enjoy an environment or their ability to participate and concentrate. A reduction in the enjoyment or convenience of social infrastructure access may also deter users and potentially impact on community participation levels, which would have an impact on community values.

A number of schools and childcare facilities are located near the project (refer to Figure 21-3 to Figure 21-10). Students, teachers and visitors at the schools would potentially experience temporary amenity impacts due to increased noise and on occasion dust from construction activities at temporary construction support sites and surface road upgrades. Education and childcare facilities may also experience increased construction traffic and occasional dust impacts due to the use of Sydney Road by construction vehicles.

The Wakehurst Parkway north construction support site (BL14) is located near the Northern Beaches Hospital. Increased noise, occasional dust and construction traffic, has the potential to impact on the amenity for patients and workers of the hospital, although any potential impacts from the associated adjacent minor surface roadworks would be for a very short period only and are generally expected to be negligible.

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

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

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 and two full planned closures of up to 48 hours each of Middle Harbour between Northbridge and Seaforth Bluff, to facilitate immersion of the immersed tube tunnel units. 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 for sporting clubs associated with Middle Harbour.

During all other days of the construction phase, partial restrictions of Middle Harbour with maritime speed restrictions and 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 consultation and communication with users of Middle Harbour, such as with the local community, Mosman Rowing Club, Northbridge Sailing Club (located in Clive Park), Seaforth Moth Sailing Club (part of the Northbridge Sailing Club), Middle Harbour Yacht Club and users of D'Albora Marinas The Spit, would assist in managing potential impacts.

Users of other social infrastructure near construction activities, such as recreational facilities (including Balgowlah Scout Hall, Balgowlah Oval, and basketball and netball courts at Willoughby) and places of worship, may also experience potential impacts on amenity due to the presence of nearby construction infrastructure and associated 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.

Short-term low 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. Those 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, Northbridge and St Mark's Anglican Church at Tunks Street, Northbridge
- Childcare facilities such as Sue's Childcare Castlevale at Artarmon Road, Willoughby; Naremburn Early Learning Centre at Donnelly Road, Naremburn; Northside Baptist Preschool at Sailors Bay Road, Northbridge; St Mark's Northbridge Preschool at Malacoota Road, Northbridge; and Jacaranda Creative Play Centre at Fromelles Avenue, Seaforth
- Educational uses such as Seaforth Public School at Kempbridge Avenue, Seaforth.

Some users 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 Chapter 10 (Construction noise and vibration). Overall, the sensitivity of social infrastructure located along the tunnels 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.

Temporary changes to local access and connectivity for motorists, pedestrians, cyclists and public transport users, may impact on access to social infrastructure near the project. A number of schools are located near surface works and temporary construction support sites at Cammeray and Balgowlah. Increased construction traffic may impact on perceptions of safety for children and students (refer to Section 21.4.5). The implementation of safeguards and management measures would assist in managing potential impacts.

Although controlled navigation routes would be provided through the site, increased marine construction traffic and activities could impact upon the perceptions of safety for water craft and other recreational users of the Middle Harbour. Measures would be implemented to manage potential safety risks associated with road and maritime construction traffic. Further details are provided in Appendix F (Technical working paper: Traffic and transport).

21.4.5 Community values

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

- Temporary adverse changes in local amenity for residents, businesses, facilities and public open space areas near temporary 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 temporary construction support sites and construction works in road reserve areas at the Warringah Freeway, the 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 delays and disruptions
- Adverse changes in visual amenity and local character due to the presence of temporary construction support sites and surface works, infrastructure, and clearing of vegetation within the construction footprint.

Local amenity and character

Noise, dust, vibration, traffic, and visual impacts from construction activities may temporarily impact on the amenity for some residents and social infrastructure closest to surface works. Impacts on night time amenity due to construction noise and vibration and light spill may also be experienced should works need to be carried out outside of standard daytime hours. This may impact on night time amenity or sleeping patterns for some residents. These impacts would be short-term and may

potentially impact on the use and enjoyment of some homes, businesses, facilities and natural areas, particularly of outdoor areas.

As discussed in Section 21.3.3, Middle Harbour influences the local amenity and character of the precinct areas and is important to the local community. Middle Harbour provides a range of formal and informal recreational opportunities to both local and regional communities (including tourists). As described in Chapter 6 (Construction work), during construction, cofferdams would be located in Middle Harbour and used as temporary construction support sites. Visual and noise impacts during construction may have a negative impact on the use and enjoyment of Middle Harbour for some people, including formal and informal recreational users of land and water based facilities.

The project would require the clearing of vegetation in road reserve areas along the Wakehurst Parkway. Loss of vegetation may impact on community values relating to landscape and visual amenity of this area and the natural environment.

The project would also require the clearing of vegetation within Artarmon Park, Balgowlah Golf Course and areas of re-generated growth within Flat Rock Reserve. Loss of vegetation may also impact on community values relating to landscape and visual amenity of these areas and the natural environment. The extent of clearing on residual Balgowlah Golf Course land will be confirmed after a dedicated consultation process to determine the final form of the new and improved open space and recreation facilities to be constructed in the area.

Following construction, areas affected by construction and not required for the ongoing operation of the project would be rehabilitated and/or repurposed in accordance with the urban design and landscape plan. This would include replacement trees and landscaping, with potential landscape and visual amenity impacts diminishing as the new trees or landscaping become established.

Overall, the sensitivity of communities near the project to changes in amenity and magnitude of potential amenity impacts is considered moderate, resulting in the significance of potential impacts on local amenity assessed as moderate. 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.

Community cohesion

The project construction phase 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 Course, and the removal of golfing facilities at Balgowlah Golf Course. This may reduce opportunities for social and community interaction, temporarily impacting on community cohesion.

Potential 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 community facilities 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.

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.

Community health and wellbeing

Some areas near temporary construction support sites and along the Warringah Freeway and surface connections such as to the Gore Hill Freeway have potential to experience impacts from construction activities that create extended periods of noise potentially above the relevant assessment thresholds including for sleep disturbance. This has the potential to result in sleep disturbance for some residents and occupants of buildings nearest to these works, potentially impacting health and wellbeing for some individuals. 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 (refer to Chapter 13 (Human health)). Mitigation measures proposed include communication to ensure the

community are aware of the timing of impact piling in Middle Harbour for cofferdam works. Impact piling works would be similar to works carried out recently for Sydney Harbour wharf upgrades by Transport for NSW.

The potential for construction dust to impact on health and wellbeing of groups in the community who may be more sensitive to changes in air quality (such as children, elderly people or people who suffer from asthma or similar conditions), is likely to be of concern for some community members near construction activities.

Increased construction traffic could impact upon the 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.

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 outlines expectations for staff in and outside the workplace. 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 general community to perceived health and safety impacts is moderate and the magnitude of possible impacts is 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.

21.4.6 Economics

Employment

During construction, the project would benefit employment through direct employment opportunities on the project and indirect employment opportunities in businesses and industries that support this construction.

A project of this scale is expected to support up to 7500 full time equivalent job years (direct employment) during the five 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. Indirect employment opportunities would be generated across local, regional and national businesses in industries that support construction such as manufacturing and services.

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* (Training Services NSW, 2020), 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, 2020) and *Infrastructure Skills Legacy Program*. To meet the targets within the *Infrastructure Skills Legacy Program*, the contractor would be required to employ women in two percent 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 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. A workforce strategy for the project, that includes strategies to increase employment and training opportunities for the groups discussed above, would be developed and implemented and would help to maximise employment benefits of the project.

The construction workforce would generally be sourced from across the Greater Sydney region. It is expected that there would be capacity within the regional labour force for the project.

21.4.7 Business and industry

Businesses across the precinct areas may be affected during the construction phase by temporary changes in passing trade, access and travel time (for employees, customers, deliveries and/or servicing), parking, serving and deliveries and amenity. Depending on the nature of the business, the actual impact on business revenue may vary (positively or negatively). These impacts may be an inconvenience for businesses affected although they would be temporary in nature as construction activities at each temporary construction support site would be comparatively less than the overall construction program. There may also be benefits for businesses due to increased passing trade and business exposure.

Potential impacts have been assessed for those business centres identified as being most likely to experience direct and indirect construction impacts. Potential impacts at these locations are discussed below. Further information is provided in the business impact assessment in Annexure A of Appendix U (Technical working paper: Socio-economic assessment).

Passing trade

Passing trade refers to customers who choose to visit a business because they see it when walking, cycling or driving past, not because they planned to go there.

Construction of the project would result in changes to vehicle, pedestrian and cyclist flows that could influence the level of passing trade. Some businesses could benefit due to passing trade being re-directed to them or due to increases in construction workers in the area. Conversely some businesses might be disadvantaged as traffic is diverted away, or as they become less attractive to passing trade due to construction impacts (such as reduced visibility, amenity, ease of access or parking availability).

Increased passing trade from construction workers and construction vehicles is predicted for a number of business clusters located near the temporary construction support sites. Vehicle diversions are also expected to increase traffic along Sydney Road, leading to an increase in passing trade. Increased pedestrian and cyclist passing trade is expected at Francis Road, Lambs Road, Cleg Street and Reserve Road in Artarmon as a result of the diversion of the Gore Hill Freeway shared footpath. Overall, benefits to businesses as a result of passing trade are expected during construction.

Employee and customer access

The construction phase of the project would result in changes to road, public transport and active transport networks, which may affect employee and customer access. Increased journey times can affect staff recruitment and retention, which may in turn impact on business productivity and function. Similarly, customers may respond to access difficulties and delays by visiting alternative centres that offer similar goods or services, resulting in a loss of trade for affected businesses.

Businesses often rely on parking facilities for deliveries and/or services and parking convenience for workers and customers. Increased demand and competition for car parking could influence customers to drive to an alternative business providing similar goods or services in a more accessible location. A reduction in parking spaces may also impact on visitor numbers to the broader area and therefore reduce opportunities for passing trade. Limitations on business parking could also reduce productivity, employee attraction and retention. For example, competition for parking may increase in the Artarmon Industrial Centre precinct due to the additional construction workers in the area. Construction workers will be actively encouraged to use public transport rather than travelling to work by car. Where public transport availability to temporary construction support sites is limited, shuttle bus transfers may also be provided from public transport centres where required. This would be of moderate significance for the Artarmon industrial area, as the sensitivity and magnitude would be moderate.

The traffic and transport assessment (refer to Chapter 8 (Construction traffic and transport)) identified that road network performance would be affected during construction, with a number of temporary road closures and increased construction traffic resulting in increased travel times in some areas. The T2 transit lanes currently in operation along the Gore Hill Freeway would be permanently converted to general traffic lanes to allow for construction of the Gore Hill Freeway Connection and to improve lane utilisation. This is not expected to materially impact employee and customer travel times by bus (refer to Chapter 8 (Construction traffic and transport) for more information). Changes to road network performance would likely affect employee and customer travel time and the efficiency of services and deliveries. Impacts of moderate significance on employee and customer access would be experienced by businesses within Artarmon Industrial Centre, and impacts of moderate-low significance would be experienced at The Spit. Impacts on employee and customer access would be experienced by businesses within the Frenchs Forest Business Hub Centre, Manly Vale Business Centre, Balgowlah Centre, Seaforth Centre, and Miller Street Cammeray and would be of low to negligible significance as both sensitivity and magnitude would be low to negligible.

Construction vessels travelling from the Outer Harbour to Middle Harbour would complete their movement when the Spit Bridge is open. Given the length, limited speed and limited manoeuvrability of the immersed tube tunnel units, the construction contractor may be required to arrange several special bridge opening times outside of peak traffic periods to transport the units to their intended destination. If required by the construction contractor, the additional bridge opening times would have a limited impact on maritime businesses.

Servicing and deliveries

Businesses rely on deliveries and dispatch of goods to support the sale of products and/or services. Businesses also require services from other businesses such as refuse collection. These activities are often required to occur daily or multiple times per day. The construction phase of the project would result in changes to loading zones, road performance and road network configuration, which can affect the reliability and capacity of servicing and delivery. This may temporarily impact travel times and vehicle-related costs as well as revenue for businesses.

Reduced road performance is expected to lead to some delays in service and delivery times to businesses, however it is expected that impacts to business viability would be minor. The business surveys indicated that 60 per cent of businesses believed construction of the project would have a neutral effect on servicing and delivery, whereas 39 per cent of businesses believed it would have a negative effect.

The closure of Lambs Road between Punch Road and Cleg Street, and periodic closures of Reserve Road, Hampden Road, Dickson Avenue and Punch Street during construction are expected to have impacts of moderate significance on businesses in the Artarmon Industrial Centre because of disruption to servicing and deliveries, as the level of sensitivity and magnitude is moderate.

A key factor in receiving servicing and deliveries is access at the business location itself, as this access is often reliant on dedicated loading zones. The construction of the project is, however, not anticipated to remove loading zones or parking that would affect the business clusters.

The significance of impacts on services and deliveries would be low at the Frenchs Forest Business Hub Centre, the Manly Vale Business Centre, the Balgowlah Centre and the Seaforth Centre.

Amenity

The construction phase of the project would affect the amenity of an environment, including for people visiting or working at local businesses in the precinct areas. This would be as a result of increased noise, vibration and dust, or reduced visual outlook and business visibility. Changes to amenity can affect business ambience, productivity, functionality, exposure and client patronage. Business clusters that have higher dependency on amenity to attract and retain customers would be more susceptible to changes in amenity as a result of construction activity.

During construction, visual amenity would be affected by the removal of vegetation and the introduction of temporary construction support sites, equipment and other visible elements such as hoardings and fencing. This is most likely to impact on those retail, personal service providers, cafes and restaurants that rely on the pleasantness and quality of an environment to attract customers. Important aspects of visual amenity which may be affected include access to natural daylight, clear sightlines and permeability to the surrounding landscapes. Businesses that rely on storefront exposure to attract customers may be affected by reduced visibility or safety concerns of customers as a result of the presence of construction machinery and materials. The significance of impacts on amenity at the Balgowlah Centre would be low, and moderate-low at the Artarmon Industrial Centre, the Seaforth Centre and The Spit.

Increased noise and vibration levels from construction activities and traffic could also impact on customer amenity, and on the amenity and productivity levels of employees. Potential exposure to dust and air pollutants could impact on cleanliness and attraction in particular for sensitive business receive such as education, accommodation and food services that rely on outdoor dining.

The establishment of construction infrastructure and increased construction traffic at Spit West Reserve would have an impact on the views, character and identity of maritime businesses at The Spit. Although cafes, restaurants and the function rooms/event spaces at The Spit have a high dependency on visual amenity, the orientation of view corridors from these businesses would be in a direction away from the construction footprint, and the significance of amenity impacts are expected to be moderate-low.

Employee productivity and communication

During construction, there would be a temporary increase in noise levels due to the use of construction plant, equipment and vehicles that may affect employee productivity and communication. The significance of impacts on employee productivity and communication for businesses at the Artarmon Industrial Centre, along Punch Street, Cleg Street, Waltham Street and the Gore Hill Freeway, would be low as the sensitivity and the magnitude of change for this business centre would be low. Impacts on employee productivity and communication would be negligible at the Balgowlah Centre and are not anticipated at businesses at the Frenchs Forest Business Hub, Miller Street (Camberay), The Spit and Seaforth Centre.

Business visibility

The construction phase of the project would result in changes to vehicle, pedestrian and cyclist flows that could influence the level of business exposure and visibility. Some businesses could benefit as they might be exposed to more potential customers (ie through pedestrian or traffic diversions) while others might not, as traffic is diverted away or construction hoardings reduce the ease of access to/visibility of their business, which could result in a loss of trade. During construction, site hoardings may impact business visibility along Punch Street and Dickson Avenue, resulting in a low significance of impact on business visibility at the Artarmon Industrial Centre. However, overall, benefits are anticipated for the business centres assessed.

Demand for services

The construction phase of large infrastructure projects can affect demand for local and regional goods and services. This can result in both negative and positive impacts with some businesses experiencing a loss of customers avoiding particular areas due to construction activities while other businesses experiencing increased trade from construction workers in the area. Demand for services, such as construction recruitment agencies, construction companies and resource suppliers, can also be generated from infrastructure projects, creating employment opportunities both within and outside local business centres.

Construction of the project would benefit short-term local employment opportunities through the creation of direct construction related employment on the project and indirect employment opportunities in businesses and industries that support the construction works. An increase in construction workers in an area often provides an economic injection into the local economy due to increased demand for local services. As a consequence of the increase in workers associated with

construction of the project, the largest benefits from increased trade are anticipated for convenience retail and the food and beverage industry.

Demand for services at business centres along the project are generally assessed as being benefited during construction of the project.

Displacement of businesses

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 workers
- Trade catchment alterations
- Business closure.

Businesses required to close or relocate due to the project are predominantly commercial, light industrial or speciality services, including a media and production company, swim school and beauty college, and are located in the Artarmon Industrial Centre. These businesses would service a wider area and would likely employ a small number of workers. Due to the nature of these businesses and the 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.

The project would also result in permanent land use impacts at the Balgowlah Golf Course. Land currently occupied by the Balgowlah Golf Course would be utilised by the Balgowlah construction support site (BL10) and the construction of a new access road, motorway facility and ventilation outlet. The temporary construction support site would occupy part of the land for a period of up to five years and the golf course would be permanently closed at the start of construction. The closure of the golf course would result in a loss of employment. Residual land would be progressively become available through the construction period which would facilitate re-purposing it as part of the new and improved open space and recreation facilities, subject to completion of a dedicated consultation process led by Transport for NSW and Northern Beaches Council as described in Chapter 6 (Construction work). As part of this consultation process, a community reference group would 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.

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 is not expected to be substantially affected by these changes. The significance of property acquisitions on individual businesses is expected to be high-moderate, with level of sensitivity considered to be high and magnitude of change considered to be moderate.

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. Although the impact on individual businesses may be significant, the compensation process is generally designed to reduce this impact. Refer to the business impact assessment in Annexure A of Appendix U (Technical working paper: Socio-economic assessment) for further details.

Maritime businesses

Construction activities have the potential to impact maritime businesses as follows:

- Middle Harbour access:
 - Generally, access through Middle Harbour between Northbridge and Seaforth Bluff would be restricted via a controlled navigation route for all business related water craft. 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 waterway users and the project team. These controlled restrictions would occur during the whole of the construction period. This would result in the slowing of maritime traffic potentially affecting recreational movements and resulting in potential access and connectivity impacts for Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club (part of the Northbridge Sailing Club), Middle Harbour Yacht Club and maritime businesses located at The Spit local centre (low significance)
 - Construction of the project would require up to six closures, including two full and four partial closures, of Middle Harbour between Northbridge and Seaforth Bluff for periods of up to 48 hours each to install the immersed tube tunnel units. These closures would normally occur on weekdays to limit the disturbance to maritime and tourism businesses. 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, while smaller vessels passing through may require escort vessels to be provided. This would result in periods of maritime traffic disruptions potentially affecting recreational movements and resulting in potential access and connectivity impacts for Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club, Middle Harbour Yacht Club and maritime businesses located at The Spit local centre (low significance)
- Employee and customer access: Construction works may require several additional bridge opening times of the Spit Bridge outside of peak traffic periods to transport immersed tube tunnel segments, which may have a limited impact on maritime businesses. The project would also require some commercial moorings to be temporarily relocated during the construction phase (negligible significance)
- Amenity: Construction activities are expected to impact on local amenity and alter the views, character and identity of Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club (part of the Northbridge Sailing Club), Middle Harbour Yacht Club and businesses within The Spit local centre (low significance)
- Travel time delays: 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 significance)
- Business operation impacts: Interference with training routes used by members of the Mosman Rowing Club, course layouts for Northbridge Sailing Club, Seaforth Moth Sailing Club or kayak routes have the potential to result in existing members joining an alternative club. Any impacts on these 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 work vessel movements may also disrupt boating and kayak users, although the duration of peak works would be relatively short (low significance).

During construction, maritime businesses and waterway users would also experience temporary changes to access and temporary impacts on amenity during construction. Impacts to waterway users have been reduced by minimising movement of moorings, limiting closure, ensuring right of way for recreational craft over construction maritime vessels and maintaining access to the foreshore where feasible (as discussed in Section 21.4.8). Businesses and users would be able to adapt to the change with minimal disruptions to the way they operate or use the waterway.

While there may be temporary impacts on some maritime businesses during construction, there is not expected to be a lasting impact on these businesses. Any effects would be experienced at an individual business level, with no discernible changes to overall performance of the broader maritime industry. Measures would be defined that outline how marine works would be carried out and mitigate potential business impacts as far as practical.

Refer to Chapter 8 (Construction traffic and transport) for safeguards to manage impacts from maritime construction activities.

21.4.8 Access and connectivity

Potential short-term impacts on access and connectivity are identified below.

Roads and private access

The following potential access impacts are anticipated:

- 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 possible delays and disruptions for motorists and other road users
- Increased construction traffic on roads within the precinct areas, including heavy vehicles used to deliver materials and equipment and construction worker vehicles, potentially impacting on road safety for motorists, pedestrians and cyclists. However, most construction traffic would access temporary construction support sites from the arterial road network or water
- The permanent removal of 10 parking spaces along Ernest Street and the temporary removal of parking spaces on other local roads such as Punch Street, Dickson Avenue, Barton Road, Cleg Street and Hampden Road, resulting in a reduction of available parking. Some car parking for the construction workforce would be provided at the temporary 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 will be implemented, such as encouraging the use of public transport and provision of workforce shuttle buses
- Access to private properties near proposed works is generally expected to be maintained during construction. Where temporary changes are required, suitable access arrangements would be implemented in consultation with affected property owners.

The sensitivity of road users to changes in construction traffic and the magnitude of impacts are considered moderate. As such, the overall significance of impacts on road users are assessed as moderate. 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. 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.

Public and active transport

The following potential public transport impacts are anticipated:

- 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
- Delays or short-term changes in local routes and bus priority infrastructure may be required due to temporary road adjustments and could result in minor travel time increases.

Changes to local bus routes and bus stops would be determined prior to the start of works in consultation with relevant stakeholders, including other divisions of Transport for NSW and bus operators. Advanced notification would be provided to affected bus customers and bus stops would

be relocated within walking distance of their existing position, to minimise disruption where reasonable and feasible. 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.

Active transport impacts would be anticipated due to temporary closures or changes to pedestrian and cycle paths would be required near construction works for safety of pedestrians and cyclists. Existing connectivity for users of these facilities would be maintained and temporary access arrangements would result in a small increase in travel distances. Temporary closures and adjustment of pedestrian and cycle paths would include:

- 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 (parallel to Flat Rock Drive, on the western side of the Flat Rock Drive construction support site (BL2)), and provision of signalised pedestrian crossing at the access to the Flat Rock Drive construction support site (BL2) (the existing walking tracks along the eastern perimeter of the site would be largely maintained with two minor temporary diversions required)
- 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 around the Spit West Reserve construction support site (BL9)
- Provision of signalised pedestrian crossing at the Sydney Road and Burnt Bridge Creek Deviation site accesses for the Balgowlah Golf Course construction support site (BL10)
- Temporary adjustment to Manly Dam mountain bike track at Wakehurst Parkway
- Demolition and replacement of the Wakehurst Parkway pedestrian bridge. The existing bridge will remain operational while the replacement works are carried out
- Temporary adjustments to Wakehurst Parkway shared user path near the Wakehurst Parkway north construction support site (BL14).

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.

Maritime transport

The following potential maritime transport impacts are anticipated:

- Generally, access through the site between Northbridge and Seaforth Bluff would be restricted via a controlled navigation route for all business related water craft. These controlled restrictions would occur during the whole of the construction period. This would result in the slowing of maritime traffic potentially affecting recreational movements and resulting in potential access and connectivity impacts for Mosman Rowing Club, Northbridge Sailing Club, Seaforth Moth Sailing Club, Middle Harbour Yacht Club and maritime businesses located at The Spit local centre
- Temporary closures of Middle Harbour between Northbridge and Seaforth Bluff, which would occur on weekdays to limit the disturbance to harbour recreational users, community groups and clubs. During the two proposed 24 to 48 hour full closures of Middle Harbour, all marine traffic would be restricted from moving through the site for the period. During the four proposed 24 to 48 hour partial 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 sporting clubs associated with Middle Harbour

- The six steel shell immersed tube tunnel units and heavy marine construction plant would need to access the Spit West Reserve construction support site (BL9) via the Outer Harbour and then via Middle Harbour between Grotto Point and the Spit Bridge. Navigation impacts in these areas are not expected to be substantial due to the lower frequency of construction vessel movements and the increased space the Outer Harbour provides for maneuverability
- 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, however the significance of impacts is considered to be negligible
- 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. Relocated moorings would be relocated elsewhere in Middle Harbour in consultation with the lease holder(s) during construction and would be restored to their original position on completion of the project. A number of moorings would also require very short term temporary relocation on the eastern side of the channel, west of Bradys Point to allow safe passage of the immersed tube tunnel units.

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. Rowers and sailing craft would have right of way over maritime construction vessels in the vicinity of the project. 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.

21.5 Assessment of potential operational impacts

The operation of the project has the potential to positively and negatively affect residents, businesses, road users, users of social infrastructure and the wider community. This section provides an assessment of potential social and economic impacts within the precinct areas during operation of the project.

21.5.1 Equity

The operation of the project would provide improved access and connectivity which would benefit the wider community and people living and working in or near the precinct areas. In particular, reduced 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, 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 help to reduce traffic on major roads in the precinct areas, including Military Road/Spit Road/Manly Road, Warringah Road, Eastern Valley Way, Pacific Highway and Western Distributor, Frenchs Forest Road, the Ourimbah Road corridor and local roads such as Brook Street (Naremburn). It would also support local environment and amenity improvements in the precinct areas and surrounding region and improve access and connectivity for residents, business

and industry in the precinct areas, northern suburbs, north western suburbs, south western suburbs and the Greater Sydney region.

21.5.2 Population and demography

Travel time savings and improved accessibility provided by the project are likely to make some areas within or near to the precinct areas more attractive for people looking to relocate. While this change has been occurring and is expected to continue, 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.

21.5.3 Social infrastructure

As discussed in Section 21.4.4, a number of open spaces would be used during construction of the project. At completion, land not required for operation of the project would be rehabilitated and reinstated. However, some land would be retained for operational purposes as follows:

- A portion of land at Cammeray Golf Course would be acquired and/or leased as part of the Warringah Freeway Upgrade component of the Western Harbour Tunnel and Warringah Freeway Upgrade project. Part of the site would be later adjusted to support the establishment of the Cammeray Golf Course construction support site (BL1) and operational facilities and other utilities for the project. This would require the reconfiguration of the golf course to allow its ongoing use. As discussed above, Transport for NSW will continue its collaborative engagement with Cammeray Golf Club to allow the golf course to continue operating as a nine hole golf course during construction. The establishment of the motorway facilities would change the visual setting of this location. Landscaping would be provided to reduce the visual impacts of these facilities. Further discussion about the project's impacts on visual and landscape impacts are provided in Chapter 22 (Urban design and visual amenity). 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 high-moderate
- A portion of land currently occupied by the Balgowlah Golf Course would be acquired by Transport for NSW for the construction of permanent facilities, including a new access road, motorway facility and ventilation outlet, leading to the closure of the golf course. This would require members and visitors of the golf club to access golf courses elsewhere, impacting on social networks associated with the club. The sensitivity of the golf course to change is considered high and the magnitude of the impact considered high given the permanent closure of the golf club. As a result, the overall significance of potential impacts to Balgowlah Golf Course during operation have been assessed as high.

The project would progressively return an area, equivalent to around 90 per cent of the current open space at Balgowlah Golf Course, to the community as new and improved public open space and recreation facilities. 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 comment on the final layout of the new and improved open space and recreation facilities at Balgowlah. This consultation would be separate to the consultation for the Beaches Link and Gore Hill Freeway Connection environmental impact statement. This process would 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 would 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. 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 and improved 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. Further information regarding the new and improved open space and recreation facilities at Balgowlah is provided in Chapter 20 (Land use and property)

- 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 ongoing use or functioning of the park and its facilities, which mainly include seating and dog off lease area within a vegetated open space. Overall, the significance of potential impacts on the permanent strip acquisition 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.

During operation, the project would contribute to improved access and connectivity through improved travel time and improved travel time reliability, including to local and regional infrastructure within and near the precinct areas including major hospitals, tertiary education facilities, regional and state sport and recreation facilities, and major retail, commercial uses, cultural and community support facilities (refer to Section 21.3.2). However, operation of the project may also result in impacts to some social infrastructure due to changes in local road access.

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.

21.5.4 Community values

Local amenity and character

Operation of the project may result in changes to traffic noise levels for communities near the tunnel connections and the Warringah Freeway. In particular, increased traffic noise may be experienced by some receivers near the surface connections at the Gore Hill Freeway, Balgowlah and the Wakehurst Parkway due to forecast increases in traffic volumes and realignment or widening of roads closer to receivers. Conversely, decreased traffic noise impacts may be experienced by some communities near the surface connections at Balgowlah, the Gore Hill Freeway and the Warringah Freeway due to the forecast reduction in traffic volumes along existing surface roads with traffic being moved into tunnels. This may have beneficial impacts on local amenity at some properties.

The early development of the new and improved open space and recreational facilities in Balgowlah would improve access to sport and recreational facilities for surrounding communities. Increased availability of public open space and passive and active recreation facilities would impact positively on local amenity in this area. 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.

The sensitivity of communities near the entry and exit ramp tunnels to connections at the surface 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.

Community cohesion

Community cohesion is encouraged by connectivity or discouraged by barriers to movement. During operation, the project would support improved travel and access to work, business and leisure activities in the precinct areas 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. Reduced travel times and improved travel time reliability may encourage some people to make trips they otherwise wouldn't, helping to facilitate community cohesion.

Locally, residential property acquisition has the potential to impact on community cohesion through the disruption to social networks and community relationships. As discussed in Chapter 20 (Land use and property), 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.

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. The permanent impact on the continued operation of Balgowlah Golf Course would require members and visitors to access golf courses elsewhere, impacting on social networks associated with the club. Potential impacts on individual members is likely to depend on individual circumstances such as the length of membership and the ability to access membership at an appropriate alternative club. The closure of the club may result in some members no longer participating in the sport. 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. The progressive establishment of new and improved public open space and recreation facilities in Balgowlah would provide opportunities for community members to meet and connect, helping to support community interaction and cohesion within the broader local community.

Changes to the Cammeray Golf Course may impact on the use of the golf course for some members. While works carried out as part of the Western Harbour Tunnel and Warringah Freeway Upgrade project would allow the Cammeray Golf Course to continue operating as a nine hole golf course, this may potentially result in some members and golfers accessing alternative 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 on community cohesion is considered moderate. As such, the overall significance of potential impacts on community cohesion due to the closure of Balgowlah Golf Club and permanent changes to Cammeray Golf Course are assessed as moderate.

Community health and wellbeing

Some residents and communities near the project may experience a level of stress and anxiety (refer to Chapter 13 (Human health)) 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 the Warringah Freeway, the Gore Hill Freeway, Burnt Bridge Creek Deviation and the Wakehurst Parkway 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, Balgowlah Boys High, Seaforth Public School, ANZAC Park, Cammeray Park, Cammeray-Neutral Bay Skate Park, Cammeray Tennis Club and Seaforth Oval). Concerns about potential impacts on the health of students of schools near ventilation outlets were raised during consultation for the project.

The project tunnel ventilation outlets contribution to air pollutant concentrations would be negligible and any predicted changes in air quality mainly due to changes in traffic volumes on surface roads. At a regional level, potential impacts on air quality would be negligible and generally undetectable. Refer to Chapter 12 (Air quality) for an assessment of air quality impacts from the project. 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.

The project would support improvements in road safety, with reduced traffic demands along key surface road transport corridors including heavy vehicles transferring into the tunnels 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 Spit Road and Military Road corridor (refer to Chapter 9 (Operational traffic)).

The establishment of new and improved public open space and recreation facilities at Balgowlah Golf Course site 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 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.

21.5.5 Economic

Employment

The project would support improved access and connectivity to employment areas in the study area and the wider Sydney region. Changes to the business environment or the acquisition of properties accommodating businesses as part of the project may cause some loss of local employment, which 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 precinct areas.

Freight and efficiency costs

Operation of the project would deliver significant long-term improvements to freight and efficiency costs for a large number of businesses and business centres within the region. Operation of the project would have benefits for businesses and business centres across the Northern Beaches by reducing travel times for light commercial and freight trips, which would in turn reduce transportation costs and increase efficiency. It is noted that Spit Road and Military Road have access restrictions for large articulated trucks (ie B-doubles and other higher mass limit vehicles). As such, access to the Northern Beaches for B-doubles is currently limited to Mona Vale Road and Warringah Road. Notwithstanding, the project would result in the majority of heavy vehicle trips on existing roads travelling through the Northern Beaches peninsula transferring to the tunnels. Peak period heavy vehicle volumes on Spit Road, Warringah Road and Mona Vale Road would decrease as a result of the project.

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, Neutral Bay and Cremorne.

Employment and customer access

The project would 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.

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 and employment opportunities due to improved accessibility. The project has the capacity to increase the secondary trade catchment (the area from which the business attracts or services 20 to 30 per cent of customers). With the project, travel time from Artarmon to Manly, Frenchs Forest to North Sydney and North Sydney to Balgowlah would be between 10-15 minutes faster in both directions, compared to an alternative 'Do minimum' (without the project) scenario in 2027 and 2037. These travel time savings expand the catchment areas benefiting businesses in the suburb and further afield.

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 from improved travel times.

Existing local and B-Line bus services would also benefit from reduced congestion on surface routes resulting in efficiency improvements in journey-to-work time. Additional significant improvements would result from the addition of further express bus routes using the tunnels to access employment centres and connecting to transport hubs like North Sydney and new transport services like the new Sydney Metro stations at Crows Nest and North Sydney.

Overall, 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.

Tolling

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 tunnels. While no decision on final toll costs has been made, if tolls were introduced, 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. This would cause a redistribution of customer expenditure, potentially benefiting some locations while others are disadvantaged. 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. Alternate untolled routes would be available for motorists using existing surface roads.

The assessed significance of impacts associated with tolling are expected to be low, with the sensitivity of affected businesses to tolling changes and magnitude of impacts considered to be low. Overall, although the potential introduction of tolling would be a direct cost to businesses and persons, this would be offset by the reductions in congestion, vehicle running costs and travel time savings.

21.5.6 Business and industry

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

- Increased passing trade due to increased traffic volumes
- Improved travel times for employees and customers accessing the centres due to increased travel speeds
- Changes to access for employees and customers
- Potential increase to the trade catchment for some businesses, due to improved accessibility.

Potential impacts on business and industry have been assessed for those business centres identified as being most likely to experience direct and indirect operational impacts as discussed below. Business centres which are not anticipated to experience operational impacts include the Warringah Mall, Austlink Business Park, Manly Vale Business Centre, Seaforth Centre, Miller Street Cammeray and The Spit. These centres have not been included in the discussion below.

Passing trade

Operation of the project may result in changes to vehicle, pedestrian and cyclist flows that could influence the level of passing trade.

The operation of the project would result in additional passing trade for businesses within the Balgowlah Centre and the Frenchs Forest Business Hub due to increased traffic demand. In addition, pedestrian and bicycle facilities to be provided as part of the project would improve the active transport network and benefit passing trade. Overall, benefits to businesses within the Balgowlah Centre are expected due to increased passing trade as a result of the project.

The conversion of Dickson Avenue east of Reserve Road to a cul-de-sac and the removal of property access to Reserve Road (replaced with access via Hesky Lane) would potentially reduce passing traffic on Reserve Road, and increase on Hesky Lane and the surrounding road network (such as Taylor Lane, Cleg Street, Herbert Street and Waltham Street). Overall, the Artarmon Industrial Centre has a negligible sensitivity to passing trade and low magnitude of change, making the significance of any negative impacts as a result of the project considered to be negligible.

Employee and customer access

Operation of the project would result in changes to road, public transport and active transport networks, which would affect employee and customer access.

Customers and employees at the Artarmon Industrial Centre may experience 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. The centre has a low sensitivity to customer and employee access and negligible magnitude of change, resulting in a negligible significance of impacts.

The project would result in isolated, minor localised increases in travel times and minor reduced travel speeds in the southbound direction on Wakehurst Parkway, north of Warringah Road, and reduced local access from Wakehurst Parkway northbound into Frenchs Forest Road East. This may affect employee and customer access to the Frenchs Forest Business Hub. However, impacts are considered to be negligible to businesses as there would be a negligible magnitude of change. The substantial increase in connectivity would counter negative impacts and enhance accessibility for the broader catchment.

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 tunnels to access employment centres and connecting to transport hubs like North Sydney and new transport services like the new Sydney Metro stations at Crows Nest and North Sydney.

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

Servicing and deliveries

Changes in the road network performance may lead to some minor localised impacts to delivery times in Frenchs Forest north of Warringah Road, which may result in impacts of low significance on servicing and deliveries for businesses within the Frenchs Forest Business Hub Centre. The level of sensitivity of the centre is moderate and the magnitude of change is low.

Generally, the project is expected to result in benefits to servicing and deliveries due to increased transport efficiencies and road capacity. The additional, faster and more direct road connections

would improve connectivity to the broader network and enhance the efficiency of supply chain movements, allowing deliveries to reach their destinations more quickly.

Amenity

Businesses within the Balgowlah Centre may experience a very minor increase in 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, and therefore the impact would be negligible.

Businesses within the Artarmon Industrial Centre may experience impacts on amenity and character due to views of the motorway facilities and ventilation outlet, motorway control centre and portals, and due to the removal of vegetation. However, industrial land use generally has a lower dependency on character and amenity than commercial or mixed use centres. The level of sensitivity of the centre is negligible and the magnitude of change is considered to be low. As a result, the significance of potential impacts is considered to be negligible.

Employee productivity and communication

Businesses within the Artarmon Industrial Centre along Punch Street, Cleg Street, Waltham Street and the Gore Hill Freeway may experience slightly higher noise levels due to additional vehicles on the road. The significance of these impacts is considered negligible, with a negligible sensitivity and low magnitude of change.

Business visibility

The operation of the project may result in benefits for businesses within the Balgowlah Centre and Artarmon Industrial Centre due to improved business visibility as a result of increased traffic at these locations.

Demand for services

During operation of the project, businesses are generally expected to experience benefits to demand for services due to improved access and connectivity, and increased trade catchments. No negative impacts on demand for services are anticipated due to the project.

Maritime businesses

The top of the immersed tube tunnels would be up to 9.2 metres above the existing elevation of the harbour bed at the centre of the crossing. The water depth above the immersed tube tunnels would vary between 16 metres and 22 metres, depending on the distance from the shore (due to the profile of the bed of the harbour). Such reduction in water depth is considered inconsequential as the draught of vessels in this part of the Harbour is constrained by shallow water depths downstream. Refer to the navigational impact assessment in Annexure A of Appendix F (Technical working paper: Traffic and transport).

Commercial moorings relocated during construction would be restored at or near their original position upon operation of the project.

Once in operation, the project would have no impacts on business reliant on the Middle Harbour for operation.

21.5.7 Access and connectivity

Road and private access

The project would improve regional access and connectivity for motorists and other road users by providing an alternative crossing of Middle Harbour. The project would relieve congestion on the Military Road/Spit Road and Warringah Road/Eastern Valley Way corridors, and enable faster, more reliable journeys for bus customers, freight and private vehicles 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, Macquarie Park and other strategic centres. This would have positive long-term impacts for motorists.

Locally, the project would provide an alternative to existing 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 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. Traffic calming measures would be implemented where required and agreed in consultation with Northern Beaches Council, which would help to minimise potential for 'rat running' on local roads.

Public and active transport

The project would provide opportunity for improved access to public transport for local and regional communities. The new tunnels would allow the opportunity for 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. The new tunnels would reduce congestion on key arterial routes like Warringah Road, Eastern Valley Way and Military Road thereby improving travel times and reliability of buses in peak periods between the Northern Beaches, North Sydney, north western Sydney and the Sydney CBD. The new tunnels would also make buses a more attractive surface route transport option by relieving existing congestion and removing stop start conflict to improve existing travel times thereby supporting further mode shift to public transport. 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, the north-west and beyond and opportunity for efficient access and interchange with the Sydney Trains and Sydney Metro stations at North Sydney.

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 predominantly located within the road corridor. The project would improve cyclist and pedestrian connectivity along the project corridor through increased provision of dedicated cyclist and pedestrian links. This includes the provision of a 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 would contribute to improved access and connectivity to social infrastructure within Middle Harbour and the Northern Beaches, which would increase access to recreational opportunities such as kayaking, boating and swimming.

Reinstatement of moorings impacted during construction near the Middle Harbour immersed tube tunnels would be as close as possible to their current locations.

A detailed assessment of potential operational traffic impacts of the project is included in Chapter 9 (Operational traffic and transport).

21.6 Environmental management measures

Measures to avoid, minimise or manage social and economic impacts as a result of the project are detailed in Table 21-6. 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 21-6 Environmental management measures – socio-economics

Ref	Phase	Impact	Environmental management measure	Location
SE1	Design	Social infrastructure	Where feasible and reasonable, the extent of permanent impact on public open space areas (for example, Artarmon Park) will be minimised in further design development.	BL/GHF
SE2	Construction	Social infrastructure	Ongoing engagement will 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, child care, health and medical facilities) about the timing and duration of construction works and management of potential impacts.	BL/GHF
SE3	Pre-construction and construction	Stakeholders, community and business	Consultation for the project will be carried out in accordance with the Community Consultation Framework provided as Appendix E of the environmental impact statement.	BL/GHF
SE4	Pre-construction and construction	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 will be developed and implemented to help maximise employment benefits of the project.	BL/GHF

Ref	Phase	Impact	Environmental management measure	Location
BU1	Pre-construction and construction	Businesses	Where businesses are affected by property acquisition, or lease cessation, the acquisition and compensation process will 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> as relevant.	BL/GHF
BU2	Construction	Businesses	Specific consultation will be carried out with businesses potentially impacted during construction. Consultation will aim to identify specific potential construction impacts for individual businesses.	BL/GHF
BU3	Construction	Businesses	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 phase will be identified and implemented. A phone hotline that enables businesses to find out about the project or register any issues will be maintained.	BL/GHF

Beaches Link = BL, Gore Hill Freeway = GHF