

14 Property and land use

This chapter considers the potential land use and property implications of constructing and operating the project, proposes mitigation measures to avoid or reduce impacts and outlines how the desired performance outcomes have been met. **Table 14-1** sets out the SEARs relevant to land use and property and identifies where the requirements have been addressed in this EIS.

Table 14-1 SEARs - Property and land use

Assessment requirements	Where addressed in this 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 other major projects in the vicinity of the project) and in consultation with relevant land owners (such as those land owners whose property is being acquired or local residents who would be directly affected by road widening or loss of on street parking).	<p>An assessment of construction and operation impacts on potentially affected properties, businesses, and recreational users with regard to the below listed items is provided in section 14.4 and section 14.5 of this report:</p> <ul style="list-style-type: none"> • property acquisitions / adjustments • future land uses • relevant statutory rights. <p>Assessment of social and economic impacts is provided in Chapter 15 (Social and economic).</p>
2. The Proponent must assess impacts from construction and operation on potentially affected properties, businesses, and recreational space users, including amenity impacts (including from cumulative and extended construction time frames and construction fatigue, particularly where use of current road project construction facilities are proposed), traffic congestion, property acquisitions/ adjustments, future land uses, restricted access, parking and business disruption, relevant statutory rights, and community severance and barrier impacts resulting from the project.	<p>An assessment of construction and operation impacts on potentially affected properties, businesses, and recreational users with regard to the below listed items is provided in section 14.4 and section 14.5 of this report:</p> <ul style="list-style-type: none"> • property acquisitions / adjustments • future land uses • relevant statutory rights. <p>Assessment of amenity impacts with regard to the below listed items are provided in Chapter 8 (Traffic and transport), Chapter 15 (Social and economic) and Chapter 13 (Landscape and visual impact assessment):</p> <ul style="list-style-type: none"> • traffic congestion • restricted access • parking and business disruption • community severance • barrier impacts resulting from the project.
3. The Proponent must identify and assess the need for temporary and permanent relocation during construction of community facilities such as sports fields and playgrounds.	Section 14.4 and section 14.5
5. The Proponent must assess potential impacts on utilities directly affected by the project (including communications, electricity, gas, fuel, stormwater, potable water and sewerage) and identify management options for impacted utilities, including its relocation or adjustment.	Section 14.5.3

14.1 Assessment methodology

The assessment method used the following approach:

- Review of the existing environment with reference to existing land uses and aerial photography and a detailed site investigation (see **section 14.2**)
- Reviewing key strategic planning policies and documents relevant to the study area, to identify planned future priorities, land uses, planning controls and developments (see **section 14.3**)
- Assessing the potential impacts of construction and operation on existing and likely future land uses (see **section 14.5**), and properties in and around the project (see **section 14.4**)
- Identifying mitigation measures that would assist in reducing or avoiding land use and property impacts (see **section 14.6**).

14.2 Existing environment

The project generally traverses the south eastern Sydney suburbs of Arncliffe, Banksia, Rockdale, Kogarah and Brighton-Le-Sands, within the Bayside Local Government Area (LGA) with the permanent power supply connection also crossing through Earlwood, Wollie Creek and Bardwell Valley. Land use zonings within and in the vicinity of the project are set by the following environmental planning instruments:

- Sydney Regional Environmental Plan No.33 – Cooks Cove
- Rockdale LEP 2011 (current plan for Bayside Council).
- Canterbury LEP 2012 (current plan for Canterbury-Bankstown Council)

Under these instruments, the land within and in the vicinity of the project is zoned for a mix of infrastructure, residential, recreation, industrial, commercial and environmental uses (refer to **Figure 14-1**).

Current land uses primarily comprise road infrastructure, open space and low / medium density residential land uses.

There are two major arterial roads within the area - Princes Highway and the M5 Motorway – as well as, other main roads such as President Avenue and West Botany Street. A large area of land within and in the vicinity of the project has also been zoned for the existing F6 reserved corridor. Having been set aside for future infrastructure, this area has largely been protected from development. However, there are some small areas within the zoned area which have been developed for residential and other purposes in the interim as a result of changes in government initiatives.

The open space in the area includes the Rockdale Wetlands and Recreation Corridor (which is located partially within and adjacent to the existing F6 reserve corridor), parks and reserves adjacent to and adjoining muddy creek and the Kogarah Golf Course.

Commercial uses in the area are primarily focussed around the Princes Highway, the Grand Parade, and Rockdale Plaza. There is also an area of light industrial land located to the south of Bay Street, focussed around West Botany Street.

Although the area consists of primarily lower density housing, there are some areas that have transitioned to higher densities, particularly near Marsh Street and along the Princes Highway.

A number of health and education uses are also located along the Princes Highway, near its intersection with president Avenue. The recently constructed Cairnsfoot Special school is also located to the east of where the project would be located.

Sydney Airport is located to the east and has a significant influence on the surrounding development.

The majority of the project would be located underground within tunnels and have limited potential for impact on property and land use. Surface sites occur where works are required to build temporary construction facilities or permanent operational infrastructure.

For the purposes of assessment, the project has been divided into study areas. These study areas are outlined in **Table 14-2** and shown on **Figure 14-1**. A description of the existing environment within these study areas is provided in the following sections.

Table 14-2 Property and land use study areas

Study area	Project construction elements	Project operation elements
Marsh Street	<ul style="list-style-type: none"> • Arncliffe construction ancillary facility (C1) 	<ul style="list-style-type: none"> • Motorway Operations Complex (MOC1)
Muddy Creek recreation area	<ul style="list-style-type: none"> • Shared cycle and pedestrian pathways east construction ancillary facility (C4) • Shared cycle and pedestrian pathways west construction ancillary facility (C5) 	<ul style="list-style-type: none"> • Shared cycle and pedestrian pathways
Rockdale Roads and Maritime Depot	<ul style="list-style-type: none"> • Rockdale construction ancillary facility (C2) 	<ul style="list-style-type: none"> • Rockdale Motorway Operations Complex (north) (MOC2)
West Botany Street	<ul style="list-style-type: none"> • President Avenue construction ancillary facility (C3) 	<ul style="list-style-type: none"> • Rockdale Motorway Operations Complex (south) (MOC3)
Rockdale recreation area and President Avenue	<ul style="list-style-type: none"> • President Avenue construction ancillary facility (C3) • Construction of shared cycle and pedestrian path and on-road cycleway 	<ul style="list-style-type: none"> • President Avenue interchange • Entry and exit ramps • Shared cycle and pedestrian pathways (including President Avenue shared cycle and pedestrian bridge)
Princes Highway and President Avenue intersection	<ul style="list-style-type: none"> • President Avenue / Princes Highway intersection upgrade works 	<ul style="list-style-type: none"> • President Avenue / Princes Highway intersection upgrade
Arncliffe, Banksia and Rockdale tunnel corridor	<ul style="list-style-type: none"> • Cut and cover tunnel construction 	<ul style="list-style-type: none"> • Road tunnels
Permanent power supply corridor	<ul style="list-style-type: none"> • Permanent power supply connection construction 	<ul style="list-style-type: none"> • 33 kV permanent power supply



Figure 14-1 Land use zoning and study areas

Marsh Street

Land Use

The project in the Marsh Street study area would be located on land currently being used to construct the New M5 Motorway. Prior to commencement of the project, the construction site would be demobilised and the area prepared. The northern sector of this area adjacent to Marsh Street would be the Motorway Operations Complex (MOC1) permanent facility for both New M5 Motorway and the project.

The land north of Marsh Street consists predominately of low density residential land uses with a pocket of high density residential and commercial land uses to the north east. The low density residential area consists of a mix of one to two storey detached dwellings while the high density residential and commercial area consists of a number of hotels with ground floor retail and apartment buildings that range between five and 13 storeys.

The land to the south, east and west consists primarily of the Kogarah Golf Club including greens and a club house. The heritage listed Southern and Western Suburbs Ocean Outfall Sewer (SWSOOS) and the M5 East Motorway are also located to the south of the site, running in parallel to each other.

Purpose built breeding ponds for the Green and Gold Bell Frog are located in an area to the south west near Marsh Street and the SWSOOS (the RTA Ponds).

Planning Controls

According to the *Cooks Cove Sydney Regional Environment Plan No. 33 2004* (SREP 33), the south eastern parts of this study area (including the land that would be used for the project) is zoned a mix of ‘Trade and Technology’, ‘Special Uses’ and ‘Open Space (Investigation Area)’ (refer **Figure 14-1**). The aims of each of these zones are:

- Trade and Technology: To encourage economic activity and trade-focussed businesses as defined in the SREP
- Special Uses: To accommodate existing special uses, including the SWSOOS and M5 corridor and to provide for the development of a transport corridor
- Open Space: To provide for open space and recreational uses and environmental protection areas.

The north western parts of this study area are zoned a mix of SP2 Infrastructure, B4 Mixed Use, R4 High Density Residential, R3 Medium Density Residential and RE1 Public Recreation under the Rockdale LEP 2011 (refer to **Figure 14-2**).

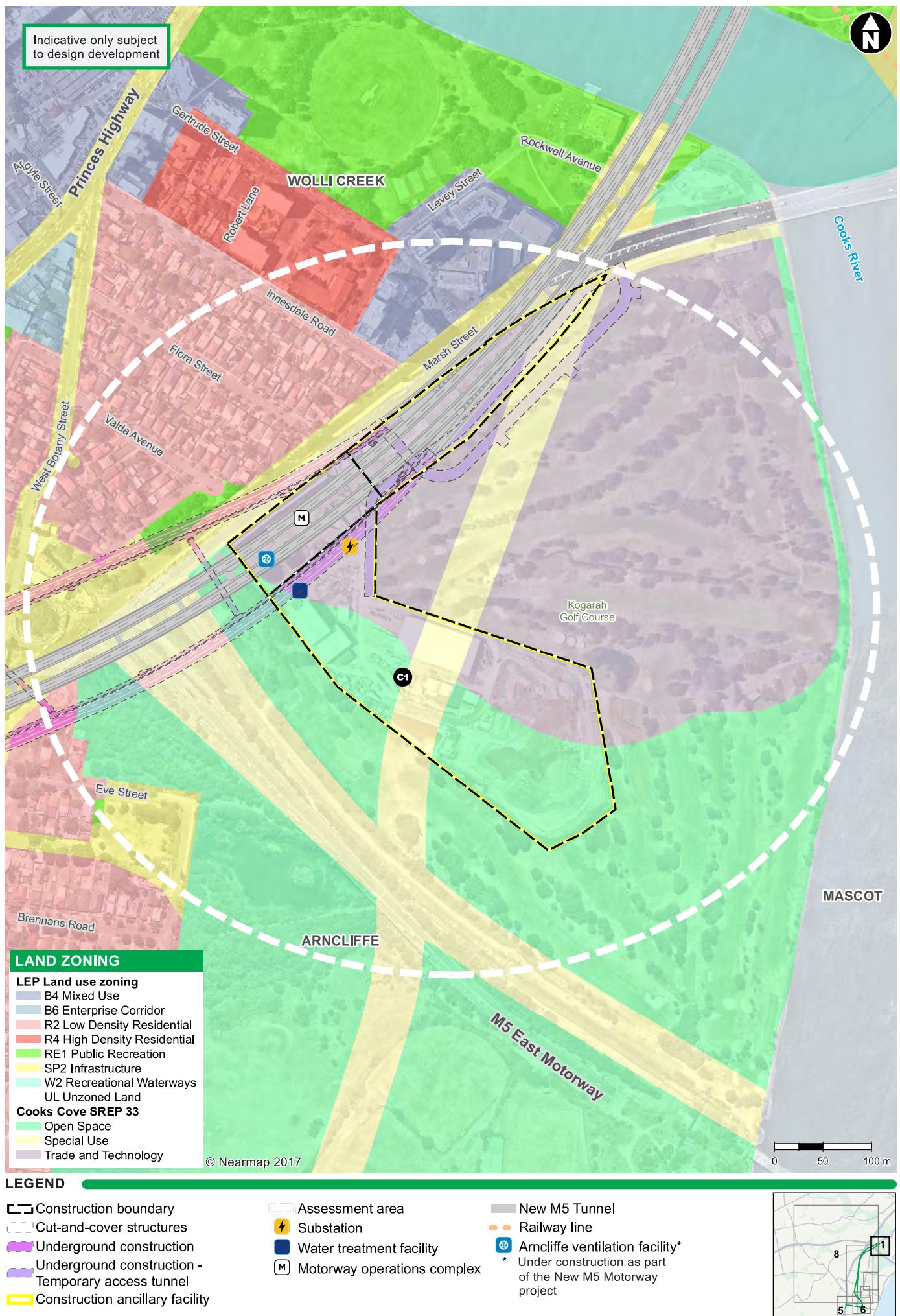


Figure 14-2 Marsh Street study area

Muddy Creek recreation area

Land Use

This study area consists primarily of open space, utilised for active and passive recreation uses. This includes White Oak Reserve, Rockdale Park, Rockdale Womens Sports Field, White Oak Creek Reserve, C.A. Redmond Field, Ador Reserve and McCarthy Reserve.

A constructed portion of the Muddy Creek canal runs north east to south west through the centre of the study area.

Low scale, detached dwellings lie to the east and south east while to the south west residential dwellings are primarily townhouses. A caravan park is located to the north west, across Muddy Creek.

An education facility (Cairnsfoot Special School) is located to the east adjoining the C.A. Redmond Field.

A cycleway is located along the eastern bank of Muddy Creek to the north of Bestic Street, connecting to the Cooks River and the Botany Bay foreshore.

Planning Controls

Within the Rockdale LEP 2011, land in this area is Infrastructure (SP2) and Public Recreation (RE1). The objectives of the SP2 Infrastructure and Public Recreation (RE1) zones are to provide for transport infrastructure and related uses and to enable land to be used for public open space or recreational purposes respectively.

Land use zones in the vicinity of the project comprise the following zones: Infrastructure (SP2), Public Recreation (RE1), Low Density Residential (R2) and Medium Density Residential (R3) (refer to **Figure 14-3**).

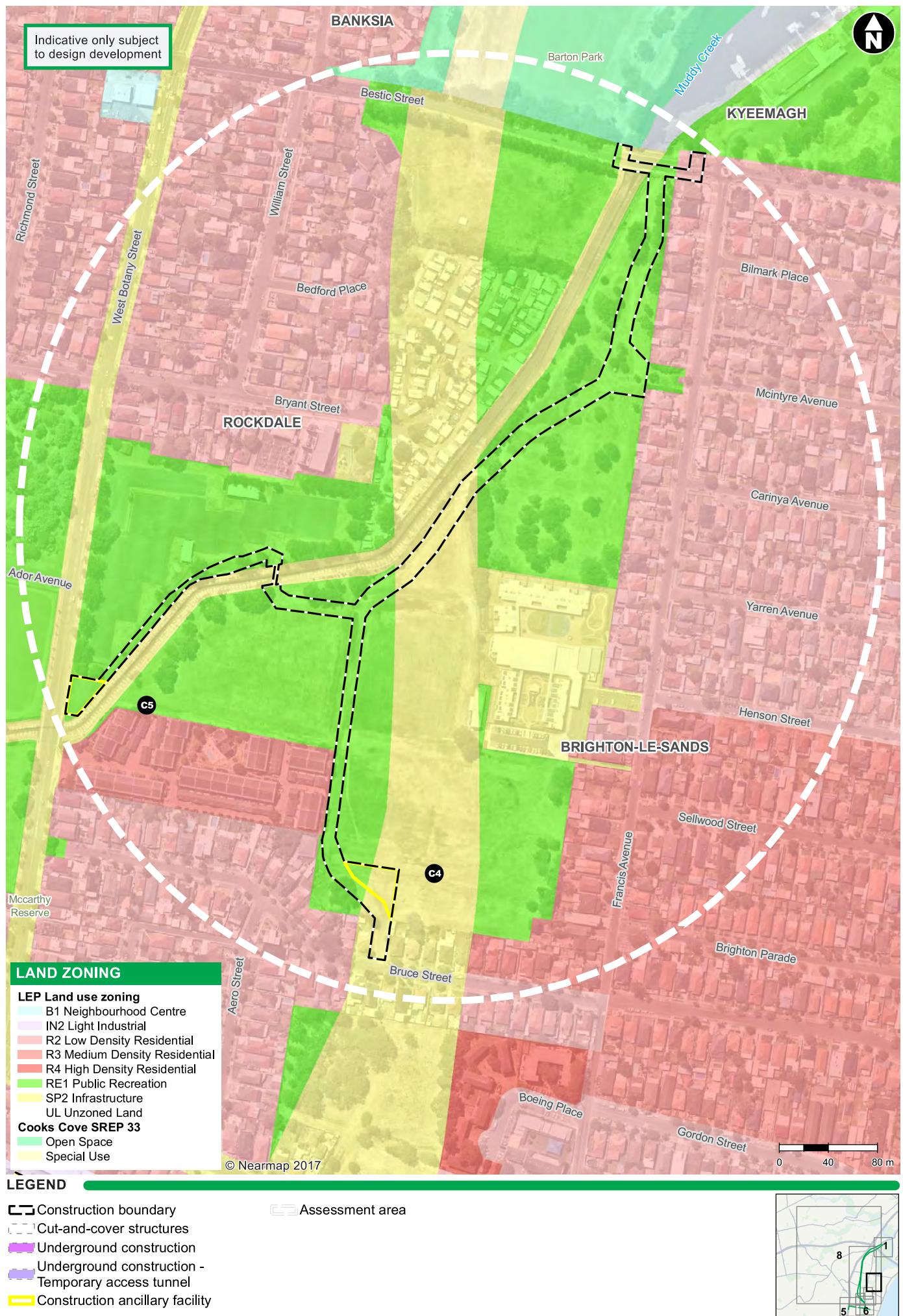


Figure 14-3 Muddy Creek recreation area study area

Rockdale Roads and Maritime Depot

Land Use

The project in this area would occupy around half of the existing Roads and Maritime maintenance depot (35,000 square metres in total). Surrounding land uses in the vicinity of the project include road infrastructure, light industrial, commercial, residential and public open space.

The commercial uses surrounding the project include a number of independent small businesses, bulky goods and other retail.

Kings Wetland (which forms part of the Rockdale Wetlands) is located to the east and consists primarily of dense vegetation with pockets of open space.

Residential land uses are located to the north and consist of low scale detached dwellings with the exception of a two storey walk up apartment building adjacent to the north west corner of the site.

Planning Controls

The land that would be used for the project is zoned Light Industrial (IN2) and Infrastructure (SP2) under Rockdale LEP 2011. The objectives of the Light Industrial (IN2) and Infrastructure (SP2) zones are to provide a wide range of light industrial, warehouse and related land uses and to provide for transport infrastructure and related uses respectively.

The land use zoning surrounding the project area comprises Infrastructure (SP2), Light Industrial (IN2), Low Density Residential (R2), Medium Density Residential (R3) and Public Recreation (RE1) (refer to **Figure 14-4**).

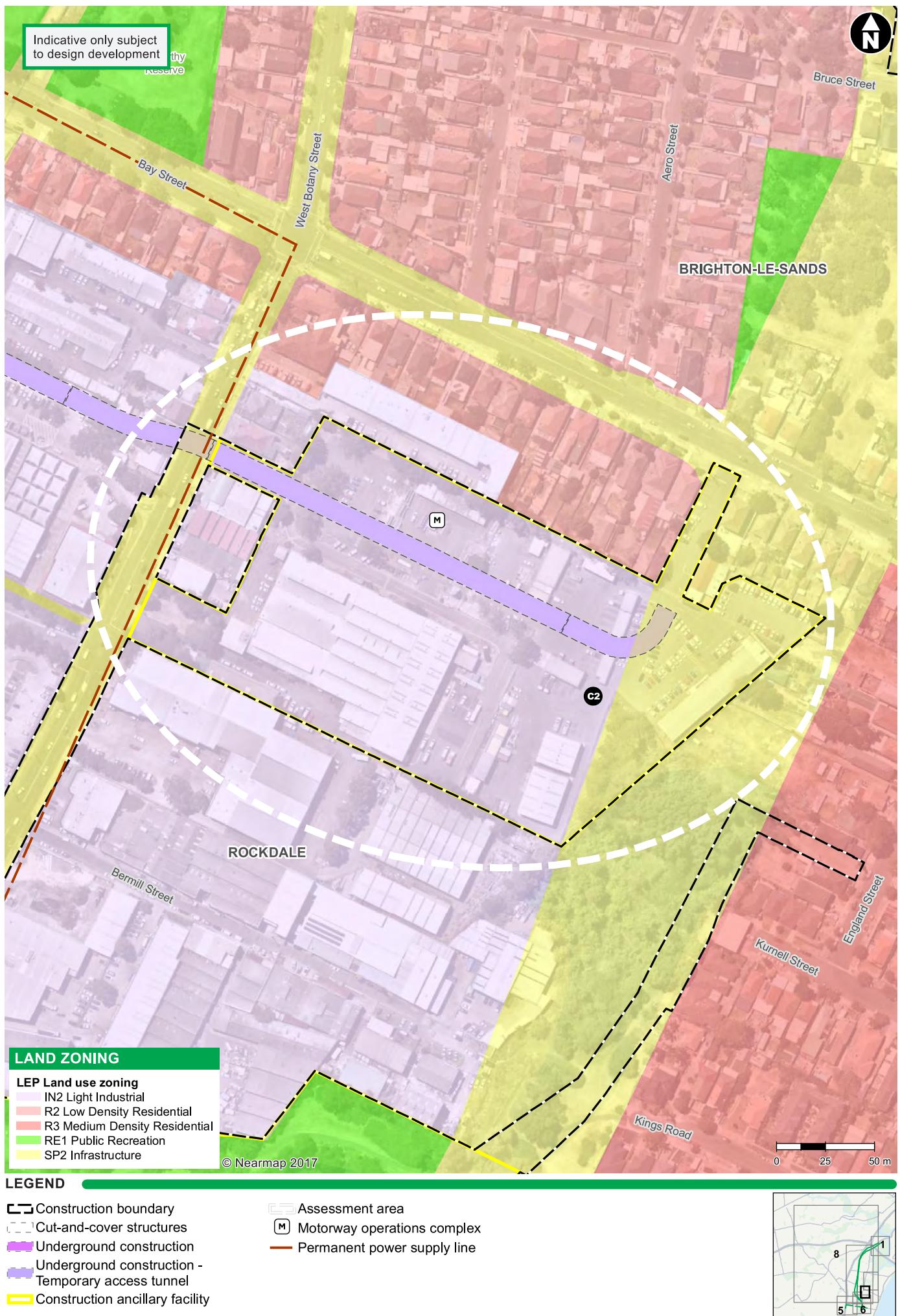


Figure 14-4 Rockdale Roads and Maritime Depot study area

West Botany Street

Land Use

The project in the West Botany Street study area would be located on land that currently comprises seven lots of commercial land use. Existing business uses include a joinery and fitout services business, a glass business and a clothing retail outlet. Two of the lots are vacant.

Land uses surrounding these seven lots include road infrastructure, light industrial and commercial. The land use on the other (eastern) side of West Botany Street is open space.

Planning Controls

The project would be located on land zoned Light Industrial (IN2) under Rockdale LEP 2011. The objective of this zone is to provide a wide range of light industrial, warehouse and related land uses.

The land use zoning surrounding this area is a mix of the following zones: Light Industrial (IN2), Infrastructure (SP2) and Public Recreation (RE1) (refer to **Figure 14-5**).

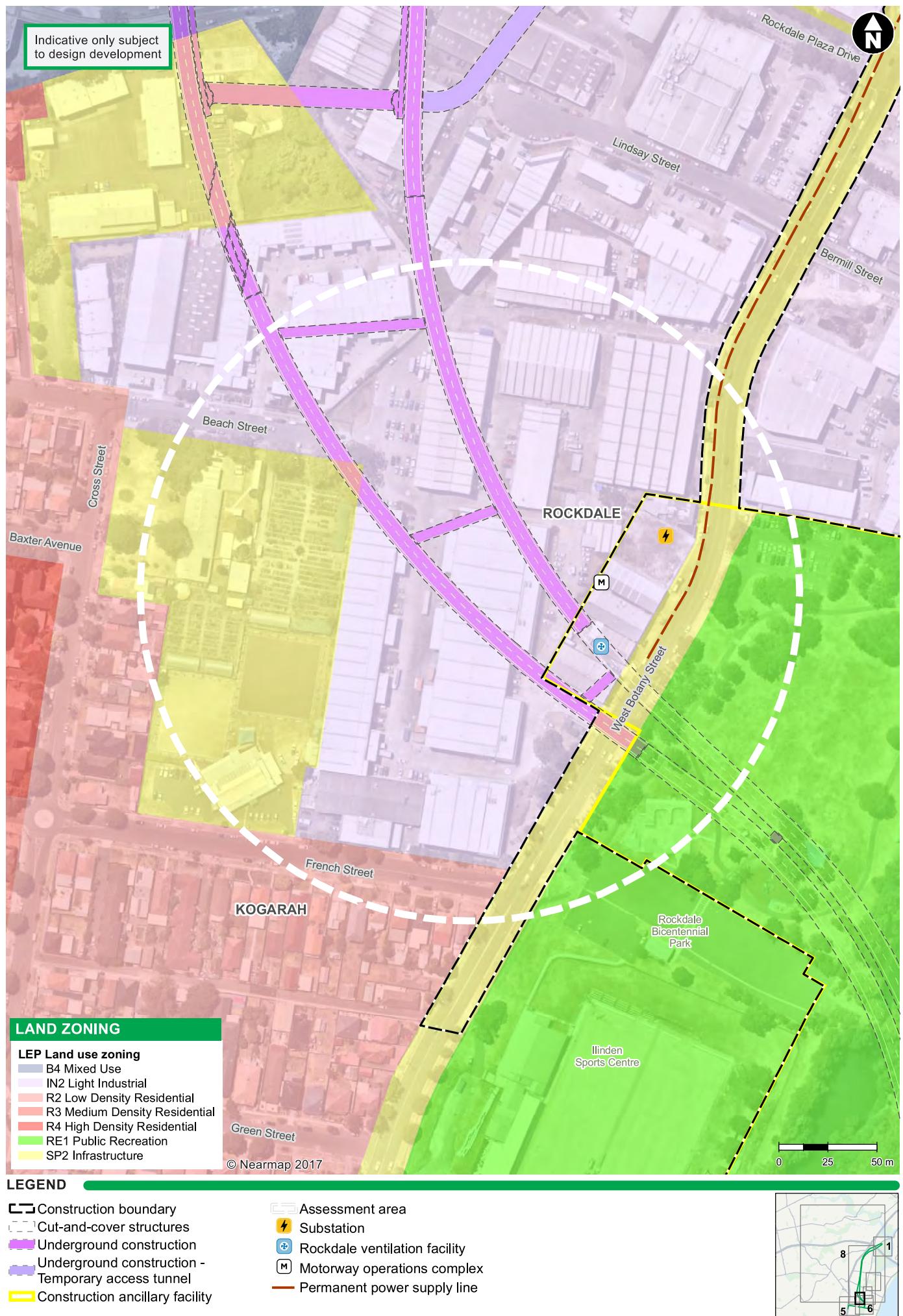


Figure 14-5 West Botany Street study area

Rockdale recreation area and President Avenue

Land Use

The project in this area would be almost wholly located within the existing F6 reserved corridor, currently designated as Rockdale Bicentennial Park situated between West Botany Street and Crawford Road and north of President Avenue.

Rockdale Bicentennial Park consists of open grassed areas, a children's play area, a skate park and the Kings Wetland area. Rockdale Bicentennial Park (East) is characterised by open parkland primarily used for sporting fields while areas of Scarborough Park (north of President Avenue) are primarily vegetated open space. Residential land uses within the existing F6 reserved corridor consist of low density detached dwellings.

Surrounding land uses include light industrial, commercial, road infrastructure, residential and open space. The surrounding open space consists of the remainder of Bicentennial Park, Memorial Fields, and Scarborough Park, Ilinden Sports Centre (adjoining the site to its west) and Civic Avenue Reserve (to the south of the site).

Residential uses in the surrounding area comprise one and two storey detached dwellings to the south, east and west of the site with some scattered townhouses.

Industrial uses adjacent to the project include a range of service and retail related commercial premises. A scout hall adjoins Rockdale Bicentennial Park to the north east, accessed via Kurnell Street.

Planning Controls

The project would be located on land zoned a mix of Infrastructure (SP2), Public Recreation (RE1), Low Density Residential (R2) and Light Industrial (IN2). The objectives of these zones are:

- Infrastructure (SP2): To provide for transport infrastructure and related uses
- Public Recreation (RE1): To enable land to be used for public open space or recreational purposes respectively
- Light Industrial (IN2): To provide a wide range of light industrial, warehouse and related land uses
- Low Density Residential (R2): To provide for the housing needs of the community within a low density residential environment as well as other land uses that provide facilities or services to meet the day to day needs of residents.

Land use zones surrounding the project are a mix of the following zones: Infrastructure (SP2), Public Recreation (RE1), Low Density Residential (R2), Medium Density Residential (R3) and Light Industrial (IN2) (refer to **Figure 14-6**).

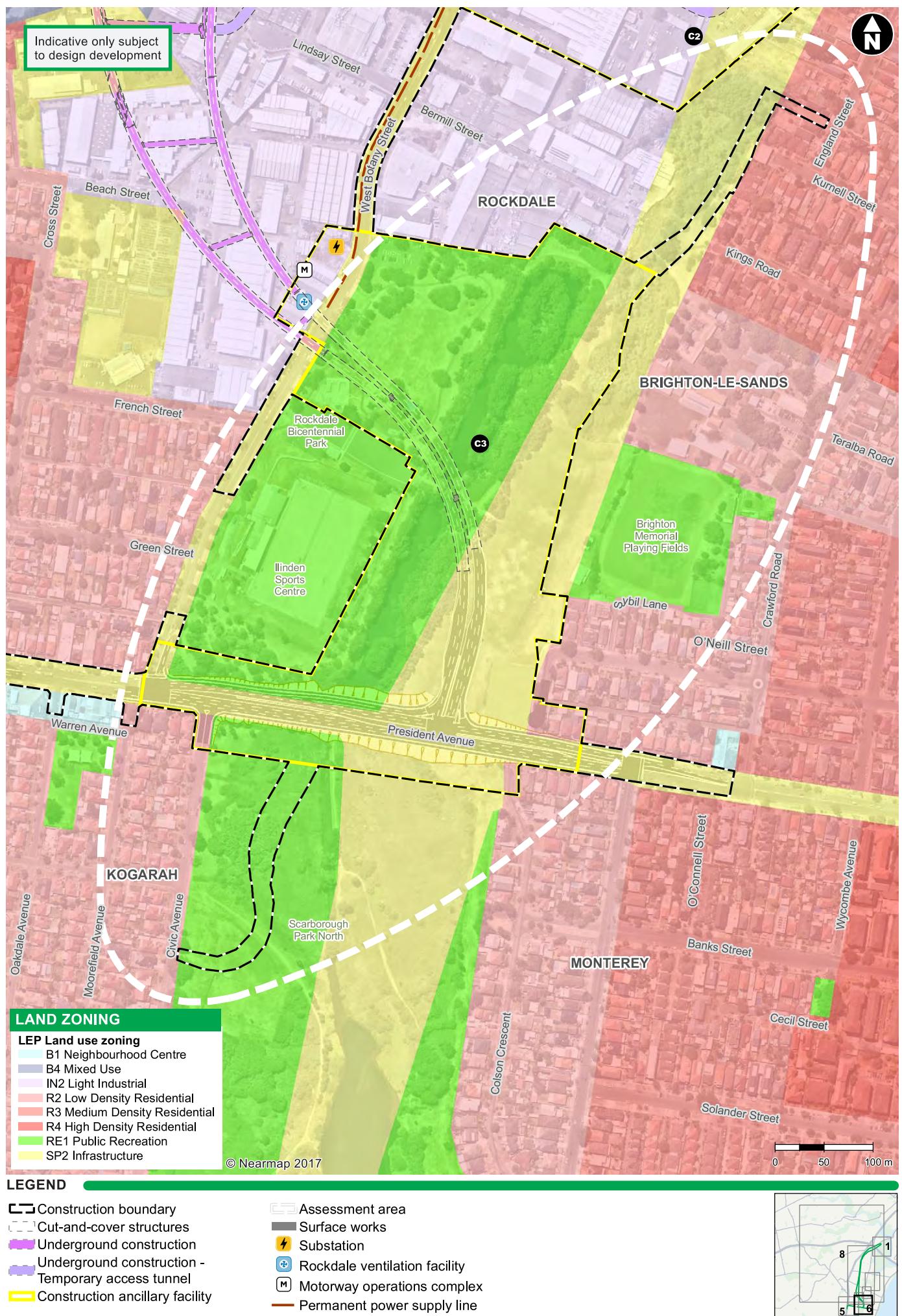


Figure 14-6 Rockdale recreation area and President Avenue study area

Princes Highway and President Avenue intersection

Land Use

This study area is located between West Botany Street and Bank Lane and primarily comprises parts of the road corridor (including verges).

The part of the study area that runs along the Princes Highway includes land between the St George Private hospital (near South Street) and Green Street. The project would be primarily located within the road corridor, although would also be located on some small areas of land to the eastern side of the Princes Highway. These land uses outside of the road corridor include three walk up apartments, the TAFE NSW St George Campus, a service station and a co-located auto service business.

Land uses in the area surrounding where the project would be located include a mix of commercial, residential, education facilities and health facilities including the TAFE NSW St George Campus, St George Private Hospital and James Cook Boys Technology High School which are located to the south of the site.

There are two commercial strips adjoining the project footprint, one fronting President Avenue and one along Princes Highway. The southern side of President Avenue, west of West Botany Street, consists of a row of commercial premises with uses that include a pet store, dentist, massage and chiropractic services, beauty services, clothing retailer, cooking school, butcher, café, bakery and veterinary hospital. A service station is also located to the west of this commercial strip. The Princes Highway, between South Street and Gladstone Street consists of an accountant firm, chocolate shop, furniture retailer, car wash and two service stations (one on each side of the road).

The surrounding residential uses comprise a mix of walk up apartments along President Avenue and to the north west of the project, larger scale apartment buildings located with frontages to Princes Highway to the west and south west of the project and low scale detached dwellings to the south of President Avenue and the project.

Planning Controls

The upgraded Princes Highway and President Avenue intersection would be located on land zoned as a mix of Infrastructure (SP2), High Density Residential (R4), Low Density Residential (R2) and Neighbourhood Centre (B1) by the Rockdale LEP 2011. The objectives of these zones are:

- Infrastructure (SP2): To provide for transport infrastructure and related uses
- High Density Residential (R4): To provide for the housing needs of the community within a high density residential environment and enable other land uses that provide facilities or services to meet the day to day needs of residents
- Low Density Residential (R2): To provide for the housing needs of the community within a low density residential environment as well as other land uses that provide facilities or services to meet the day to day needs of residents
- Neighbourhood Centre (B1): To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood.

The land use zoning surrounding the project is a mix of the following zones: Infrastructure (SP2), Neighbourhood Centre (B1), Low Density Residential (R2), High Density Residential (R4) and Mixed Use (B4) (refer to **Figure 14-7**).

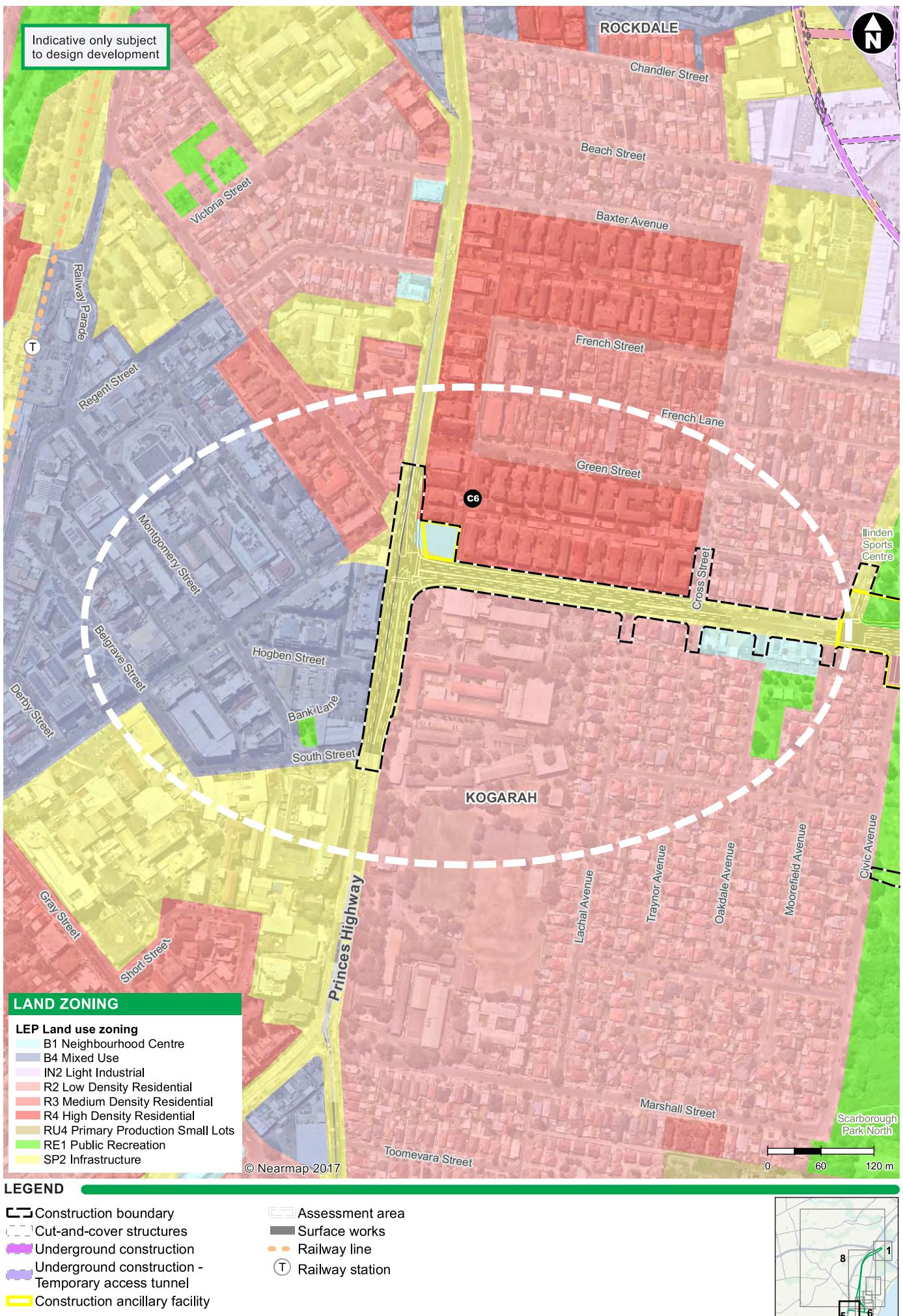


Figure 14-7 Princes Highway and President Avenue intersection study area

Arncliffe, Banksia and Rockdale tunnel corridor

Land Use

This study area comprises a corridor of land between the M5 East Motorway near Marsh Street in Arncliffe and Beach Street in Kogarah, crossing through Rockdale and Banksia.

The project in this study area would be located below land which comprises primarily low density residential uses with a pocket of industrial uses to the southern end and some pockets of open space.

Land uses in the area surrounding where the project would be located include a mix of commercial, residential and education facilities (Arncliffe Public School).

Planning Controls

The project within this study area would be located on land zoned a mix of Infrastructure (SP2), Low Density Residential (R2), Medium Density Residential (R3), High Density Residential (R4), Mixed Use (B4), Light Industrial (IN2) Public Recreation (RE1) and Private Recreation (RE2) by the Rockdale LEP 2011. The objectives of these zones are outlined following:

- Infrastructure (SP2): To provide for transport infrastructure and related uses
- High Density Residential (R4): To provide for the housing needs of the community within a high density residential environment and enable other land uses that provide facilities or services to meet the day to day needs of residents
- Medium Density Residential (R3): To provide for the housing needs of the community within a medium density residential environment and to enable other land uses that provide facilities or services to meet the day to day needs of residents
- Low Density Residential (R2): To provide for the housing needs of the community within a low density residential environment as well as other land uses that provide facilities or services to meet the day to day needs of residents
- Mixed Use (B4): To provide a mixture of compatible land uses and to integrate suitable business, office, residential, retail and other development in accessible locations so as to maximise public transport patronage and encourage walking and cycling
- Light Industrial (IN2): To provide a wide range of light industrial, warehouse and related land uses
- Public Recreation (RE1): To enable land to be used for public open space or recreational purposes respectively
- Private Recreation (RE2): To enable land to be used for private open space or recreational purposes, to provide a range of recreational settings and activities and compatible land uses and to protect and enhance the natural environment for recreational purposes.

The land use zoning surrounding the project is a mix of the following zones: Infrastructure (SP2), High Density Residential (R4), Medium Density Residential (R3), Low Density Residential (R2), Public Recreation (RE1), Private Recreation (RE2), Mixed Use (B4), Enterprise Corridor (B6), Light Industrial (IN2) (refer to **Figure 14-8**).

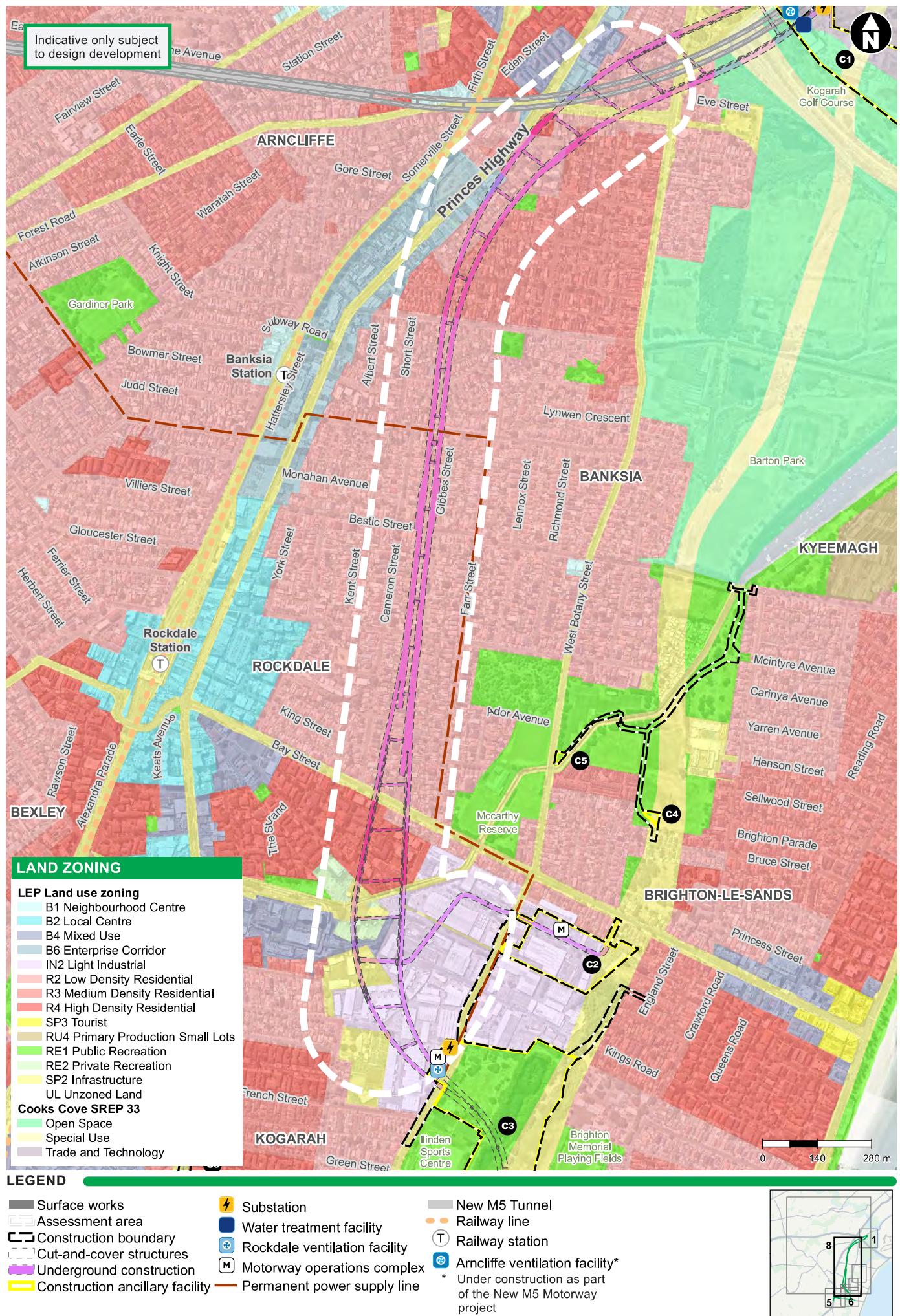


Figure 14-8 Arncliffe, Banksia and Rockdale tunnel corridor study area

Permanent power supply corridor

Land Use

This study area comprises a corridor of land between Westfield Street Earlwood and West Botany Street in Rockdale, traversing Bardwell Park, Bardwell Valley and Wollie Creek.

The project in this study area would be located primarily below land which comprises road reserve with the exception of passing across the Bardwell Valley Golf Course, along the edge of Silver Jubilee Park and under the T4 Illawarra and Eastern Suburbs Line.

Land uses in the area surrounding where the project would be located include a mix of commercial, industrial, residential and recreation.

Planning Controls

The project within this study area would be located on land zoned a mix of Infrastructure (SP2), Low Density Residential (R2), Medium Density Residential (R3), High Density Residential (R4), Neighbourhood Centre (B1), Enterprise Corridor (B6), Public Recreation (RE1) and Unzoned Land by the Rockdale LEP 2011 and Low Density Residential (R2), Local Centre (B2), Public Recreation (RE1), Infrastructure (SP2) and Unzoned Land by the Canterbury Local Environment Plan 2012. The objectives of these zones are outlined following:

- Infrastructure (SP2): To provide for transport infrastructure and related uses
- High Density Residential (R4): To provide for the housing needs of the community within a high density residential environment and enable other land uses that provide facilities or services to meet the day to day needs of residents
- Medium Density Residential (R3): To provide for the housing needs of the community within a medium density residential environment and to enable other land uses that provide facilities or services to meet the day to day needs of residents
- Low Density Residential (R2): In both the Rockdale (2011) and Canterbury (2012) LEPs, the objective of this zone is to provide for the housing needs of the community within a low density residential environment as well as other land uses that provide facilities or services to meet the day to day needs of residents
- Neighbourhood Centre (B1): To provide a range of small-scale retail, business and community uses that serve the needs of people who live or work in the surrounding neighbourhood
- Local Centre (B2): To provide a range of retail, business, entertainment and community uses that serve the needs of people who live in, work in and visit the local area, encourage employment opportunities in accessible locations, maximise public transport patronage and encourage walking and cycling and facilitate and support investment, economic growth and development for active, diverse and well-designed centres
- Enterprise Corridor (B6): To promote businesses along main roads, encourage a mix of compatible uses, provide a range of employment uses, limit retail activity and promote redevelopment that will contribute to the locality
- Public Recreation (RE1): In both the Rockdale (2011) and Canterbury (2012) LEPs, the objective of this zone is to enable land to be used for public open space or recreational purposes respectively
- Unzoned Land: The unzoned land as indicated in both the Rockdale (2011) and Canterbury (2012) LEPs, refers to the bridge that forms part of Hartill-Law Avenue above Wollie Creek. There are no objectives for this land.

The land use zoning surrounding the project is a mix of the following zones: Infrastructure (SP2), Low Density Residential (R2), Medium Density Residential (R3), High Density Residential (R4), Neighbourhood Centre (B1), Enterprise Corridor (B6), Public Recreation (RE1), Light Industrial (IN2) and Unzoned Land by the Rockdale LEP 2011 and Low Density Residential (R2), Local Centre (B2), Public Recreation (RE1), National Parks and Nature Reserves (E1), Infrastructure (SP2) and Unzoned Land by the Canterbury Local Environment Plan 2012 (refer to **Figure 14-9**).

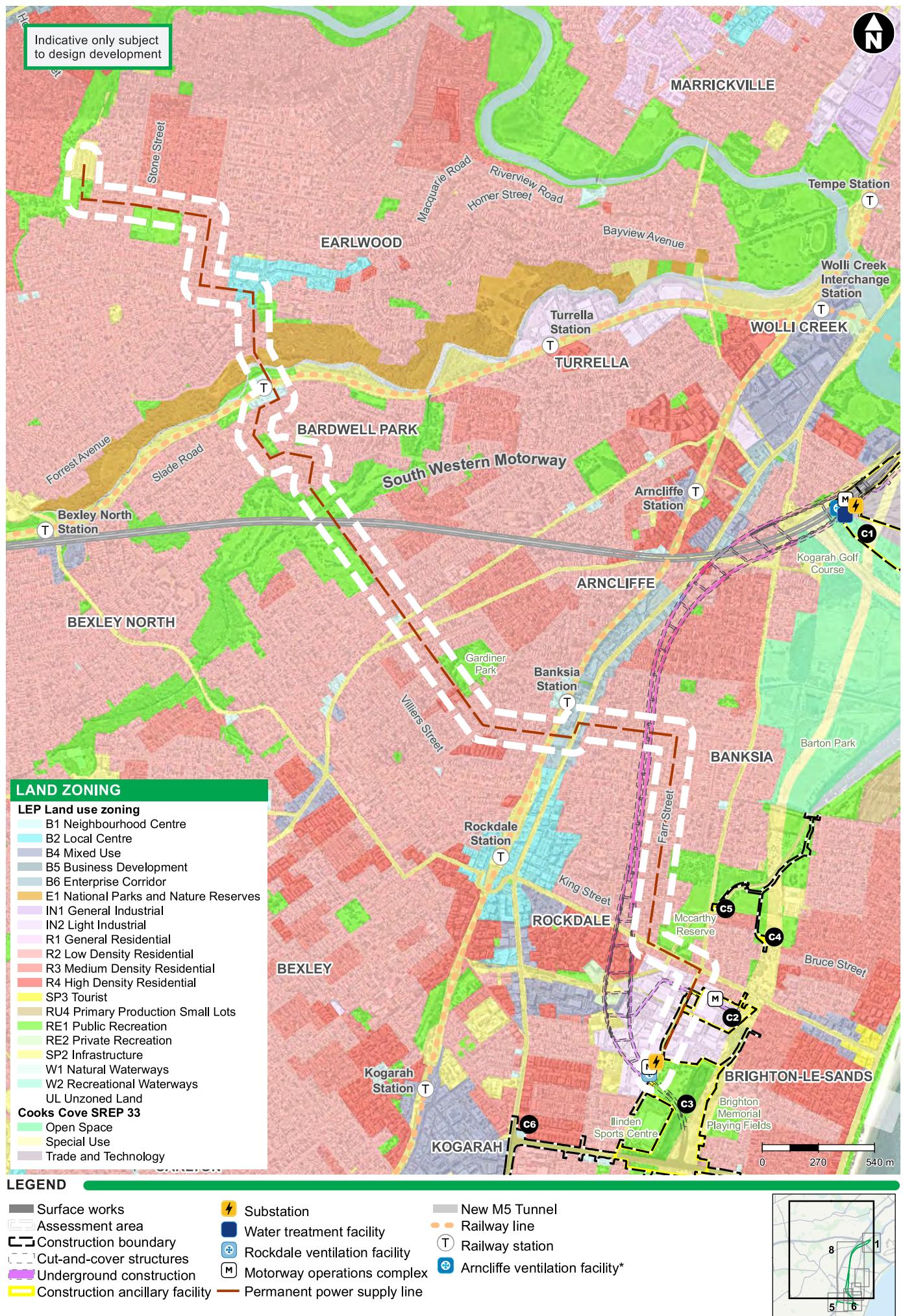


Figure 14-9 Permanent power supply corridor study area

14.3 Future land use

14.3.1 Strategic planning

Relevant strategies directing future land use planning for the study area are summarised below. These strategies are further detailed in **Chapter 4** (Strategic context and project need).

Greater Sydney Region Plan

The *Greater Sydney Region Plan*¹ sets the vision and strategy for Greater Sydney. The *Greater Sydney Region Plan* brings new thinking to land use and transport patterns with the aim of boosting Greater Sydney's liveability, productivity and sustainability.

The project is identified in the *Greater Sydney Region Plan* as a committed initiative for immediate detailed planning (subject to final business case). The *Greater Sydney Region Plan* places a strong focus on the integration of land use and transport planning with the aim of delivering benefits such as improved access to transport and services, connectivity to jobs and homes and positive health and environmental outcomes.

The *Greater Sydney Region Plan* includes a direction to deliver great places that bring people together and identifies that these are characterised by a mix of land uses in walkable, human scale, fine grain neighbourhoods. It also advocates for encouraging the substitution of walking and cycling for short car journeys through the provision of suitable pathways.

The *Greater Sydney Region Plan* also identifies an objective of ensuring industrial and urban services land is protected, particularly from encroachment of residential and other incompatible uses.

District Plans

The *Eastern City District Plan*² is a guide for implementing the *Greater Sydney Region Plan* at a District level and is a bridge between regional and local planning.

The *Eastern City District Plan* acknowledges the potential benefits of the F6 and recognises it as a committed project that is subject to a final business case (refer to **Chapter 4** (Strategic context and project need)).

The plan identifies Kogarah as a health and education precinct and a nominated Collaboration Area. The Kogarah health and education precinct crosses the boundary of the South and Eastern City districts and so the strategic direction for the precinct is detailed in the *South District Plan*³. The *South District Plan* states that collaborative planning will be used to encourage and prioritise land uses that can grow health and ancillary services and provide opportunities for new allied health and education services within the Kogarah health and education.

The *Eastern City District Plan* also identifies Brighton-Le-Sands and Rockdale as local centres. The *Eastern City District Plan* states that Councils are in the best position to investigate and confirm locations in their LGA required for additional medium-density land use opportunities and proposes the following be considered in doing so:

- Transitional areas between urban renewal precincts and existing neighbourhoods
- Residential land around local centres where links for walking and cycling help promote a healthy lifestyle in identifying for this land use
- Areas with good proximity to regional transport where more intensive urban renewal is not suitable due to challenging topography or other characteristics
- Lower density parts of suburban Greater Sydney undergoing replacement of older housing stock
- Areas with existing social housing that could benefit from urban renewal and which provide good access to transport and jobs.

¹ Greater Sydney Commission (2018) *Greater Sydney Region Plan*

² Greater Sydney Commission (2018) *Eastern City District Plan*

³ Greater Sydney Commission (2018) *South District Plan*

Bayside West Precincts 2036 – Arncliffe and Banksia

The Bayside West Precincts 2036⁴ is a strategic plan for the Arncliffe Precinct and Banksia Precinct. The plan aims to create connected town centres for Arncliffe and Banksia, better transport connections, more housing choices, a vibrant Princes Highway corridor and new areas of open space.

Of particular relevance, the strategy proposes the following in terms of future land uses for land areas that would be located within the Marsh Street study area (refer **Figure 14-10**):

- High density residential to the north of the site across Marsh Street
- Medium – low density residential development to the south of the site
- Reconfigured open space within the study area.

Sydney Green Grid

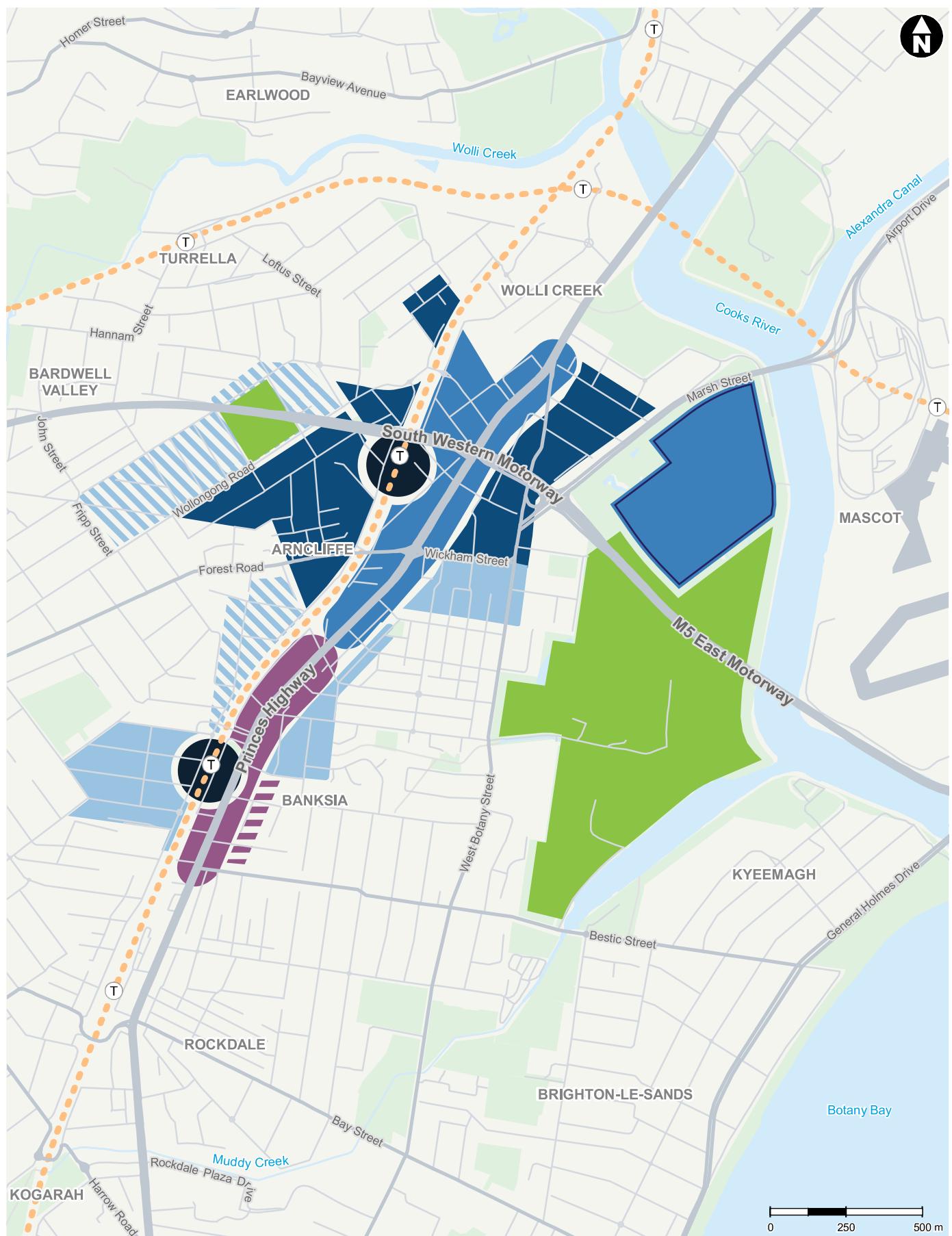
The NSW Office of the Government Architect has released a plan to seek out opportunities for a network of high-quality green space that connects town centres, public transport hubs, and major residential areas. This network is known as the Sydney Green Grid⁵.

The vision for the Sydney Green Grid is identified in the *Eastern City District Plan*, and includes the Rockdale Wetlands Open Space Corridor which runs from the Muddy Creek recreation area and Rockdale recreation area to south of President Avenue (refer **Figure 14-11**). The plan states that parts of this corridor are zoned for a future motorway, and that the motorway should be designed to retain and protect recreational open spaces and the ecological values of the corridor.

Future Transport 2056

The project is listed as a committed initiative for the next 0 – 10 years in the *Future Transport Strategy* (refer to **Chapter 4** (Strategic context and project need)), with future stages of the F6 Extension also acknowledged as a visionary motorway for investigation. Committed initiatives are for immediate detailed planning or are part of key maintenance, renewal or safety programs.

⁴ NSW Department of Planning and Environment (2018) *Bayside West Precincts 2036 – Arncliffe and Banksia*
⁵ www.governmentarchitect.nsw.gov.au/articles/2017/06/sydney-green-grid

**LEGEND**

- High density residential development
- High density mixed use development
- Medium density, low-rise residential

- Employment (priority for rezoning)
- Employment (future opportunities)
- Medium density low-rise residential (future opportunities)
- Open space to be reconfigured

- (T) Railway station
- Railway line
- Road
- Waterway
- Waterbody
- Parks and recreation

Figure 14-10 Bayside West Precincts 2036 Plan

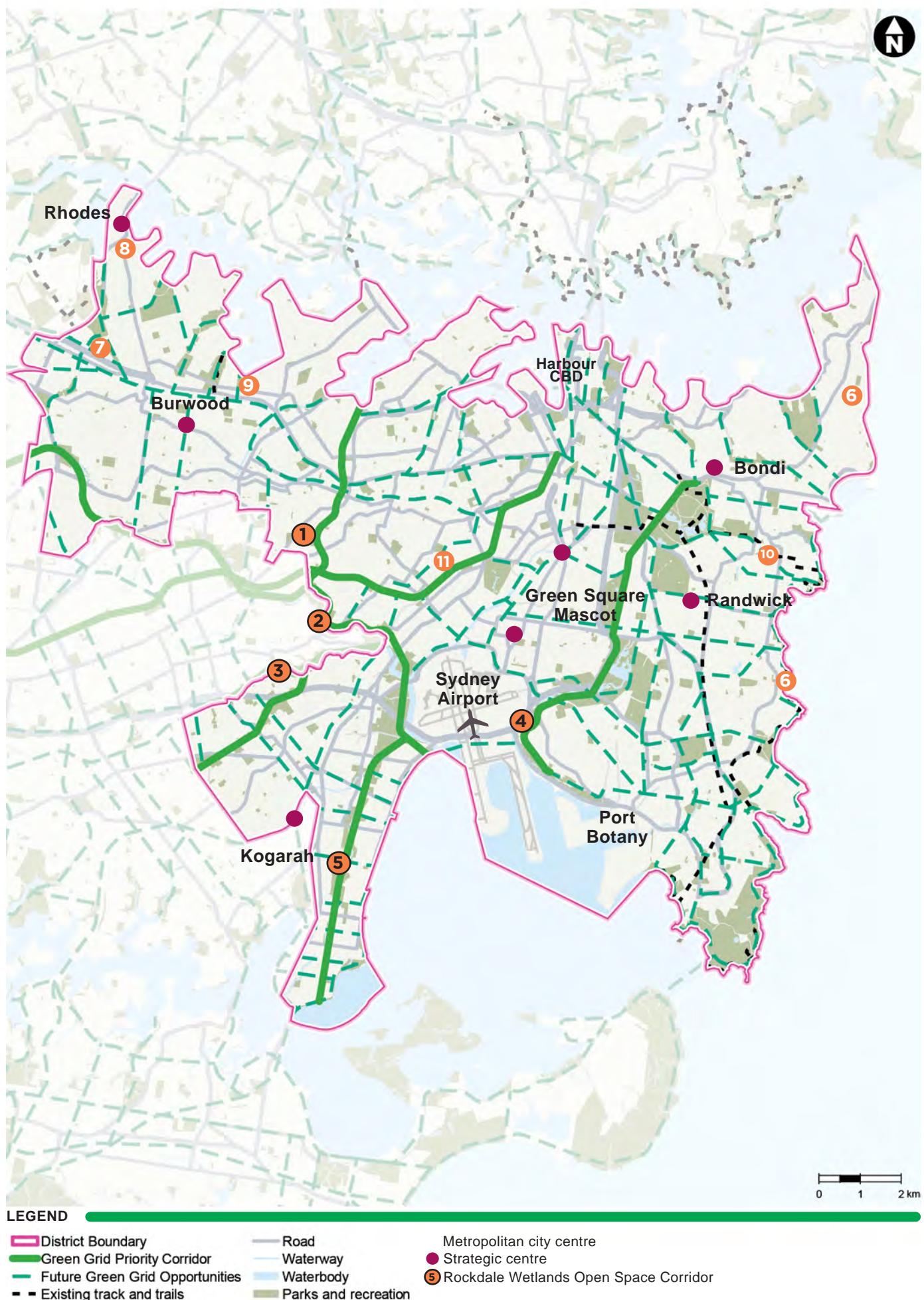


Figure 14-11 Sydney Green Grid including the Rockdale Wetlands Open Space Corridor

14.3.2 Future developments within and surrounding the project

Proposed development on land proposed to be used for the project

There are no current development proposals for land that would be used for the project. The potential development of residual land following completion of construction is considered in **section 14.4.2**.

Proposed development surrounding the project

A search of Bayside Council's development application (DA) register, the NSW major project tracking system and the Joint Regional Planning Panels development and planning register, found the following proposed development relevant to land surrounding the project (located within the study areas):

- A DA for the construction of a two storey child care centre at 47-47A Bestic Street, Rockdale, approximately 700m to the west of the shared cycle and pedestrian path at Muddy Creek. The DA comprises accommodation of 50 children, ten staff, operating 7am - 7pm Monday to Friday with basement car parking accessed from Cameron Street and demolition of existing structures was submitted to Bayside Council on 2 March 2017. This application is currently under assessment
- A DA for the construction of a seven storey mixed use development at 648-652 Princes Highway and 1-3 Ashton Street, Rockdale, approximately 600m to the west of the ventilation facilities at West Botany Street. The DA comprises 63 residential units (including 22 units as affordable housing), three commercial units, basement car parking and demolition of existing structures was lodged with Bayside Council on 14 December 2016. This application is currently under assessment
- A DA for the construction of a ten storey mixed use development at 295 Bay Street Brighton-Le Sands, approximately 300m to the east of the shared cycle and pedestrian path at Rockdale Bicentennial Park. The DA comprises a boarding house containing 79 rooms (including manager's room), two levels of basement car parking and demolition of existing structures was submitted to Bayside Council on the 2 December 2016. This application is currently under assessment.

In addition to the above major developments, the Cooks Cove precinct, within which the project at Marsh Street would be located, has a history of development proposals going back 14 years. Although there are no current development applications for the precinct, previous proposals have largely focused on its development for mixed residential and commercial uses. The most recent DA was submitted to Bayside Council and subsequently withdrawn by the proponent in 2017. This DA sought approval for development of the southern part of the precinct, (representing Stage 1 of development) for an 18-hole golf course and driving range as well as site remediation, environmental improvements and public domain enhancements⁷.

14.3.3 Existing and future use of the F6 reserved corridor

The existing F6 reserved corridor has been in place since 1951. The corridor is zoned SP2 Infrastructure (Classified Road) in the Local Environment Plan, which is a 'special purpose' zone used to provide infrastructure and related uses, and to protect land from development that is not compatible with, or that may detract from, the provision of infrastructure.

The existing F6 reserved corridor between Arncliffe and Kogarah includes land that is held privately, by local councils, Roads and Maritime and other NSW Government agencies. It is predominantly open space, parkland and public use facilities and includes residential and commercial properties. The location of the existing F6 reserved corridor is shown on **Figure 5-5**. The project is largely located subsurface and outside of the existing F6 reserved corridor for reasons outlined in **section 5.4.1**.

The future use of the existing F6 reserved corridor between Arncliffe and Kogarah that would not be required for the project is being considered by Transport for NSW. Initially a review of the corridor for possible alternative future public and active transport uses is being undertaken as part of a wider review of the integrated transport needs for the area. Future Transport 2056 released in March 2018, provides the vision for how transport can support growth and the economy of Greater Sydney and NSW over the next 40 years. The strategy identifies strategic directions and visionary initiatives, including a South East Mass Transit Link to Kogarah and Miranda. This is an initiative for long term (20+ years) investigation that would consider options using the established SP2 Infrastructure corridor.

⁷ <http://rccweb.rockdale.nsw.gov.au/EPlanning/Pages/XC.Track/SearchApplication.aspx?id=285529>

Any assessment or decision regarding the lifting of the existing corridor reservation or rezoning of this corridor, would be separate to the planning approval process for the project and be developed in collaboration with the Department of Planning and Environment and Bayside Council.

Roads and Maritime has accumulated property within Stage 1 of the existing F6 reserved corridor that is generally residential in nature and includes dwellings that have been tenanted as well as vacant residential lots. Roads and Maritime also holds some greenfield sites that are currently used as park land.

Subject to the assessment of the existing F6 reserved corridor for integrated, long term transport purposes, the NSW Government may consider these properties to be surplus to requirements and may seek to sell its interest in these properties as a consequence.

14.4 Potential impacts – property

14.4.1 Property impacts

The main property impact would be where an acquisition of the land is required either for construction and/or operation of the project or where occupation of property is required during construction only.

The majority of sites required to support construction are located within the permanent operational footprint of the project, therefore minimising the need for property acquisition and occupation. Notwithstanding, additional land would be required beyond this footprint at the northern and southern ends of the project which would result in temporary impacts on property.

Where private land required for the project is not currently owned by Roads and Maritime, discussions are being held with the affected property owners concerning the purchase, lease or licence of the land.

The project would also require Council owned land within Rockdale Bicentennial Park and the use of other Government owned lands. Roads and Maritime would enter into agreements with the relevant Government departments about the temporary or permanent use of this land. Where government owned land is required temporarily, this would generally be established through a lease or a Memorandum of Understanding. For any land owned by local or state government that would be required permanently for public purposes, Roads and Maritime would discuss and make arrangement with the relevant government owners for the transfer of this land.

In addition to the properties affected by surface activities, land (or interests in land, such as easements) below the surface of the ground would be acquired. This is called substratum acquisition and is discussed separately in **section 14.4.1**.

All acquisitions required for the project would be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the land acquisition reforms announced by the NSW Government in 2016⁸, which can be viewed online at:

<https://www.finance.nsw.gov.au/land-property/land-acquisition-reform-2016>

Roads and Maritime would appoint a Personal Manager Acquisitions to assist each of the land owners, residents and commercial tenants affected by acquisition for the project. The Personal Manager Acquisitions would be appointed at the beginning of the acquisition process and would continue to work with the land owners, residents and commercial tenants to offer them assistance and support throughout the acquisition and relocation process. Further information about this process can be found online at:

<http://www.propertyacquisition.nsw.gov.au/>

The project has limited permanent infrastructure at surface, with the majority of infrastructure comprising the underground tunnel. The property impacts are generally located around the President Avenue intersection and West Botany Street, where the tunnel surfaces.

Permanent private land acquisition for operational infrastructure would involve:

- Full acquisition of 12 privately owned properties
- Partial acquisition of three privately owned properties.

⁸ NSW Government (2016) Review of the NSW *Land Acquisition (Just Terms) Compensation Act 1991*

Private property to be permanently acquired in addition to existing Roads and Maritime owned properties are detailed in **Table 14-3** and **Table 14-4**. These properties do not include any that are already owned by the Roads and Maritime.

Table 14-3 Private property to be permanently acquired

Title	Location	Acquisition	Category	Project component
1/DP100164	427 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
2/DP100164 3/DP22338	429 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
4/DP22338	433 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
5/DP22338	435 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
6/DP22338	437 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
7/DP381773	439-441 West Botany Street, Rockdale	Full	Industrial	Rockdale (south) motorway operations complex (MOC3)
2/DP28912	136 President Avenue, Brighton-Le-Sands	Full	Residential	President Avenue intersection
164/DP4393	140 President Avenue, Brighton-Le-Sands	Full	Residential	President Avenue intersection
166/DP4393	144 President Avenue, Brighton-Le-Sands	Full	Residential	President Avenue intersection
165/DP4393	142 President Avenue, Brighton-Le-Sands	Full	Residential	President Avenue intersection
A/DP360801	15 England Street, Brighton-Le-Sands	Full	Vacant residential	Shared cycle and pedestrian pathway
/SP66921	726-728 Princes Highway, Kogarah	Partial (about three per cent)	Residential (Common property)	Princes Highway /President Avenue intersection upgrade
4/DP650223	730 Princes Highway, Kogarah	Partial (about seven per cent)	Residential	Princes Highway /President Avenue intersection upgrade
/SP9797	732 Princes Highway, Kogarah	Partial (about nine per cent)	Residential (Common property)	Princes Highway /President Avenue intersection upgrade
2/DP659367 2/DP659366 1/DP659365	734 Princes Highway, Kogarah	Full	Commercial	Princes Highway /President Avenue intersection upgrade

Table 14-4 Public property to be permanently acquired

Title	Location	Acquisition	Category	Ownership	Project component
3/DP810353	"St George TAFE" 750 Princes Highway, Kogarah	Partial strip	Education	Department of Education	Princes Highway /President Avenue upgrade
1/DP535905 74/DP746043 71/DP738382	Rockdale Bicentennial Park	Partial (about 1.1 hectares)	Park reserve / Recreation	Bayside Council	President Avenue intersection
1/DP1113262	Scarborough Park North	Partial strip	Park reserve / Recreation	Bayside Council	Shared cycle and pedestrian pathway / President Avenue intersection
14/DP213314 1/DP108492	Kogarah Golf Course, Arncliffe	Partial	Park reserve / Recreation	Bayside Council	Arncliffe motorway operations complex (MOC1)

The shared cycle and pedestrian pathways would predominately be located on local roads and park reserve owned by State or Local Governments. Roads and Maritime would enter into agreements with the relevant Government departments about the permanent use of this land. The shared cycle and pedestrian pathways would require the acquisition of one privately owned property on England Street (refer to **Table 14-3**).

Further development of the design for the shared cycle and pedestrian pathways would occur in consultation with key stakeholders. The identification of property requirements for the shared cycle and pedestrian pathways would be ongoing and is provided as indicative at this stage.

Work would be needed on the existing road network to support the project. This work would impact five properties not owned by Roads and Maritime, all of which are located on the Princes Highway, Rockdale outside of the existing F6 reserved corridor.

Table 14-3 indicates one private residential property and two parts of residential strata common property are expected to require partial acquisition. A full acquisition of one commercial property would also be required (refer to **Table 14-3**). The State Government partial acquisition relates to a partial strip of land, adjacent to President Ave and Princes Highway, which is currently occupied by the St George College TAFE (refer to **Table 14-4**).

The project would also require existing leases on five properties owned by Roads and Maritime to be extinguished for purposes of permanent infrastructure. These properties are detailed in **Table 14-5**.

Table 14-5 Roads and Maritime property with leases to be extinguished

Title	Location	Category	Ownership	Project component
6/DP28912	65 O'Neill Street, Brighton-Le-Sands	Residential	Roads and Maritime	President Avenue intersection
5/DP28912	67 O'Neill Street, Brighton-Le-Sands	Residential	Roads and Maritime	President Avenue intersection
4/DP28912	69 O'Neill Street, Brighton-Le-Sands	Residential	Roads and Maritime	President Avenue intersection
1/DP28912	134 President Avenue, Brighton-Le-Sands	Residential	Roads and Maritime	President Avenue intersection
3/DP28912	138 President Avenue, Brighton-Le-Sands	Residential	Roads and Maritime	President Avenue intersection

Temporary lease of property during construction

A number of construction ancillary facilities and work sites would be required for temporary use during construction. As a result some areas of land would need to be temporarily leased or occupied. Some of these sites would be located outside of the existing F6 reserved corridor. **Table 14-6** provides the leasing requirements for the project, which are also shown on **Figure 14-12** and **Figure 14-13**.

Table 14-6 Public property to be temporarily leased for construction

Title	Location	Category	Ownership	Leasing details ¹	Project component
14/DP213314 1/DP108492	Kogarah Golf Course	Park reserve / Recreation	Bayside Council	6 ha	Arncliffe construction ancillary facility
194/DP752056	Rockdale Bicentennial Park	Park reserve / Recreation	Bayside Council, State Government	2.2 ha	Shared cycle and pedestrian pathways
1/DP535905 74/DP746043 71/DP738382	Rockdale Bicentennial Park	Park reserve / Recreation	Bayside Council	5.4 ha	Tunnel Portal / President Avenue intersection
1/DP1113262	Scarborough Park North	Park reserve / Recreation	Bayside Council	0.5 ha	Shared cycle and pedestrian pathways / President Avenue intersection

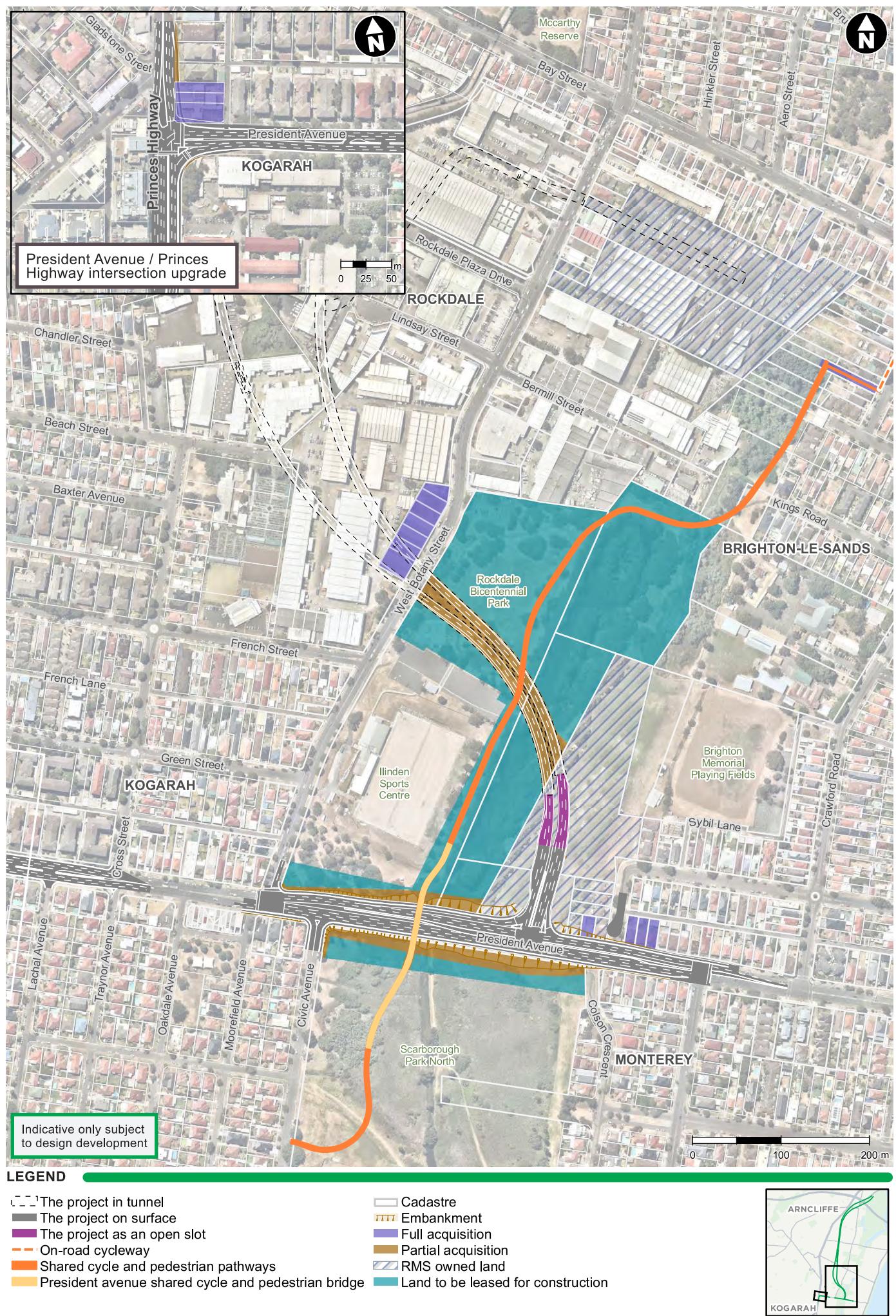
¹ These areas do not include lands to be acquired for operation of the project, that may be leased during construction and then acquired. Land to be acquired is listed in **Table 14-4**.



LEGEND

- | | | |
|------------------------------------|----------|---------------|
| The project in tunnel | Cadastre | New M5 Tunnel |
| RMS owned land | | |
| Partial acquisition | | |
| Land to be leased for construction | | |

Figure 14-12 Properties to be acquired and leased - northern area of the project



14.4.2 Residual project land

The project has been designed and developed to minimise the need to acquire privately owned property. Any private property acquisitions would largely be for permanent infrastructure. Consequently, it is expected that there would be very little, if any, reusable land to support alternative use at the completion of construction.

Residual land generated by the project would be limited to parcels of residual land at the following locations:

- 734 Princes Highway, Kogarah which includes lots 2/DP659367, 2/DP659366 and 1/DP659365
- 140 President Avenue, Brighton-Le-Sands (164/DP4393)
- 142 President Avenue, Brighton-Le-Sands (165/DP4393)
- 144 President Avenue, Brighton-Le-Sands (166/DP4393)

The locations and extent of residual project land are shown in **Figure 14-14**.

Land leased temporarily for construction of the project (e.g. for the construction within Rockdale Bicentennial Park and Kogarah Golf Course) would be returned to its former use as public space. Consequently, there would be no residual land remaining in these circumstances.

The land within Rockdale Bicentennial Park would be reinstated as open space/parkland. An indicative concept for the urban design and landscaping works at Bicentennial Park has been prepared and is included in **Appendix C** (Place making and urban design). The concept design would be refined during the development of an Urban Design and Landscape Plan and would be prepared in consultation with Bayside Council and other key stakeholders including the community.



Figure 14-14 Residual project land - southern area of the project

14.4.3 Substratum subsurface acquisition

In addition to the properties affected by surface activities, land (or interests in land, such as easements) below the surface of the ground would be acquired to accommodate the tunnels and entry and exit ramps. This is called subsurface (or substratum) acquisition and is illustrated in **Figure 14-15**.

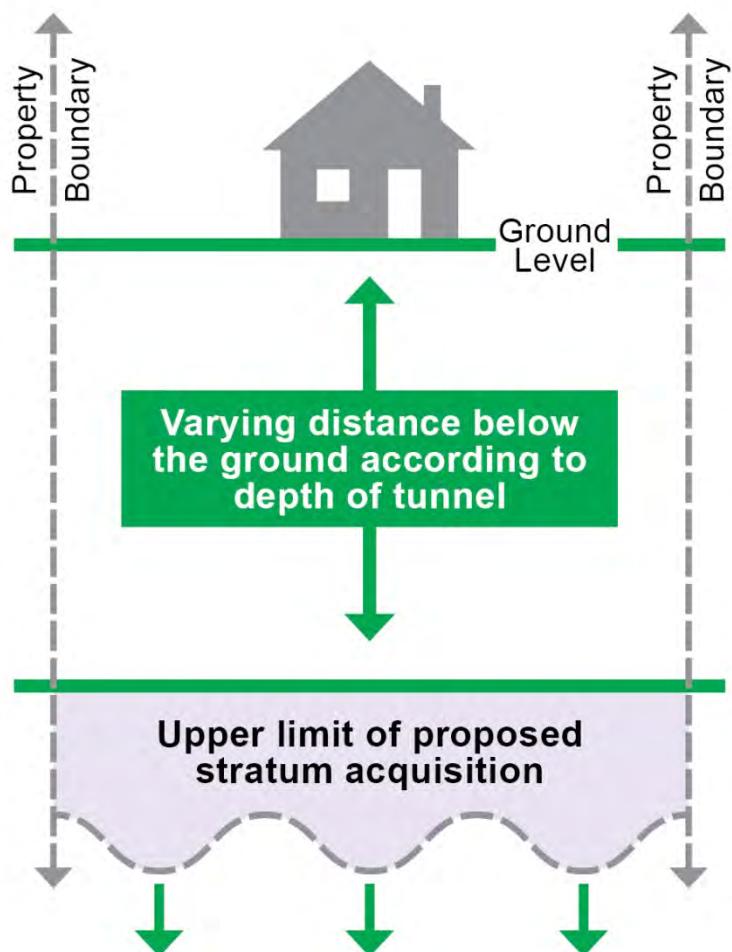


Figure 14-15 Example of substratum acquisition

The *Land Acquisition (Just Terms Compensation) Act 1991* (NSW) rules that compensation is not payable for the majority of subsurface acquisition of land or easements, unless specific circumstances as detailed in that Act apply. Appendix C of the Roads and Maritime *Land Acquisition Information Guide*⁹ sets out in detail the compensation provisions of the Act relating to subsurface acquisition and the land acquisition reforms announced by the NSW Government in 2016 can be viewed online at:

https://www.finance.nsw.gov.au/sites/default/files/NSW_Government_Response.pdf

This subsurface acquisition would be a stratum acquisition envelope around the tunnels, including any associated ground support that may be required. The introduction of the subsurface stratum, and the tunnel itself, has the potential to limit development above the alignment in some circumstances. The tunnel depth is generally shallowest at tunnel portals. Tunnel portal locations and general depths are described in **Chapter 6** (Project description).

In most cases, subsurface acquisition would not affect the continued existing, or future use of property at the surface. Subject to council regulations and approvals, landowners would generally be able to:

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

⁹ Roads and Maritime Services, 2014

Subsurface acquisition would include land both privately and publically owned, with separate processes for each as relevant. Where subsurface acquisition is confirmed during detailed design, Roads and Maritime would contact owners of directly affected properties. If private property is directly affected, Roads and Maritime has the authority to acquire the subsurface land, under the *Roads Act 1993 (NSW)*, by a compulsory acquisition process.

14.4.4 Commonwealth land

Subsurface acquisition of around 0.2 hectares of Commonwealth land would be required. The total land area is around 1.5 hectares. This land is located south of Rockdale Plaza and north of Beach Street, accessed off Chandler Street and Beach Street. The land is owned by the Department of Defence and is used for the purposes of the Kogarah Army Reserve Depot and Royal Australian Artillery Headquarters.

The project's northbound tunnel and a cross passage would be located around 25 metres below the Commonwealth land. No impacts to the property on the surface are anticipated.

14.4.5 Crown Land

Crown Land would not be impacted by the project.

14.4.6 Ground movement

Ground movement may occur in some areas along the tunnel alignment induced by tunnel excavation. A preliminary ground movement assessment was undertaken for the project to identify areas on the surface that may be subject to ground movement (refer **Chapter 17** (Ground water and geology)). The assessment was based on a 15 degree angle of draw from the outside base of the tunnels.

An assessment of the anticipated ground movement impacts to properties during construction and operation of the Project is outlined below. Further investigations to support the detailed design of the project would confirm predicted ground movements and any potential associated impacts.

It is generally accepted that the risk of damage to surface features is negligible when subjected to total settlements of less than 10 mm.

Construction

The preliminary ground movement assessment determined that the land overlying the majority of the tunnel is expected to experience between around 2 mm – 5 mm of settlement during construction (refer **Figure 17-7**). Due to the increased widths of the tunnel at locations where there are caverns (refer **Figure 17-7**), these areas may experience settlement in the range of 10 – 13mm during construction.

It is therefore anticipated that the potential impacts to properties would be negligible to minor.

Operation

Drawdown of groundwater over time during operation of the project has the potential to result in ground movement. Ground movement due to groundwater drawdown is expected to be negligible along the tunnel alignment other than at the palaeochannels in the vicinity of Spring Street, Bay Street and President Avenue. At these locations ground movements could be within the range of 2 mm to 50 mm (refer to **Chapter 17** (Groundwater and geology) for further information). It is considered that the impacts to land uses would be nil to minor. Ground settlement as a result of the project will be managed to comply with criteria outlined in **Chapter 17** (Groundwater and geology). In addition, prior to the commencement of construction, pre-construction Building Condition Surveys will be offered in writing, to the owners of properties where there is a potential for construction activities to cause cosmetic or structural damage.

14.5 Potential impacts – land use

Land use changes as a result of the project would occur largely in response to the introduction of new transport infrastructure at Arncliffe and Rockdale. As outlined in **section 14.3.2**, the project would not impact on land subject to current development applications.

The following sections summarise the potential implications of the operational infrastructure and the key aspects of construction that impact land use, such as construction ancillary facilities.

Potential indirect impacts as a result of changes to land use would predominantly relate to social and economic values. **Chapter 15** (Social and economic) provides details relating to these potential impacts.

14.5.1 Impacts to land uses

An assessment of the potential impacts of the project on land uses, both during construction and operation is provided in **Table 14-7**.

Table 14-7 Potential impacts to land use

Potential impacts construction	Potential impacts operation
Marsh Street study area	
<p>The project at the Marsh Street study area would be located on land currently used as a construction compound for the New M5 project. The New M5 construction compound would be partially demobilised before use by the project for the Arncliffe construction ancillary facility (C1). The construction ancillary facility would potentially affect the long term operation of the Kogarah golf course as it would result in requiring it to operate with nine holes for an extended period of time (the golf course is now nine holes, reduced from the 18 it was prior to the establishment of the New M5 construction compound). The land on which the tunnel site is located was previously leased by Council to the Kogarah Golf Club.</p> <p>During the period of construction, the occupied land would be unavailable for use for recreation purposes. Once project construction is completed however, the land not required for operational facilities would be returned for use by Rockdale City Council.</p> <p>Construction impacts would therefore be moderate.</p> <p>Future land use at this location would be subject to the Cooks Cove SREP. Although no development proposals have been confirmed under this planning framework, any future potential development under the Cooks Cove SREP would be restricted to areas outside the Arncliffe construction ancillary facility (C1) for the duration of construction activities.</p>	<p>The parts of the Arncliffe construction ancillary facility (C1) not required for the Arncliffe Motorway Operations Complex (MOC1) would be rehabilitated and returned for potential future development consistent with land use zoning provisions set out in the Cooks Cove SREP.</p> <p>The location of the Arncliffe Motorway Operations Complex at MOC1, particularly in combination with the facility constructed as part of the New M5 project, would influence the types of future land uses (development) within its vicinity. The ventilation facility to be operated as part of the project (refer to Chapter 9 (Air quality)) would require future surrounding development to meet height and distance (from the ventilation facility) requirements to ensure there are no air quality impacts. These requirements would be determined following detailed modelling.</p> <p>The desired potential development of the Cooks Cove precinct for high density mixed use purposes as outlined in the Bayside West Precincts 2036 Plan and indicated by the previous development proposals submitted for the site may therefore be restricted by the ventilation facility.</p> <p>The land on which the permanent facilities are located would also be prevented from being returned for recreational uses. Therefore, operational impacts are considered to be moderate.</p>

Potential impacts construction	Potential impacts operation
<p>Muddy Creek recreation study area</p> <p>The construction of a shared cycle and pedestrian pathways between Bestic Street and Bruce Street, to the east of West Botany Street would temporarily restrict use of open space/recreation land. This change in land use during construction would have a low impact on local and regional land use, as it would largely take place on the peripheral edges of the fields and reserves. The works would not dissect any of the sports fields and so would allow for their continued use during construction. The works would also be minimal in nature.</p> <p>Construction impacts would therefore be minimal.</p>	<p>Operational impacts to land use are considered to be negligible and would provide some benefits. This is because the provision of the shared pathway is compatible with, and enhances, the existing land use.</p> <p>The resulting permanent shared cycle and pedestrian pathways infrastructure would be compatible with and compliment the current land uses at the site. At operation, the project would create better connections through the surrounding open space and would be developed to align with the objectives of the Sydney Green Grid.</p> <p>The benefits provided by the shared path are consistent with the objectives set out in the Greater Sydney Region Plan with regard to encouraging the substitution of walking and cycling for short car journeys through the provision of suitable pathways.</p> <p>They would also be consistent with the objective set out for the Brighton-Le-Sands local centre in the Eastern City District Plan of improving walking and cycling connections (including through the Greater Sydney Green Grid).</p> <p>The works would therefore have a positive impact leading to improvements to land uses within and surrounding the site.</p>
<p>Roads and Maritime depot study area</p> <p>The location of the Rockdale construction ancillary facility (C2) at the Roads and Maritime depot would result in a temporary impact to land use for part of the site from a Roads and Maritime depot to construction infrastructure.</p> <p>Construction of the project would have a low impact as the Roads and Maritime depot would continue in its current use during construction, although restricted to a reduced area.</p>	<p>The parts of the site not used for Rockdale Motorway Operations Complex (north) (MOC2) would be rehabilitated and returned for continued use as the Roads and Maritime depot and would be consistent with land use zoning provisions. The Roads and Maritime depot would be restricted to a smaller area and some current activities would need to be moved to another location.</p> <p>Operational impacts are therefore considered to be moderate.</p>

Potential impacts construction	Potential impacts operation
<p>West Botany Street study area</p> <p>The construction of operational infrastructure such as the Rockdale ventilation facility at West Botany Street would result in a change of the land use from industrial to construction infrastructure and the loss of five commercial businesses.</p> <p>The impacts are therefore considered to be moderate/high.</p>	<p>The permanent location of the Rockdale Motorway Operations Complex (south) (MOC3) at this site would prevent the potential future redevelopment of this land for light industrial uses in accordance with the land zoning provisions in this area.</p> <p>The loss of this land for future development for these uses would in part not meet the objective set out in the <i>Greater Sydney Region Plan</i> to ensure industrial and urban services land is retained and managed. Although a small portion of the industrial and urban services land in Rockdale would not be retained for its current use as a result of the project, part of this objective relates to safeguarding this land from competing pressures and the encroachment of incompatible uses. The Operations complex would not be incompatible with surrounding industrial uses and would therefore meet this part of the objective.</p> <p>This change in land use from commercial to transport infrastructure would have a moderate impact on local industrial land use. However, the broader area surrounding the site (to the south, west, north and north east) along West Botany Street, contains commercial/industrial uses and proportionately the loss of these commercial premises is minor in a regional context.</p> <p>It is therefore considered that the operation impacts are moderate/high</p>

Potential impacts construction	Potential impacts operation
<p>Rockdale recreation area and President Avenue study area</p> <p>The President Avenue construction ancillary facility (C3) would result in a temporary change in land use from primarily public open space/recreation to construction infrastructure. The works would temporarily restrict access to much of the Rockdale Bicentennial Park (East) as well as the north western parts of Bicentennial Park as shown on Figure 14-6. This would require the temporary relocation of some community facilities located within these areas. This would include a skate park and children's playground which would be temporarily relocated to a nearby open space and some existing playing fields which would be temporarily relocated nearby following consultation with Council. Some of the associated playing fields could be reconfigured for use at their current location during construction depending on suitable access.</p> <p>Although the development of this construction ancillary facility would see a significant reduction in public open space/recreation land use at this location, it is considered to constitute a moderate impact, due to the fact that Roads and Maritime would work with community groups to relocate community facilities to areas within proximity. The relocation of these amenities to nearby locations would ensure the wider community would continue to benefit from their use during the construction period.</p>	<p>The permanent location of project infrastructure at this site including entry and exit ramps and other road infrastructure would result in the permanent change of land use from primarily open space to transport infrastructure. Following construction, the majority of the existing open space areas being utilised would be returned to parkland as shown on Figure 14-14. Rockdale Bicentennial Park and the associated playing fields would be reinstated with a new car park to the north, a skate park and children's playground. The playing fields on the eastern side of the Rockdale Wetlands would also be reinstated to the existing condition following construction.</p> <p>A new shared cycle and pedestrian pathways would be constructed which would include a new pedestrian bridge which would provide access to the Rockdale Wetlands. A concept design for the urban design and landscaping works associated with this land is included in Appendix C (Place making and urban design).</p> <p>The reinstatement of Rockdale Bicentennial Park would be undertaken in consultation with Bayside Council and relevant stakeholders.</p> <p>The project would also result in the permanent change of some residential land to either transport infrastructure or open space with the acquisition of properties to the south near President Avenue.</p> <p>Given the repurposing of this land would follow a considered urban design, operational impacts within this study area would be moderate-low.</p>

Potential impacts construction	Potential impacts operation
<p>Princes Highway / President Avenue intersection study area</p> <p>The introduction of temporary construction facilities at this site for the purposes of widening parts of President Avenue and the Princes Highway would result primarily in a temporary change in land use from transport infrastructure to construction infrastructure. The construction impacts are therefore considered to be low.</p>	<p>Operation of the project would in large part see the continued use of the site for transport infrastructure. The widening of the two roads would however require the permanent acquisition of three lots (currently used as a service station and auto business) and partial acquisition of three residential lots (all fronting the Princes Highway) and a partial strip of the TAFE NSW St George Campus. The project would require a small area on the western edge of each of the partially impacted lots (refer to section 14.4.1) and as the built form within each is generally setback, it would not greatly impede their continued respective uses. Much of the land within the three lots that are currently used for the purposes of a service station would become residual project land during operation. The future use of this land is yet to be determined, however it would not be precluded from similar commercial uses. It would also not prevent use of this or other land in the study area, for the purposes of growing health and ancillary services within the Kogarah health and education precinct. It is therefore considered that the land use impacts would be moderate.</p>
<p>Arncliffe, Banksia and Rockdale tunnel corridor</p> <p>Tunnel construction would take place underground and so is anticipated to have minimal impacts to land uses. There is however the potential for some impacts as a result of ground movement. It is generally accepted that the risk of damage to surface features is negligible when subjected to total settlements of less than 10 mm. The preliminary qualitative ground movement assessment (refer Chapter 17 (Ground water and geology)) has determined that the land overlying the majority of the tunnel is expected to experience between around 2 mm – 5 mm of settlement (refer Figure 17-7). Due to the increased widths of the tunnel at locations where there are caverns, these areas may experience settlement in the range of 10 – 13mm. Land uses in these areas predominately comprise residential land. The impacts of ground movement as a result of the project are therefore anticipated to range from negligible to minor.</p>	<p>As operation of the project within this study area would take place underground, impacts to land uses are anticipated to be minimal. There is however the potential for impacts to land uses above ground as a result of surface settlement due to drawdown of groundwater (refer to section 14.4.6). It is considered that the impacts to land uses would be nil to minor. Ground settlement as a result of the project will be managed to comply with criteria outlined in Chapter 17 (Groundwater and geology).</p>

Potential impacts construction	Potential impacts operation
<p>Permanent power supply corridor</p> <p>The introduction of temporary construction facilities within this study area for the purposes of constructing the permanent power supply would result in a brief temporary change in land use from primarily road infrastructure to construction infrastructure. There would also be brief, temporary interruptions to some recreation land uses at Bardwell Valley Golf Club and Silver Jubilee Park.</p> <p>The works would primarily require small amounts of localised excavation for trenching or under-boring activities. In locations where the project would be located within the road reserve, this would result in the temporary disruption of traffic (along isolated sections of road) for a period of several days to weeks.</p> <p>Where the project would traverse the Bardwell Valley Golf Club, use of some holes/sections of the course may be interrupted for a period of approximately one to two weeks (depending on the final construction method).</p> <p>Use of a small part of the north eastern edge of Silver Jubilee Park would also be interrupted for a short period of time (approximately one to two weeks) during construction. As works would take place at the edge of the park and would be minor in nature, interruptions to the general use of the park for its current purposes would be minimal and largely associated with potentially restricting access via a paved pathway at the park's entrance near Wollie Creek Road. Accessibility via this location may be interrupted for a short period of time (one to two weeks). Users requiring a paved pathway would however be able to access the park from the Alsace Avenue Entrance (approximately 200 metres to the south west).</p> <p>The permanent power supply would cross two railways. It would cross the T8 Airport and South Line in conduit across an existing bridge, and would be underbored below the T4 Illawarra and Eastern Suburbs Line. No impacts to train services are anticipated.</p> <p>Due to the temporary nature of the land use changes associated with construction of the project within this study area and the generally limited nature of the disruptions to existing land uses as outlined above, construction impacts are considered to be low.</p>	<p>The operation of the power supply would have no impacts on land uses as they would each be returned to their existing uses following completion of construction.</p> <p>The impacts from power installation are therefore considered to be nil.</p>

14.5.2 Impacts to elevated receptors

Elevated receptors include multistorey residential and commercial buildings. The project has the potential to influence development patterns for future elevated receptor locations as a consequence of operation of the project's ventilation outlets at Arncliffe and Rockdale. **Chapter 9** (Air quality) includes an assessment of potential air quality impacts for elevated receptor locations. **Chapter 10** (Health, safety and hazards) presents the calculated risks associated with the maximum predicted change in PM_{2.5} concentrations at heights of 10 metres, 20 metres, 30 and 45 metres above ground level throughout the study area in the 2036 Cumulative scenario. It should be noted that it is not necessarily the case that there are existing buildings at these heights at the residential, workplace and recreational (RWR) receptor locations, however this analysis has been included to evaluate potential future development.

All calculated risks at elevated receptor locations at 10 metres, 20 metres, 30 metres and 45 metres height are considered to be in the range of tolerable/acceptable based on the annual mean changes in PM_{2.5} concentrations.

Changes in the maximum 24-hour concentration in the vicinity of the ventilation outlets are likely to be acceptable up to a height of 30 metres. At a height of 45 metres, the largest increases in concentration are considerably higher than at ground level, but at the relevant locations there are no existing or proposed buildings above this height.

The future development of land (including re-zonings) in the vicinity of the ventilation facilities that may involve multi-storey buildings above 30 metres in height would need to consider the air dispersion performance of the ventilation facilities. Roads and Maritime would assist local councils or the DP&E in determining any relevant land use considerations applicable to future development for inclusion in LEPs or development control plans, where required. This would include procedures for identifying the width and height of buildings that are likely to be either affected by the plume from the ventilation outlet or affect the dispersion of the plume from the ventilation outlet.

A discussion of potential impacts on future development in the vicinity of the ventilation facilities as related to elevated receptors is provided in **Table 14-8**

Table 14-8 Potential impacts on future development

Rockdale ventilation facility	Arncliffe ventilation facility
<p>Development patterns and height restrictions for developments in this area are regulated under the Rockdale LEP 2011. Land in the immediate vicinity of the Rockdale ventilation facility is zoned industrial with a building height limit of 14.5 metres. The low density zoned residential land which surrounds the industrial zoned land has a building height limit of 8.5m. At this height there would be minimal influence from the ventilation outlets and the local air quality is influenced by emissions from the surface road which diminishes at heights towards 10m.</p> <p>A high density residential zoned area with a building height provision of 14.5 metres is located approximately 250 metres to the west of the ventilation facility. Another high density zoned residential area with a building height limit of 31 metres is located approximately 280 metres to the sites north east. As noted above, the health risks would be in the tolerable/acceptable range.</p>	<p>Development patterns and height restrictions for developments in this area are regulated under the Rockdale LEP 2011 and SREP 33. The areas to the site's immediate north and north east are zoned for low density residential development and have maximum building heights of 8.5 metres. At this height there is minimal influence from the ventilation outlets and the local air quality is influenced by emissions from the surface road which diminishes at heights towards 10m. However, the Bayside West Precincts 2036 Plan (2018) identifies a large portion of this area of land for future high density residential development (priority area for rezoning). Any future planning controls for this area would need to be developed (based on detailed modelling) to ensure air quality and health risks to elevated receptors are in the tolerable/acceptable range or better..</p> <p>Further north towards Cahill Park, building heights are significantly higher and range between 17.5 metres and 29.5 metres in the high density residential zoned area and 46m in the mixed use zoned areas. This area is located approximately 260m away (at its closest point) and again the air quality and health risks are considered to be in the acceptable/tolerable range.</p> <p>There are no current building height controls for the land to the south/south east of the site under SREP 33. However the Bayside West Precincts 2036 Plan (2018) also identifies the surrounding land in this area for high density mixed use development (priority area for rezoning). Any future planning controls for this area would need to be developed (based on detailed modelling) to ensure impacts on the elevated receptors are in the tolerable/acceptable range.</p>

14.5.3 Impacts to utilities

As detailed in **Chapter 7** (Construction), it is likely that utilities and services located within or close to the project, including electricity, gas, telecommunications (including optic fibre cables), and sewer and water mains, would need to be protected, relocated or realigned as part of construction of the project. This is particularly the case around areas of surface or shallow soil disturbance.

A preliminary assessment of impacts to major utilities identified the following key areas of interest:

- Surface works along President Avenue (and network integration works at the intersection of President Avenue and Princes Highway)
- Extension of cut and cover structure over West Botany Street

The potential land use impacts in these identified areas of interest are outlined in the following section.

Power supply during construction of the project would be provided by temporary substations located at C1 and C2.

Surface works along President Avenue

It is proposed that all existing services located in both of the verges and the roadway of President Avenue be relocated into a new services corridor immediately south of the President Avenue works, within Scarborough Park. This new service easement would not preclude Council use of the land, however it would preclude planting of trees and any sort of building development above it. Given the current use of the land as open space, utility related land use impacts at this location are considered to be low.

Should a new services corridor at this location not be acceptable, then all services currently within President Avenue (in both verges and the roadway) would be relocated to the new President Avenue verges and roadway, which would have a negligible impact on land use.

The widening for an additional right turn lane into President Avenue from Princes Highway as part of the project would impact a pad mounted substation located along the Princes Highway within the St George TAFE campus. It is proposed that this substation be relocated outside of the roadworks in consultation with the TAFE. Land use impacts at this location are considered to be moderate.

West Botany Street

A number of trunk utilities are located within West Botany Street. This includes an Ausgrid 33kV feeder running through the southbound lane, and a 350 mm secondary gas main in the footpath that continues on to President Avenue. The proposed utility treatment strategy at this location is to protect both of these assets during construction.

A 300 CI sewer running approximately along the back of the seven properties being considered for acquisition is also impacted. It is proposed that this sewer be avoided during the design and construction of the ancillary facilities. If required, the sewer can be relocated locally to the back of the property boundary.

Impacts at this location of the project are therefore considered to be negligible.

14.6 Management of impacts

Environmental management measures relating to land use and property are outlined in **Table 14-9**.

Table 14-9 Environmental management measures – land use and property

Impact	Reference	Environmental management measure				Timing
Acquisition of property required for the project	PL1	Prior to the commencement of works, a toll-free Acquisition Assistance Line is to be established and maintained for a period of up to six months following completion of the final acquisition for the project. The Acquisition Assistance Line is to provide ongoing dispute resolution, a counselling program and contact information for relevant services for relocated persons.				Prior to construction
Creation of residual land	PL2	Residual land remaining following construction of the project would be confirmed to identify appropriate land use, taking into consideration the location, land use characteristics, area and adjacent land uses.				Construction
Ground settlement	PL3	Ground settlement at buildings, roads, parking areas and parks as a result of the project will be managed to comply with the following criteria unless more stringent criteria are subsequently determined by the project:				Detailed design Construction
		Surface and sub-surface structures	Maximum settlement	Maximum angular distortion	Limiting tensile strain* (percent)	
		Buildings – Low or non-sensitive properties (i.e. \leq up to 2 levels and carparks)	30 mm	1 in 350	0.1	
		Buildings – High or sensitive properties (i.e. \geq 3 levels and heritage items)	20 mm	1 in 500	0.1	
		Roads and parking areas	40 mm	1 in 250	N/A	
		Parks	50 mm	1 in 250	N/A	
		* As defined in Burland et al. 'Building response to tunnelling – Case Studies from construction of the Jubilee Link Extension', London, Thomas Telford (2001).				
	PL4	Prior to the commencement of construction, pre-construction Building Condition Surveys will be offered in writing, to the owners of properties where there is a potential for construction activities to cause cosmetic or structural damage. If accepted, a comprehensive written and photographic condition report would be produced by an appropriate professional prior to relevant works commencing.				Prior to construction
Utility impacts	PL5	Interface agreements will be entered into with relevant owners of infrastructure and utility services likely to be impacted by construction of the project. The agreements will likely identify: <ul style="list-style-type: none"> • Minimum separation distances and appropriate settlement criteria for utility infrastructure • Settlement monitoring requirements during construction • Contingency actions in the event that settlement limits are exceeded. 				Prior to construction

Impact	Reference	Environmental management measure	Timing
Impacts to the Bardwell Valley Golf Club	PL6	Work with the Bardwell Valley Golf Club to determine staging of construction works and construction method to minimise impact on the activities and operation of the Golf Club.	Construction

14.7 Environmental risk analysis

An environmental risk analysis was undertaken for property and land use and is provided in **Table 14-10** below.

A level of assessment was undertaken commensurate with the potential degree of impact the project may have on that issue. This included an assessment of whether the identified impacts could be avoided or minimised (for example, through design amendments). Where impacts could not be avoided, environmental management measures have been recommended to manage impacts to acceptable levels.

The residual risk is the risk of the environmental impact after the proposed mitigation measures have been implemented. The methodology used for the environmental risk analysis is outlined in **Appendix O** (Methodologies).

Table 14-10 Environmental risk analysis – Property and land use

Summary of impact	Construction/operation	Management and mitigation reference	Likelihood	Consequence	Residual risk
Acquisition of private property for the project.	Construction	PL1	Likely	Moderate	Low
Residual land	Construction	PL2	Certain	Moderate	Low
Change in land use at Rockdale Bicentennial Park and Memorial Fields from public recreation to transport infrastructure	Operation	PL1	Certain	Minor	Medium
Ground movement resulting in damage to buildings, structures or utility infrastructure	Construction and Operation	PL4, PL5	Unlikely	High	Low
Impacts to utilities	Prior to Construction	PL6	Likely	Moderate	Low
Disruption to use of Bardwell Valley Golf Club	Construction	PL7	Certain	Moderate	Low

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