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To inform the Land Use and Infrastructure Strategy an assessment of opportunities for change, key constraints to development and urban design analysis has been undertaken across the precincts. The key environmental and social matters that have been considered in forming the land use plan are shown below (Figure 8).

5.1 Providing Homes

A *Plan for Growing Sydney* establishes the NSW Government's vision for Sydney's future, which is a 'strong global city, a great place to live'. One of the biggest challenges in achieving this aim is

how to provide for the 726,000 new homes and new jobs needed for the predicted 2.7 million additional residents by 2036.

A *Plan for Growing Sydney* prioritises locating homes close to workplaces, shops, services and transport. This was also requested in the feedback received through community consultation undertaken during the early stages of planning for this Strategy. The results of the community consultation along with good urban design have been used to determine locations within the growth area that could accommodate higher residential densities through urban renewal.

FIGURE 8: OPPORTUNITIES AND CONSTRAINTS



The potential locations identified for an increase residential densities include the following:

- Accommodating residential development within the Princes Highway corridor and at the Arncliffe and Banksia town centres in the form of shop top housing.
- Accommodating higher density residential development adjoining areas already developed for high density development to create an appropriate transition in built form and character. This includes the northern parts of the Arncliffe precinct adjoining the Wolli Creek and Bonar Street precincts.
- Areas to the south of the Princes Highway which are relatively free of airport height and noise restrictions.
- Existing low density areas within Arncliffe and Banksia which are within walking distance to the railway stations and town centres.
- Allowing for medium density, low rise residential development adjoining existing areas of low density to ensure an appropriate transition in height and built form.

5.2 Providing Employment

Employment generating land uses located within the precincts are predominantly retail and light industrial. These uses include car dealers, vehicle repair outlets and bulky goods retailers along the Princes Highway Corridor, convenience and specialty food retailers around the train stations and small local shops in a few locations close to Arncliffe Park.

An analysis of the employment structure within the precincts demonstrates that retail trade is one of the largest employers with the construction and health care industries becoming of increasing importance. Despite the importance of motor vehicle retailing in contributing to overall employment (23.1% in 2011), clothing footwear and personal accessory retailing also comprises a large proportion of the total retail trade employment (30.5% in 2011). The growing importance of the construction industry (14.5% in 2011) has been attributed to high levels of construction in the area.

Whilst there was an increase in jobs in the retail sector from 2006 to 2011, this was primarily in bulky goods retailing (e.g. furniture, floor coverings, and houseware and textile goods). Motor vehicle retailing contracted in employment (reduction in 30 jobs).

Growth in bulky goods retailing is usually the result of increases in population and availability of large sites to accommodate showrooms and clustering of outlets. The increase in residential population anticipated in the precincts and the availability of large development sites may see this trend continue but will also generate demand for other local goods and services such as a supermarket. Improvements to local retail, including cafes, restaurants, and local shops, were highlighted in the community survey as important for enhancing the area.

Whilst employment in motor vehicle retailing has declined, economic and feasibility analysis undertaken by AEC Group (2015) suggests there will be some continued market demand for retailing of imported vehicles and parts.

Revitalising the Princes Highway

Currently land use controls (i.e. B6 Enterprise Corridor zone) along the Princes Highway corridor allow vehicle sale premises and neighbourhood shops, however prohibit most other retail premises. It also prohibits all forms of residential development.

There is therefore opportunity to enhance the range of employment opportunities available to the new and existing population through changes to the land use zones. A change to the land use zones would allow the market to respond to the changing demands of an increasing residential population and an increasing importance of other industries such as the service industry, retail and bulky goods. It will also improve opportunities for people to work close to where they live and close to public transport. The Strategy identifies that a greater mix of land uses, including residential could be appropriate within in the Arncliffe section of the Princes Highway.

In line with this change, the Strategy also acknowledges it is important to ensure that current employment opportunities provided along the corridor are not compromised. Vehicle showrooms with a retail component will continue to play an important role in servicing the growth area as well as the surrounding areas.

It is therefore recommended that the focus of the employment area is retained through the Banksia section of the highway. Overall, changes to the land use zones should ensure employment floor space through the corridor is not lost.

Airport associated employment land uses

The close proximity of Sydney Airport presents opportunities to locate supporting and associated land uses within the precincts. This could include airport logistic and freight industries but also other associated industries such as housing and services to support airport workers and short-term accommodation and services for visitors.

The area of Cooks Cove zoned in SREP 33 for trade and technology purposes seeks to capitalise on the close proximity of this area to Sydney Airport. It is noted that since the date of the commencement of SREP 33, development under this zoning has not occurred and requires reconsideration.

Further assessment of the Cooks Cove Precinct should take the proximity of the airport into consideration when determining the appropriate mix of land uses. Consideration of improving the connection between Cooks Cove and the airport for pedestrians and cyclists is also required.

5.3 Aircraft Noise and Airspace Requirements

The proximity of Sydney Airport means development within the precincts is also subject to additional constraints relating to aircraft noise and air space restrictions on building heights.

Noise

Aircraft and operational noise levels from Sydney Airport have been mapped across the growth areas. The southern portion of the Cooks Cove Precinct and the south eastern corners of the Arncliffe and Banksia Precincts are located within the 25 to 30+ ANEF (Australian Noise Exposure Forecast) contour. This means these areas are impacted by aircraft and operational noise from Sydney Airport and are not suitable for residential development.

Portions of the growth areas are located within the 20 to 35+ ANEF contour. Residential development is able to locate within this area but it is subject to additional design and construction requirements in the Rockdale Local Environment Plan 2011 to meet suitable indoor noise levels.

Airspace requirements

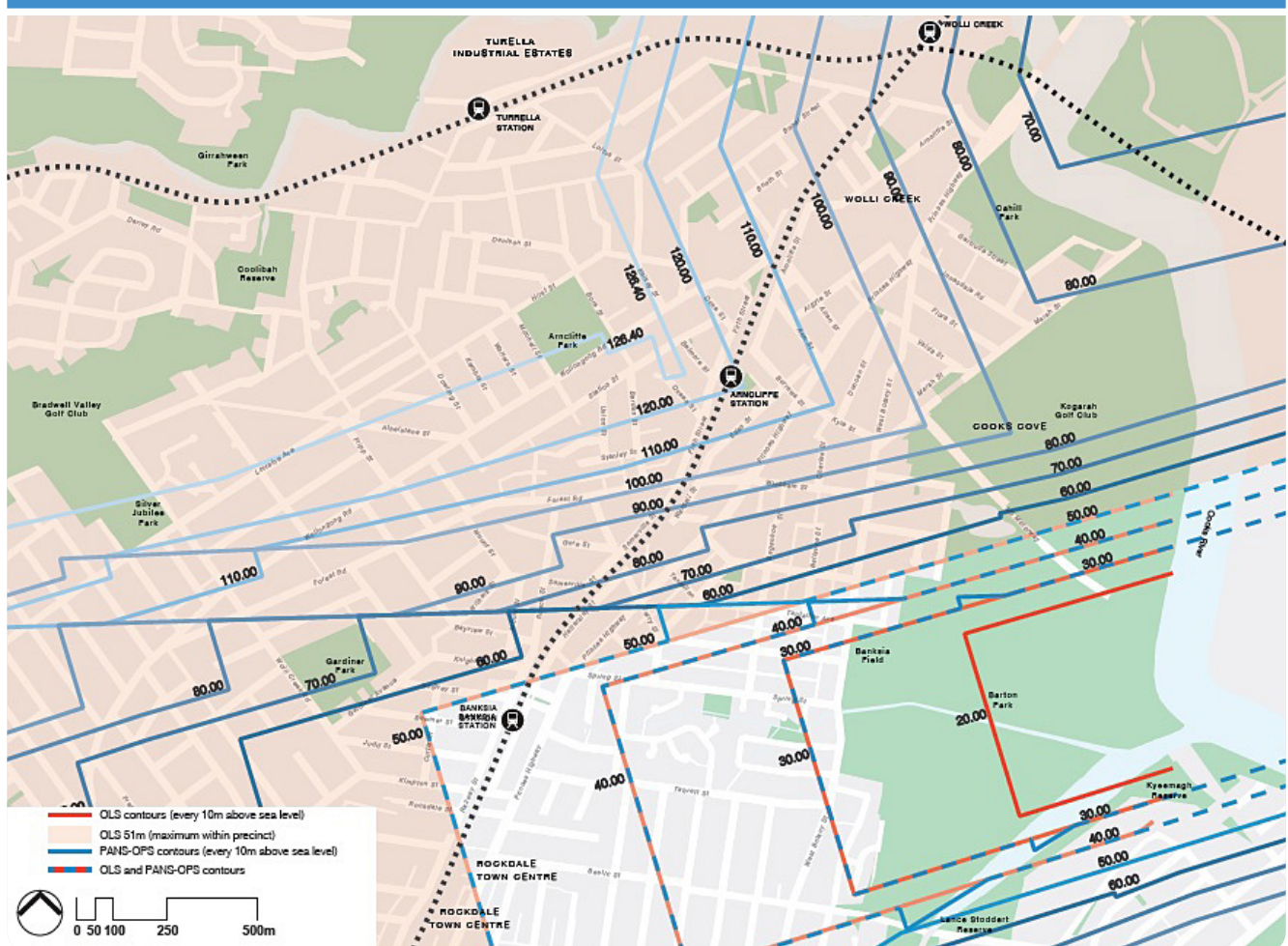
There are two air space controls which extend over the growth area. This includes the:

- Obstacle Limitation Surface (OLS) – defining the airspace in proximity to the airport which should be kept free of obstacles that may cause danger during visual operations. The intention of this surface is not to prohibit obstacles but to ensure they are examined for impact on aircraft operations.
- PANS-OPS surface – is the upper height limit which should be kept free of obstacles at all times.

The majority of the growth area is affected by the OLS. To ensure that development does not impact on the operation of Sydney Airport, new development proposing to exceed OLS require approval from Sydney Airport. This is to ensure that they will not impact the safe operation of the airport.

The PANS-OPS surface varies across the growth area from 60m AHD (around West Botany Street) to 126.4m AHD (around Arncliffe Park), or around 20m above ground level (West Botany Street) to around 112m above ground level (near Arncliffe Park). All proposed

FIGURE 9: AIRSPACE CONTROLS OVER THE PRECINCTS



5.4 The Road Network

The precincts are traversed by a number of State Roads, including the Princes Highway and the M5 Motorway. Also there are a number of key regional connectors, including Marsh Street, Forest/Wickham Road and West Botany Street.

Capacity of the road network

Strategic traffic and transport studies undertaken for the growth area (AECOM 2015 and 2016b) indicate that the current road network is already at capacity in several key locations. The key pinch points are shown in Figure 10.

The existing capacity constraints on the road network will be improved by upgrades to the local and regional road network, outlined in Section 7. However, growth in this area is reliant on upgrades to the State road network such as the WestConnex South Link motorway project.

WestConnex

WestConnex is a 33 kilometre motorway that is intended to link Sydney's west with the Sydney Airport and Port Botany. Stage 1 of WestConnex (the M4 Widening and M4 East) is currently under construction and Stage 2, the New M5, was given planning Approval in late 2015.

The New M5 is anticipated to reduce traffic flows on the existing M5, which will likely have traffic operation benefits at the currently congested M5 interchange at Marsh Street

The construction and future operation of WestConnex will affect a portion of the Cooks Cove precinct. During construction a construction compound will be located near the junction of the Hume Highway and Marsh Street. Once operational (expected

in mid-2019) a motorway operations complex will remain and include a ventilation facility and water treatment plant.

WestConnex South Link and the F6

A potential southern connection from Arncliffe to President Avenue Kogarah via the F6 Corridor is currently being investigated by the NSW Government, and would connect the new M5 to the southern suburbs of Sydney and the Illawarra. The WestConnex South Link and the F6 would further benefit traffic conditions in the Bayside West Precincts, reducing through-traffic in area along key corridors including the Princes Highway.

5.5 Public Transport

The precincts have good access to public transport infrastructure including the T4 Illawarra Railway Line, the T2 Airport Railway Line and several existing bus routes.

Whilst the growth area has good overall access to existing public transport services, there is currently limited capacity in these services.

Capacity of the rail network

The majority of the Arncliffe and Banksia Precincts are within a 10 minute walk (800m) to the Arncliffe or Banksia Railway Stations. Wolli Creek is the closest railway station to the northern portion of the Cooks Cove Precinct (approximately a 10 minute walk).

The Arncliffe, Banksia and Wolli Creek Railway Stations are located on the T4 Illawarra Railway Line. Wolli Creek is also located on the T2 Airport Railway Line. They are located approximately six to eight kilometres south-west of Central Station. The services operating through these stations provide public transport access to the CBD

FIGURE 10: ROUTE UNDER INVESTIGATION FOR POTENTIAL F6 AND WESTCONNEX SOUTH LINK



Source: RMS 2016

(via Central, Town Hall and Martin Place Stations), Bondi Junction to the north, as well as centres to the south, such as Rockdale, Kogarah, Hurstville and Cronulla.

A high level assessment of the existing projected passenger demand on the T4 Illawarra Railway Line and the T2 Airport Railway Line (AECOM 2016) concludes that without additional passenger capacity enhancements to the rail, it is expected that acceptable load limits will be reached before the year 2036. This strategy identifies that a review of current services, operating procedures and potential upgrades to the existing rail infrastructure is a key requirement to support the growth in this area.

Capacity of the bus network

A number of bus services currently run through the Arncliffe and Banksia Precincts. The bus routes do not currently service the Cooks Cove area. East of the railway line is serviced by buses connecting to Central Sydney, Bondi Junction, and Randwick (routes 442, 400 and 410). West of the railway line is serviced by a local bus service which meanders through the residential areas (route 473).

Sydney's Bus Future is the NSW strategic plan for bus services. It proposes a core bus network, which has a new suburban route from Bondi Junction to Miranda via Sydney Airport and Eastgardens. This service would help meet higher customer demand along the Princes Highway, providing high frequency

services and improved accessibility from Arncliffe and Banksia to the Airport, Eastgardens and Randwick areas.

5.6 Pedestrian and Cycling

Pedestrian connections

Pedestrian connections between major destinations within the precincts are currently limited due to topography and barriers created by the rail and road corridors. The rail corridor forms a barrier to east-west pedestrian movement. Pedestrian crossings are limited to the footbridge from Forest Road to Arncliffe Railway Station and through the underpass at Wollongong Road.

A new pedestrian tunnel is currently being constructed adjacent to the Wollongong Road Underpass to provide a safer path for pedestrians away from traffic.

The Princes Highway corridor and Marsh Street also form a barrier to east-west pedestrian movement. There are limited crossing points on both Princes Highway and Marsh Street and traffic signals are set at large cycle times during peak periods and prioritise north-south traffic movements. This makes the route from Cooks Cove to the railway stations at Wolli Creek and Arncliffe difficult for pedestrians.

There are two walking 'connecting trails' identified by the former Rockdale City Council within area. The first connects the Cook Park Trail to Bardwell Park via Arncliffe. The second route

FIGURE 11: ROAD NETWORK



is between Riverine Park and Bardwell Park via Banksia. These routes are informal and for the purposes of leisure walking, as such, they are somewhat circuitous.

Cycle routes

Dedicated cyclist facilities within the area include a mix of on and off road facilities. Cycle routes tend to radiate from Wolli Creek with few east west connections. The Cooks Cove Precinct forms an important link in the Botany Bay to Homebush Bay regional cycle network. On road facilities are provided along the western side of the rail corridor. The route includes parts of Arncliffe Street, Firth Street, Somerville Street, Gore Street, Roach Street and Railway Street.

While a level of north-south connectivity is provided at the train stations, there is limited east-west connectivity. It is difficult for cyclists to move in an east-west direction across the railway line and the Cooks River.

As part of the works being undertaken by RMS to widen RMS a new cycleway is being provided on the southern side of Marsh Street to connect to the existing cycle path on the Giovanni Brunetti Bridge. This will improve connectivity for cyclists across Cooks River.

5.7 Open space

A range of private and public open space is located within the precincts and surrounding area. This includes significant existing public recreation areas within the Cooks Cove Precinct, including Barton Park, Banksia Field, Riverine Park and Lance Studdert Reserve.

Other public recreation areas located in the surrounding areas include Cahill Park immediately to the north, Kyeemagh Reserve, Rockdale Park, McCarthy Reserve, Redmond Field, Muddy Creek and White Oak Reserves immediately to the south around Muddy Creek.

There are limited local parks provided directly within the Arncliffe and Banksia Precincts. Open space within Arncliffe and Banksia includes smaller local parks including Arncliffe and Gardiner Parks.

Opportunities exist to improve connections to these existing open space areas and upgrade the quality of the facilities provided.

Barton Park and the playing fields in the Southern portion of Cooks Cove have been subjected to a number of potentially contaminating activities in the past. Including land filling. Remediation of these areas would improve the quality of the open space.

FIGURE 12: EXISTING OPEN SPACE AND SOCIAL INFRASTRUCTURE



5.8 Existing social infrastructure

The precincts have a good supply of social infrastructure. The area is well served by regional health, tertiary education, cultural and emergency services, at Kogarah and by district level services in Rockdale.

This includes St Georges Hospital, the Kogarah Ambulance Station, the Kogarah Police Station and the St George campus of the Sydney Institute of TAFE. Other district level services are provided in Rockdale, including the recently refurbished Rockdale central library and town hall.

At the local level, Arncliffe contains a good range of community facilities which support both Arncliffe and Banksia residents. The Arncliffe town centre contains a branch library on Firth Street, a council community centre and a YMCA centre. However these facilities are older style and generally located on small constrained sites.

The precincts are currently serviced by a number of schools including:

- Arncliffe Public School (primary), located within the Arncliffe precinct
- Francis Xavier's Catholic Primary School located, within the Arncliffe Precinct
- Kyeemagh infants School, located south of Cooks Cove
- Arncliffe West Infants School, located approximately 1 kilometre northwest of Arncliffe
- Cairnsfoot Special School, located approximately 1 kilometre northwest of Arncliffe.
- Athelstand Public school (primary) located along Wollongong Road, west of Arncliffe

The Department of Education will look at expanding the capacity of public schools, as required, as part of the their annual monitoring and planning process. A funded School Asset Strategic Plan will be prepared to meet the needs resulting from the Strategy.

FIGURE 13: FLOODING



5.9 Flooding

The Arncliffe and Banksia Precincts straddle a ridge line that slopes down towards Cooks Cove and the Cooks River. The top of the ridge generally follows Forest Road with the lower, flatter areas located to the east of the rail corridor.

As Arncliffe and Banksia are existing urban areas, the majority of the stormwater flows are managed through the existing drainage infrastructure. However, a review of relevant flood studies demonstrates both of these areas are still subject to some areas flooding following significant rainfall events and require upgrades to the existing drainage infrastructure.

In major storm events (the 1% Annual Exceedance Probability (AEP) flood), localised flooding occurs generally to the north of Wollongong Road (Dowling Street through Arncliffe Park to Bonar Street), at the Railway underpass (intersection of Wollongong Road and Allen Street), along Firth Street adjoining the Illawarra Rail Line and east from Gardiner Park to Godfrey Street.

Generally, flooding in these areas is below 100mm and is therefore categorised as a low hazard. In some locations, in particular on Walters Street and Kembla Street southwest of Arncliffe Park and land around the rail underpass, flood depths are greater than 1m and therefore have a medium to high flood hazard.

Flooding is more of a significant constraint in the Cooks Cove Precinct. The majority of the precinct north of the existing M5 East is currently affected by the 1% Annual AEP flood event with flood depths between 0.5 to 2m.

A review of preliminary flood studies and a high level study drawing on the most recently developed flood model for the lower Cooks River was carried out for the purposes of this Strategy (AECOM 2016a). The study found a developable footprint could be accommodated within Cooks Cove in a way that elevates proposed new habitable space above the relevant Flood Planning Level with only minor increases in off-site peak flood levels for events up to the 1% Annual Exceedance Probability flood. Further studies will be required to confirm these findings as the planning for this area progresses.

5.10 Views

The significant ground level changes across the precincts and in the surrounding area result in views towards a number of areas being achieved from the highest points. Views towards the Sydney CBD can be achieved from the northern and eastern parts of the Arncliffe and Banksia precincts and towards the Cooks River and Botany Bay from the Forest Road ridgeline.

The Rockdale Development Control Plan 2011 (Rockdale DCP) identifies the importance of maintaining and enhancing views to significant landmarks which include the Cooks River area. It also specifically identifies the views of the St Francis Xavier's Church and St David's Church spires on Forest Road as key landmarks which should be considered in site planning.

FIGURE 14: PHOTOS OF KEY VIEWS



5.11 Vegetation and Ecology

Due to the urban nature of the Arncliffe and Banksia Precincts, vegetation in these areas is mostly located within existing public open space and private properties. It includes remnants of the original vegetation communities (Swamp Oak Floodplain Forest and Sandstone Woodland) alongside introduced native and exotic tree species. There is very limited tree planting along the Princes Highway corridor.

The Cooks Cove Precinct includes areas of significant vegetation, endangered species, and critical habitat, including:

- Part of the Rockdale Wetlands Corridor running from the Cooks River through to Sans Souci. The wetlands, located in the southern portion of the Cooks Cove Precinct, contain threatened estuarine and freshwater vegetation and coastal saltmarsh and provide a known habitat for the threatened Green and Golden Bell Frog (Rockdale Biodiversity Strategy, 2010).
- The Green and Golden Bell Frog has been detected within the Cooks Cove Precinct and is listed under the *Threatened Species Conservation Act 1995*.
- There are two constructed frog habitat ponds located adjacent to the south western corner of Cooks Cove, adjacent to Marsh Street.

FIGURE 15: PHOTOS OF HERITAGE ITEMS



Arncliffe Railway Station



Chinese Market Garden Arncliffe



SWSOOS Arncliffe

5.12 Heritage

There are three State heritage items located within precincts. These include:

- The Southern and Western Suburbs Ocean Outfall (SWSOOS) – an original section of one of Sydney's oldest main sewers, built in the 1890s to end the discharge of sewage into Sydney Harbour.
- The Arncliffe Railway Station - one of three remaining stations with 1880s 'second class' brick platform buildings on the Illawarra Rail Line.
- The Chinese market garden – a commercial garden which played a pivotal role in the late 19th and early to mid-20th century providing the majority of Sydney's fresh fruit and vegetables.

5.13 Contamination

Historical uses within the growth area have led to a number of areas of potential contamination.

For the Arncliffe and Banksia precincts, this includes vehicle sales and maintenance operations along the Princes Highway and metal fabrication and associated manufacturing operations. A review of previous contamination assessments indicates that with appropriate remediation, areas within Arncliffe and Banksia can safely accommodate residential land uses (JBS&G, 2015).

For Cooks Cove, areas of contamination have resulted from past filling operations, a former land fill and the operation of the market garden. In the northern part of the precinct, contamination hot spot are identified within the Kogarah Golf Course car park.

A review of a previous remediation action plan for Cooks Cove was undertaken by CES in 2013 concluded that the northern part of the precinct can be made suitable for mixed use development, including residential, subject to preparation and implementation of a revised ESA and Remediation Action Plan, and a subsequent Site Management Plan for acid sulfate soils.

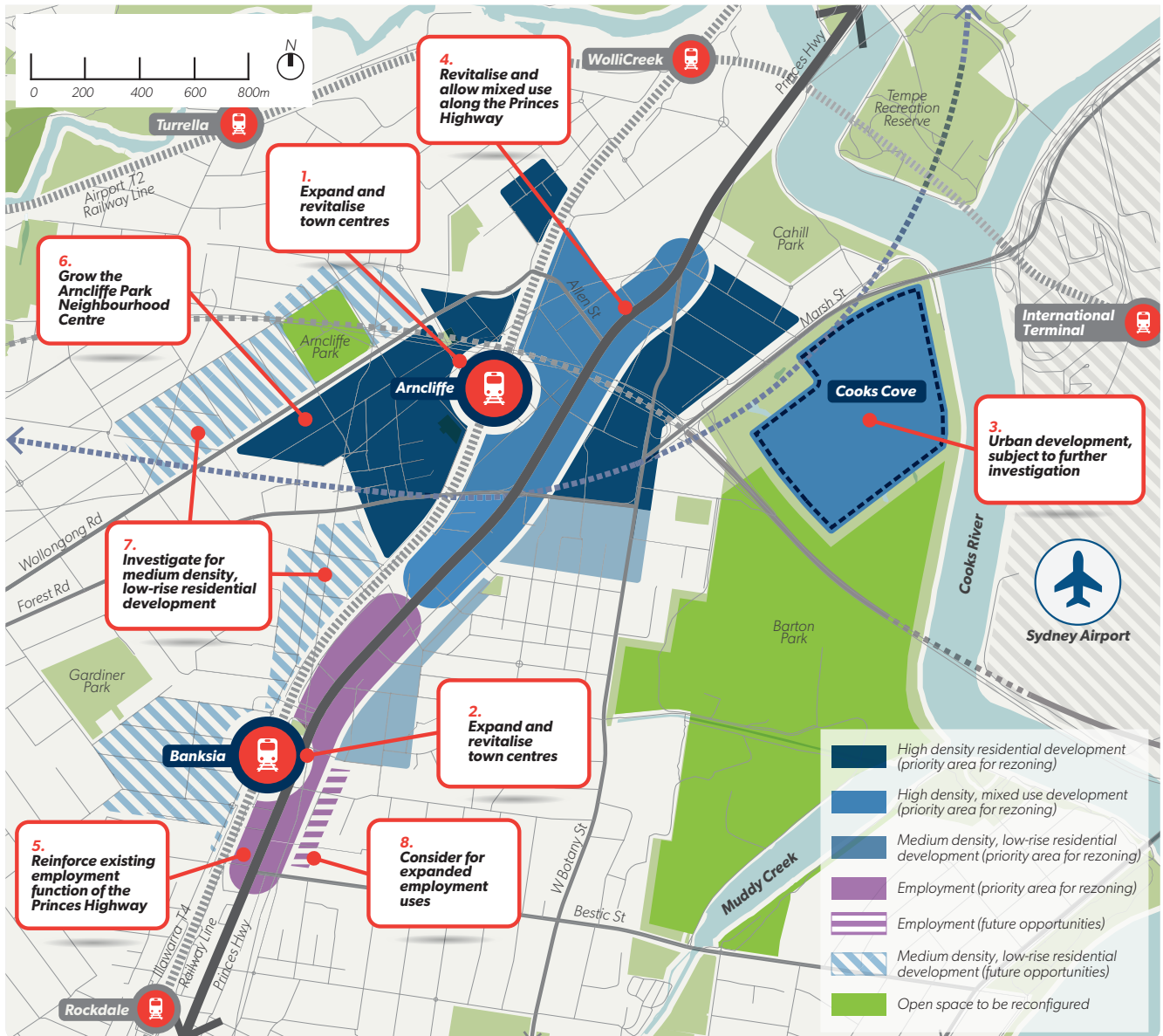
Potential contamination issues must be taken into consideration as part of future rezoning to ensure that the land is suitable or can be made suitable for the uses that would be permitted in the proposed zone, in accordance with State Environmental Planning Policy No. 55 – Remediation of Land (SEPP 55) and the Department's Managing Land Contamination: Planning Guidelines.

5.14 Utilities

All utility services are available to the precincts. Augmentation (as required) will need to be undertaken as part of the next stage of the planning process.

6

FIGURE 16: THE LAND USE PLAN



6.1 Land Use Plan

1 Expanding the Arncliffe town centre

It is proposed to expand the existing Arncliffe town centre to include areas either side of the railway line and up to Forest Road. This will allow for a greater area of commercial activity around the railway station including retail, cafes, accommodation and offices. Residential development is to be accommodated in the town centre in the form of shop top housing.

The purpose of this change is to encourage the development of Arncliffe as a vibrant and active place with the focus of activity around the station. Allowing residential development in the form of shop top housing adds to the vibrancy of the area whilst increasing the number of dwellings within close proximity to the railway station.

2 Expanding the Banksia neighbourhood centre

In Banksia, a smaller neighbourhood centre is located west of the railway station along Railway Street. The Strategy proposes to expand the town centre on the other side of the railway line in the block bound by Hattersley Street. The Strategy proposes allowing mixed use development in this area with retail at ground levels and residential apartments above. The purpose of this change is to provide a focal point with a greater range of local services to the residents of Banksia.

3 Urban Development at Cooks Cove

The Strategy identifies the northern portion of the Cooks Cove, north of the M5, as suitable for mixed use, residential development. Preliminary investigations indicate that with remediation a development footprint of up to 20ha could be provided in this portion of the Precinct (AECOM 2016a-c).

This area is currently occupied by the Kogarah Golf Course but is zoned for trade and technology purposes in SREP 33. Since the commencement of the SREP in 2004 no redevelopment under this zoning has commenced. A number of investigations and a masterplan were prepared which proposed a range of uses consistent with the SREP however development has not yet progressed.

In 2013, a Stage 1 Unsolicited Proposal was submitted to NSW Department of Premier and Cabinet. The proposal was endorsed by the former Rockdale City Council and proposed a mixed use development providing up to 5,000 dwellings and generating up to 5,000 jobs. The proposal did not progress and was discontinued in 2014.

This Strategy recommends a review of the zoning of this portion of Cooks Cove is undertaken to determine how it can be redeveloped, providing new homes and jobs in an attractive, livable and convenient place. Study requirements are provided in Section 9.

4 Princes Highway Corridor – mixed use

The Strategy recommends changing the land uses adjoining the Princes Highway, through Arncliffe, to allow for a wider range of commercial uses with residential apartments on upper levels. The purpose of this change is to encourage revitalisation of the corridor, bringing additional business opportunities whilst providing for additional housing. Buildings within this part of the corridor will typically include apartments with ground floor retail or showrooms.

5 Princes Highway Corridor – enterprise corridor

The light industrial and showroom land uses along the corridor will be retained through Banksia to continue to support employment generating land uses. Increasing the heights and floor space controls within this section of the Highway should be considered to encourage revitalisation and renewal of this part of the corridor.

6 Expanding the Arncliffe Park Neighbourhood Centre

The Arncliffe Park Neighbourhood Centre includes the local shops located along Wollongong Road, facing Arncliffe Park. This centre is to be enhanced and expanded to provide a local centre for this area of Arncliffe. Changes to land use zones should allow for retail on lower levels with residential apartments above. This change will activate this area of Arncliffe and allow more people to locate within the vicinity of the park.

7 Areas of medium density, low-rise residential development

The Arncliffe Park neighbourhood, located north of Wollongong Road, and the Gardiner Park neighbourhood, located between the park and Banksia Station, have been identified as areas for future development of medium, low rise dwellings. These areas are considered suitable for a change from low density residential development as they fall within the 800m walking catchment of the railway stations and are located close to community amenities. However, these areas have a defined local character, with a number of houses listed as local heritage items. Medium density development is considered more suitable in these locations to ensure local character can be retained. They are also affected by flooding during major storm events. Future urban design of these areas should respond to local character and heritage values and be based on further analysis of upgrades to drainage infrastructure.

8 Princes Highway expansion area

An existing residential area, which backs onto commercial properties location along the Princes Highway close to Banksia Station, has been identified as a future opportunity area. This area should be further assessed to determine if site amalgamations could occur to allow for expanded uses fronting the highway with rear lane access.

Other areas

Other areas, not identified for change, will continue to be governed by Council's existing land use controls. Additional capacity for growth has not been identified in these areas.

6.2 Built Form

High density

Areas within the Arncliffe Precinct, either side of the town centre and Princes Highway Corridor have been identified for high density residential development due to their proximity to the Arncliffe railway station. Development within these areas could include residential apartments of between 6 and 8 storeys with towers of up to 22 storeys in appropriate locations.

Medium density, low-rise

Areas south of Wickham Street within Arncliffe and Banksia will provide areas of medium density residential development. Development within this area could include town houses of up to 3 storeys. These areas will provide a transition to the lower density areas surrounding the growth areas.

6.3 Heights

The Strategy outlines the following key principles in determining the relevant built form controls for the precincts.

1. Consider Sydney Airport height restrictions

Sydney Airport height restrictions are a key consideration in determining appropriate heights within the precincts. Proposed heights should ensure buildings fall below the PANS-OPS surface. In some locations in the town centres, taller buildings exceeding the OLS (Obstacle Surface Limitation) may be considered on the basis that approval will be also required from Sydney Airport.

2. Taller buildings in accessible locations

Taller buildings are to be located closest to the town centres and public transport connections. This is to encourage the greatest densities in accessible locations and to reinforce development of the town centres.

Heights in the Arncliffe and Banksia town centres will range from 8-12 storeys with towers of up to 22 storeys in appropriate locations in Arncliffe.

3. Tallest buildings on key opportunity sites

Taller towers (up to 22 storeys) are to be located on larger sites which have the potential to provide new areas of public open space as part of their redevelopment.

4. Increasing heights on the Princes Highway

An increase in heights ranging from 8-12 storeys is to be implemented along the Princes Highway to encourage revitalisation and redevelopment within this accessible area.

5. Taller buildings in areas adjoining existing high density

Taller buildings up to 12 storeys are to be located close to areas of existing high density residential development including the Bonar Street Precinct and Wolli Creek development area.

6. Lowest buildings in areas adjoining existing low density

Low rise development is to be located adjoining existing low density residential areas to provide a transition in heights and to ensure development is in keeping with local character. Buildings of between 3 to 4 storeys are suitable in these locations.

FIGURE 17: HIGH DENSITY RESIDENTIAL



FIGURE 18: MEDIUM DENSITY LOW-RISE RESIDENTIAL



6.4 Forecasts

The dwelling growth likely to occur as a result of the proposed land use changes in the Arncliffe and Banksia Precincts has been projected in order to identify the infrastructure needs. The dwelling projections are identified in the following table.

Table 1 Dwelling projections for 2026 and 2036.

	Additional dwellings by 2026	Additional dwellings by 2031	Additional dwellings by 2036
Arncliffe	1,812	2,944	4,076
Banksia	453	736	1,019
Total	2,265	3,680	5,095

The proposed changes to the land uses and built form in Arncliffe and Banksia would provide for a full capacity of 9,600 additional dwellings. However, in reality, it is unlikely that the full capacity of new development controls would be fully reached within the first 20 years. Careful analysis of market trends, development feasibility and population changes has been undertaken to establish a projection of dwelling take up in the first 20 years.

As the range of land uses and densities at Cooks Cove is subject to further detailed analysis no dwelling projections for this precinct have yet been established. In order to plan for the infrastructure needs, a range of scenarios have been tested for Cooks Cove including 2,000, 3,400 and 5,000 dwellings.

The cumulative growth in dwellings in the Bayside West precincts and the Wolli Creek, Bonar Street precincts is shown in the graph below.

The steps for determining the projected dwelling growth for Arncliffe and Banksia were:

1. A constraints and opportunities analysis of the area to determine the most potential for redevelopment to occur in the long term; and
2. A forecast of the take-up rate of redevelopment by 2026 and 2036, based on historic take up rates in similar urban areas.

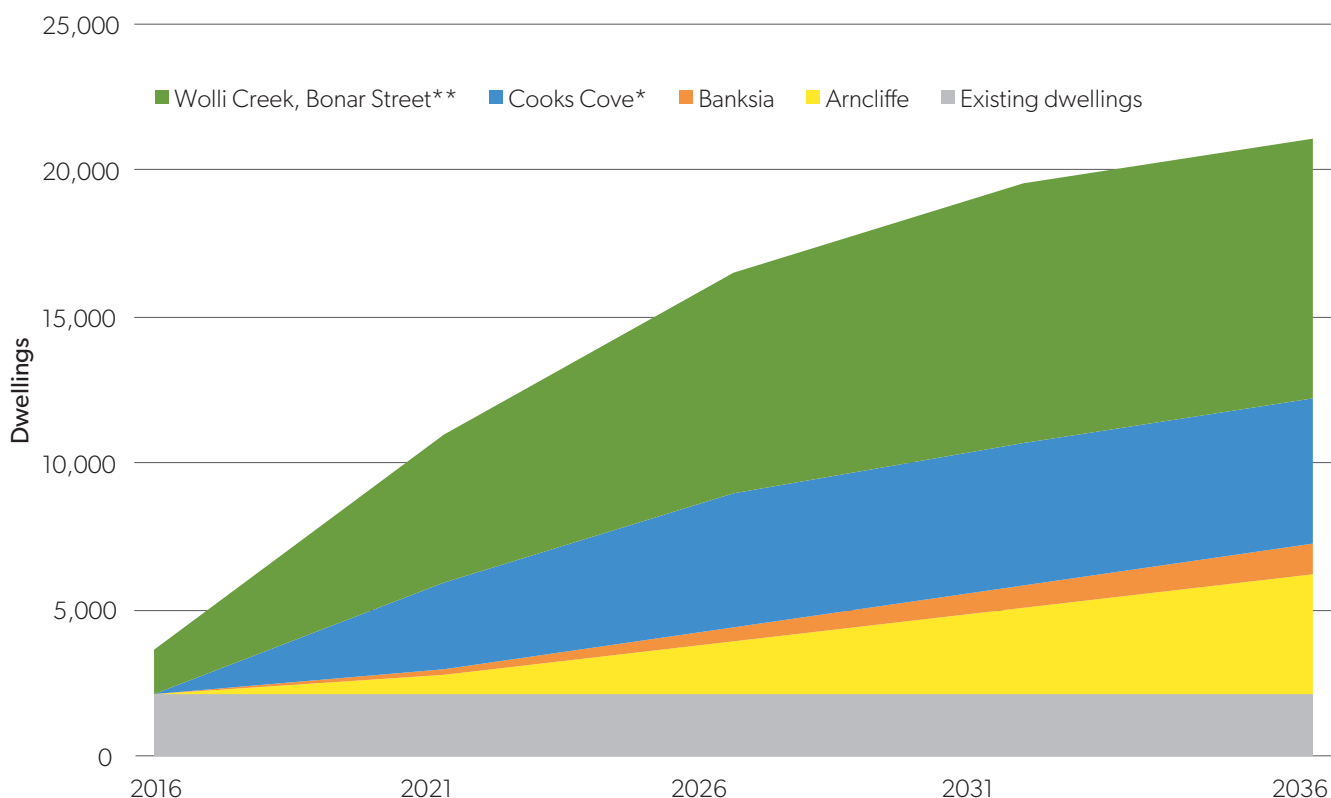
The dwelling projections for 2026 and 2036 were then used in the infrastructure and services analysis to ensure the needs of the future population are met.

The actual dwelling achieved by 2036 may differ to those forecast, as they will be dependent on several factors including economic conditions, social trends, technological changes, housing preferences and immigration levels. Infrastructure and services required to accommodate growth are constantly reviewed over time by service providers to identify the need for additional services or works that may be required (refer to monitoring of the Strategy Section 9).

Residential feasibility

The viability of new residential development in the growth area has been tested based on both existing and proposed development controls. The analysis took into consideration existing land values, unit sales and size of comparable developments, construction costs, council fees and charges, and other miscellaneous costs. The findings of the testing were considered and assisted in the determination of the desired built form outcomes discussed in this report.

Dwelling Growth



* Based on a scenario of 5,000 dwellings at Cooks Cove

** Dwelling projections for Wolli Creek, Bonar Street supplied by Bayside Council and are not subject to feasibility analysis

6.5 Staging

The Land Use and Infrastructure Strategy is a plan for growth in the precincts over a 20 year time frame.

The Strategy identifies key actions to be undertaken within the first 5–10 years.

As part of monitoring of the Strategy the actions will be updated as development progresses.

As discussed in Section 1.2, the Strategy identifies short-term opportunities for rezoning as well as long-term growth opportunities.

The areas identified for rezoning, in the shorter term, are generally those located closest to the railway stations in Arncliffe and Banksia and along the Princes Highway. These areas have been investigated in more detail and have been identified as having capacity to accommodate additional homes and jobs. In addition to increasing density, the changes recommended in these areas also aim to revitalise the town centres and provide increases in amenity and access to services for the existing and new community.

The areas identified as having future potential for medium density, low rise development include some of the outer areas of the Arncliffe and Banksia precincts. This Strategy outlines the key opportunities and constraints in these areas and identifies what further investigation is required.

6.6 Strategic Intent

The strategic intent of the Land Use Strategy is as follows:

- The Arncliffe and Banksia town centres and the Princes Highway Corridor through Arncliffe is to be zoned B4 Mixed Use allowing residential development in the form of shop top housing.
- Areas between the Arncliffe town centre and Princes Highway Corridor are to be rezoned to allow for higher density residential development including residential flat buildings.
- Opportunities for medium, low rise residential development within the vicinity of Arncliffe Park and Gardiner Park are to be investigated.
- A change of land use and zoning within the northern portion of the Cooks Cove Precinct, including the potential for a residential and mixed use development is to be investigated.
- A new school and open space is to be provided for within the Cooks Cove Precinct.
- Access to the Cooks Cove foreshore for pedestrians and cyclists is to be improved.
- The airspace and operating requirements of Sydney Airport are to be protected.
- Satisfactory arrangements are to be in place for the provision of infrastructure required to support development prior to construction.

FIGURE 19: INFRASTRUCTURE MAP



SECTION 7: INFRASTRUCTURE STRATEGY

The following tables provide an overview of the infrastructure projects that have been identified to support growth in the Bayside West Precincts.

TABLE 1: CURRENT PROJECTS

Item	Delivery	Status
Upgrade rail infrastructure to increase capacity and services	TfNSW	Rail network planning to increase services to Southern Sydney is underway. Preferred option to be determined by end of 2017. Timing and delivery are subject to funding and business case.
Upgrade to Banksia and Arncliffe Stations	TfNSW	Arncliffe Station upgrade is underway and due for completion at the end of 2016. TfNSW to undertake scoping investigations for Banksia Station upgrade.
Improvements to bus services, including: <ul style="list-style-type: none"> • a new route between Bondi Junction and Miranda • Extending the Kogarah to Tempe service • Increase services running through the Growth area, in particular the Burwood to Bondi Junction route 	TfNSW	Need for improvements to be investigated by TfNSW as part of regular monitoring and planning program.
Construction of WestConnex South Link connecting the M5 to South Sydney	TfNSW	Detailed planning and feasibility assessment by TfNSW is underway. Preferred option to be determined by end of 2017. Timing and delivery are subject to funding and business case.

TABLE 2: REGIONAL INFRASTRUCTURE UPGRADES IDENTIFIED

Measure	Delivery	Timing and delivery	Assumptions
Public transport			
B1 New bus stops on Marsh Street	Cooks Cove developer & TfNSW/Council	Bus stops to be provided prior to construction certificate for first dwelling at Cooks Cove. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	New bus stops are required on Marsh Street to accommodate access from Cooks Cove to bus network (AECOM, 2016)

SECTION 7: INFRASTRUCTURE STRATEGY

Measure		Delivery	Timing and delivery	Assumptions
Regional/State road network				
R1	New major intersections on Marsh Street to provide access to Cooks Cove.	Cooks Cove developer & RMS/TfNSW	Intersections to be completed prior to construction certificate for first dwelling at Cooks Cove.	New intersections are required at two points along March St to provide access to the Cooks Cove Precinct (AECOM, 2016).
R2	Improvements to Marsh Street and Airport Drive. Including improved pedestrian connections to the Giovanni Bridge and upgraded pedestrian crossing of Marsh Street (potential pedestrian over pass).	RMS/TfNSW/ Cooks Cove developer	Upgrades to be completed prior to construction certificate for first dwelling at Cooks Cove. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Improvements to Marsh Street and Airport Drive will be required to support the growth in traffic volumes from Cooks Cove precinct (AECOM, 2016).
R3	Upgrades to the Kyle Street / West Botany Street intersection	RMS/TfNSW	Thresholds for infrastructure delivery and costings to be established prior to the rezoning of Arncliffe and Banksia Precincts. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Upgrades to the Kyle Street/West Botany Street intersection to allow left turn from Kyle Street onto West Botany is required (AECOM, 2015).
R4	Upgrade to the existing signalised intersection at Princes Highway / Burrows Street	RMS/TfNSW	Thresholds for infrastructure delivery and costings to be established prior to the rezoning of Arncliffe and Banksia Precincts. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Upgrades to the Princes Highway / Burrows Street intersection is required to permit movements from Kyle Street (AECOM, 2015).
R5	Review configuration of Duncan and West Botany Street intersections.	Council MS/ TfNSW	Thresholds for infrastructure delivery and costings to be established prior to the rezoning of Arncliffe and Banksia Precincts. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	The need for review of the configuration of Duncan and West Botany Street intersections to accommodate growth (AECOM, 2015).
R6	Upgrade the Allen Street / Princes Highway intersection.	Council MS/ TfNSW	Thresholds for infrastructure delivery and costings to be established prior to the rezoning of Arncliffe and Banksia Precincts. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Upgrades to the Princes Highway/ Allen Street intersection is required to accommodate growth (AECOM, 2015).
R7	Upgrades to the intersection of Forest Road at Firth and Eden Streets.	Council MS/ TfNSW	Thresholds for infrastructure delivery and costings to be established prior to the rezoning of Arncliffe and Banksia Precincts. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Review of the intersections of Forest Road with Firth and Eden Streets required with consideration of constraints posed by rail overpass bridge nearby required. (AECOM, 2015).
R8	Review intersection treatments on either side of the railway underpass between Allen Street and Wollongong Road.	Council/ RailCorp	Detailed planning and timing to be undertaken by Council in consultation with TfNSW and RailCorp. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Review intersection treatments on either side of the railway underpass between Allen Street and Wollongong Road.
R9	Upgrade to the Spring Street / Princes Highway intersection.	Council/ RailCorp	Detailed planning, timing and thresholds to be investigated by RMS and TfNSW as precincts develop. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	Upgrades to Spring Street / Princes Highway intersection is required to accommodate growth (AECOM, 2015).

SECTION 7: INFRASTRUCTURE STRATEGY

Measure		Delivery	Timing and delivery	Assumptions
Improvements for Pedestrians and Cyclists				
P1	Investigate provision of a new walking and cycling bridge over the Cooks River to the Sydney Airport	Developer/ Council	Investigations into new crossing to be incorporated into any planning proposal for Cooks Cove.	Opportunities exist to provide new walking and cycling connections across the Cooks River, to enhance complementary land uses with Sydney Airport (AECOM 2016).
P2	A direct foreshore bicycle/pedestrian path along the Cooks River	Cooks Cove Developer/ Council	Construction of path to commence prior to construction certificate for first dwelling at Cooks Cove. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	A direct foreshore bicycle path along Cooks River with improved connectivity across Muddy Creek should be provided (AECOM 2016).
P3	New and improved cycle and pedestrian crossing of the Princes Highway from Cahill Park to Brodie Spark Drive. Consider pedestrian over pass.	Cooks Cove Developer RMS/TfNSW	Improved crossing to be completed prior to construction certificate for first dwelling at Cooks Cove. To be partly funded by Special Infrastructure Contribution or satisfactory arrangements.	An upgrade to the pedestrian crossing of Princes Highway from Cahill Park is required to provide a better connection from Wolli Creek Station to Cooks Cove (AECOM 2016).
Education				
E1	New school infrastructure	Department of Education	Provision for additional school infrastructure is to be allowed for, as agreed to by the Department of Education Contribution to land costs to be partly funded by Special Infrastructure Contribution or satisfactory arrangements	Opportunities exist within Cooks Cove for provision of new school infrastructure (AECOM, 2016). This is subject to detailed review and planning to be undertaken by the Department of Education.

TABLE 3: LOCAL INFRASTRUCTURE UPGRADES

Measure	Delivery	Timing	Assumptions
Roads			
L1 Charles St realignment	Council/ developer	Preliminary design and costings of upgrades to be undertaken by Council for inclusion in the Development Control Plan (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	Upgrades require to the local road network required to support anticipated growth (AECOM 2015).
L2 Gertrude St extension	Council/ developer		
L3 Intersection upgrades at: <ul style="list-style-type: none"> ● Wolli Creek Rd / Wollongong Rd ● Fripp St / Wollongong Rd ● Dowling St / Wollongong Rd ● Wickham / Charles Street 	Council/ developer		
L4 <ul style="list-style-type: none"> ● Upgrade to rail underpass at Railway Street and Subway Road 	Council/ RailCorp	Detailed planning and timing to be undertaken by Council in consultation with TfNSW and RailCorp for inclusion in the review of the Section 94 Plan (Strategy Action 3).	Upgrades to the rail underpass at Railway Street and Subway Road are required to accommodate growth (AECOM, 2015).
Improvements for Pedestrians and Cyclists			
p4 New on-road cycle paths along: <ul style="list-style-type: none"> ● Wollongong Rd and Allen St ● Wollongong Rd to Bonar St via Wardell St / Avenal St / Marinea St ● Burrows St / Kyle St ● Duncan Street to Allen St ● Spring St (including improved crossing of West Botany St) 	Council/ developers	Preliminary design and costings of upgrades to be undertaken by Council for inclusion in the Development Control Plan (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	Upgrades required to the local road network to support anticipated growth (AECOM 2015).
p5 Upgrades to the existing cycle network including: <ul style="list-style-type: none"> ● North-south route between Arncliffe Station and Banksia Station Arncliffe Street / Burrows St / Eden Street north 	Council/ developers	Preliminary design and costings of upgrades to be undertaken by Council for inclusion in the Development Control Plan (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	Upgrades recommended to the local cycle network to support anticipated growth (AECOM 2015).
p6 Improvements to pedestrian crossings at: <ul style="list-style-type: none"> ● Forest Way at Eden Street / Wardell Street Arncliffe Street / Allen Street roundabout ● Wollongong Road / Firth Street roundabout 	Council/ developers	Preliminary design and costings of upgrades to be undertaken by Council with support from the Department (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	Upgrades recommended to pedestrian facilities on the local road network to support anticipated growth (AECOM 2015).
p7 Improved pedestrian facilities, on new and existing streets at key locations to accommodate increased pedestrian activity, including along: <ul style="list-style-type: none"> ● Wollongong Road close to Arncliffe Park Burrows Road, Godfrey Street and Gardiner Avenue ● Spring Street 	Council/ developers	Preliminary design and costings of upgrades to be undertaken by Council with support from the Department for inclusion in the Development Control Plan (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	

SECTION 7: INFRASTRUCTURE STRATEGY

Measure		Delivery	Timing	Assumptions
Drainage and flooding				
D1	Upgrade trunk drainage across the catchment and upgrade existing drainage network, including: <ul style="list-style-type: none">● Drainage network along Wollongong Road from Dowling Street to Bonar Street, and under the railway line● Additional inlets and drainage works at Valda Avenue● Pipe upgrades at Eve Street Brick arch openings under sewer carrier● Modifications to Bonnie Doon Channel● Dedicated overland flow paths	Council/ developers	Preliminary design and costings of upgrades to be undertaken by Council with support from the Department for inclusion in the Development Control Plan (Strategy Action 1) and review of the Section 94 Plan (Strategy Action 3).	Arncliffe and Banksia subject to some areas of flooding following significant rainfall events and require upgrades to the existing drainage infrastructure (Mott MacDonald, 2015).
D2	New flood storage and detention basins to mitigate future flooding			
D3	New levee to provide additional drainage capacity and reduce inundation from the Cooks River			
Community infrastructure				
C1	A new district level branch library and community centre	Council or Developers	Preliminary design and costings of upgrades to be undertaken by Council for inclusion in review of the Section 94 Plan (Strategy Action 3).	New population anticipated requires a new district level branch library and community centre at Arncliffe (Eltons, 2015)
C3	Upgrade to existing parks at Wooroona Reserve, Marinea Reserve and Marsh Street Reserve		To be funded by Section 94 Contributions or priority precinct support scheme.	Arncliffe and Banksia have limited areas of local open space. Opportunities to upgrade existing and provide new areas of open space should be considered (Rockdale City Council, 2014)
C4	New lighting and safety upgrades at Gardiner Park and Arncliffe Park		To be funded by Section 94 Contributions or priority precinct support scheme.	
C6	Investigate new local parks as part of redevelopment of sites on Eden Street (Land and Housing Site) and 12 Allen Street		Investigations into new parks to be incorporated into any planning proposal or development application for these sites. To be partly funded by Section 94 Contributions or satisfactory arrangements.	
C7	Provision of new active recreation facilities at Cooks Cove		Construction of recreation areas to commence prior to construction certificate for first dwelling at Cooks Cove. To be partly funded by Section 94 Contributions or satisfactory arrangements.	

7.2 Transport

As outlined in Section 5.4, the current road and rail networks have limited capacity to accommodate significant growth. The Infrastructure Schedule highlights that major State infrastructure upgrades including upgrades to the railway lines and the proposed WestConnex South Link are required to accommodate growth in the Bayside West Precincts and also other areas of the south Sydney District.

Assessment of the road network capacity and performance was undertaken for the Arncliffe and Banksia precincts to identify the range of potential infrastructure upgrades needed to support growth in these areas. For the Cooks Cove Precinct, a preliminary traffic assessment was conducted to understand future access requirements.

Both assessments were based on the key assumption that the WestConnex South Link would be operational by 2026, reducing the role of Princes Highway accommodating through traffic in the Arncliffe and Banksia precincts. Key recommendations from these studies are the basis for the infrastructure upgrades identified in the infrastructure schedule and the further study requirements outlined for Cooks Cove.

The Cooks Cove investigations show that significant investment along Marsh Street will be required. Additional investment would also be required on surrounding roads to reduce the effect of queuing traffic on the access to the M5 Motorway and Sydney Airport. The queues forecast on Marsh Street could be especially long, possibly stretching longer than 2km and creating serious impacts on the surrounding road network. Investment should also be placed upon secondary access locations such as Levey Street to reduce the demand on Marsh Street.

7.3 Open space

The Strategy seeks to improve access to open space within the growth area by identifying where new areas of open space could be provided and improving access to existing areas.

The open space provision within Arncliffe and Banksia is limited and typical of an urban built up area (refer to Section 5.7). Cooks Cove provides large areas of open space, including Barton Park which provides a range of sporting fields and courts, and to the north at Cahill Park. To increase usage of these areas and to provide better access for new and existing residents, the Strategy identifies the need to provide better pedestrian and cycling linkages to Cooks Cove and other neighbouring areas of open space.

The provision of upgraded open space in Cooks Cove is to be assessed as further planning for the precinct. Redevelopment of the Arncliffe and Banksia precincts also provides an opportunity to open up additional areas of public open space. As large sites redevelop, portions of these sites could be provided as new open space to meet the needs of the new residents.

The following opportunities to provide additional open space areas have been identified in Arncliffe and Banksia:

1. Eden St Park

A new park could be provided close to the Arncliffe town centre, east of the station, between Eden Street and the Princes Highway as part of any future redevelopment of the public housing estate. The park could provide passive recreation opportunities.

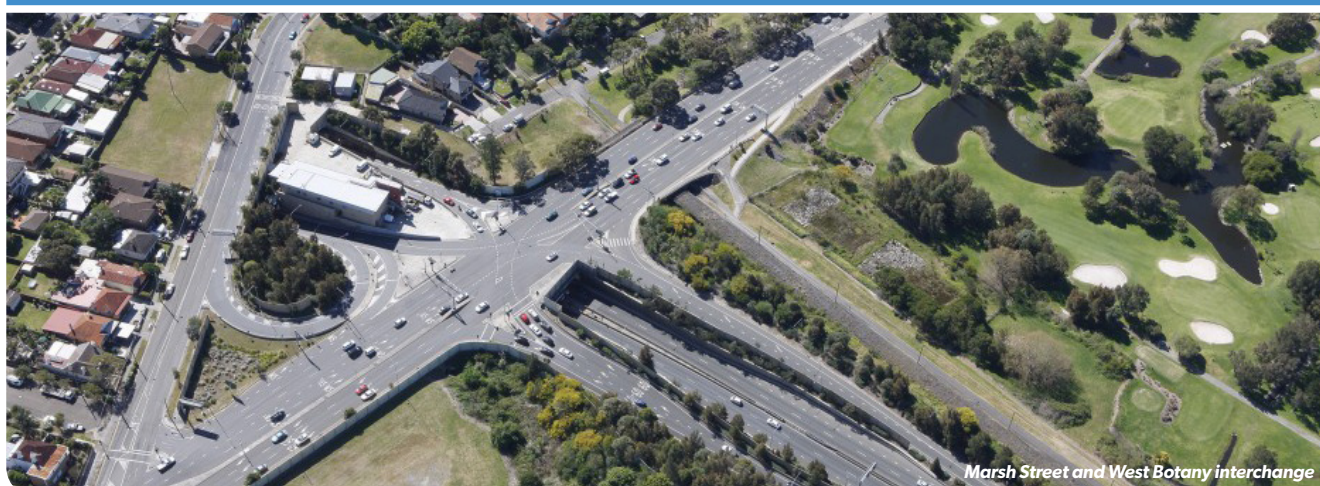
2. Allen St Park

A new park could be located adjoining the precinct boundary with Wolli Creek incorporating the heritage listed Southern and Western Suburbs Ocean Outfall Sewer as part of any future development of the Ford Service Centre. This park could provide playground facilities and passive recreation opportunities.

3. Wollongong Road Park

A new local park could be provided as part of the redevelopment of a large site at the Arncliffe Precinct boundary with the Bonar Street Precinct. It could provide an area of open space for the residents of both precincts.

FIGURE 20: M5 INTERCHANGE



Marsh Street and West Botany interchange

7.4 Pedestrian and cycling connections

The Strategy seeks to improve connections for pedestrians and cyclists throughout the Bayside West Precincts.

The improvements to pedestrian and cycling connections include:

1. Providing a new shared pedestrian and cycle path following the Cooks River, through the Cooks Cove Precinct. This link would provide the missing link to the Botany Bay to Homebush Bay regional cycle network. The location for this path will be subject to detailed design as part of future investigations for the precinct.
2. Providing improved pedestrian and cycling crossings across Marsh Street and Princes Highway to provide better access between Cooks Cove and the Wolli Creek railway station.
3. Improvements to footpath connections linking the precincts to the railway stations so that they are safe, well-lit and have pedestrian crossings at key locations.
4. A new pedestrian connection along the heritage listed Southern and Western Suburbs Ocean Outfall Sewer from the railway line to Marsh Street and Cooks Cove.
5. New on-road cycleways connecting the railway stations to the Eve Street Cycleway and Wolli Creek to form part of a new east-west cross regional route, ensuring space is provided to cyclists through the existing rail underpass.
6. Improvements to the existing north-south on-street cycleway between Banksia and Arncliffe Railway Stations.

7.5 Schools

The Strategy identifies a potential school to be located within the Cooks Cove Precinct. This should be considered in the planning for this precinct.

The NSW Government is preparing a School Assets Strategic Plan which will establish the vision, outcomes and priorities for asset planning and delivery of schools within the metropolitan area in line with the State Infrastructure Strategy.

Projected growth in the Bayside West Precincts, including the new school to be located within Cooks Cove, will be taken into account in the preparation of the asset plan.

7.6 Affordable housing and housing affordability

The NSW Government is committed to delivering more opportunities for affordable housing across Sydney. Action 2.3.3 of A Plan for Growing Sydney outlines that the NSW Government will provide more affordable housing in Government-led urban renewal projects and on Government-owned sites to meet the shortfall in affordable housing. In response to this action, the Government is currently preparing a policy on affordable housing provision and once finalised will be applied to development within the precincts.

A target of up to 10% affordable housing will be required as part of new development within the precincts.

The target is subject to further feasibility analysis undertaken as part of the establishment of the Special Infrastructure Contribution (refer to section 9.5).

The Land and Housing site located on Eden Street within the Arncliffe Precinct presents an opportunity to provide more affordable housing. This site is located within areas identified in the Strategy to be rezoned for an increase in residential densities allowing for potential redevelopment.