

# Macarthur Precinct

## LAND USE AND INFRASTRUCTURE ANALYSIS

JULY 2015





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Figure 1: Report Structure



# Introduction

## Purpose of the Land Use and Infrastructure Analysis

This Analysis forms part of the Glenfield to Macarthur Land Use and Infrastructure Strategy and describes the methodology and evidence base that informed the vision and projected growth for the Macarthur precinct. Applying the principles of ecologically sustainable development has been intrinsic to this process.

The Analysis has incorporated a review of the character, demographics and economy of Macarthur.

A comprehensive audit of the precinct's environmental and built form characteristics identified areas to be protected and unconstrained land suitable for development.

The vision and growth projections for the precinct have been informed by economic feasibility and market demand analysis and reflect the long term housing and employment needs for the area.

Recommended improvements to the transport network aim to encourage more people to walk, cycle and use public transport for local and regional trips.

Improved connections to ecological corridors and open spaces have been identified and recommendations made to improve the quality of open spaces and the public domain.

A summary of the infrastructure requirements to support the precinct's growth is also provided to guide more detailed service and infrastructure delivery investigations.

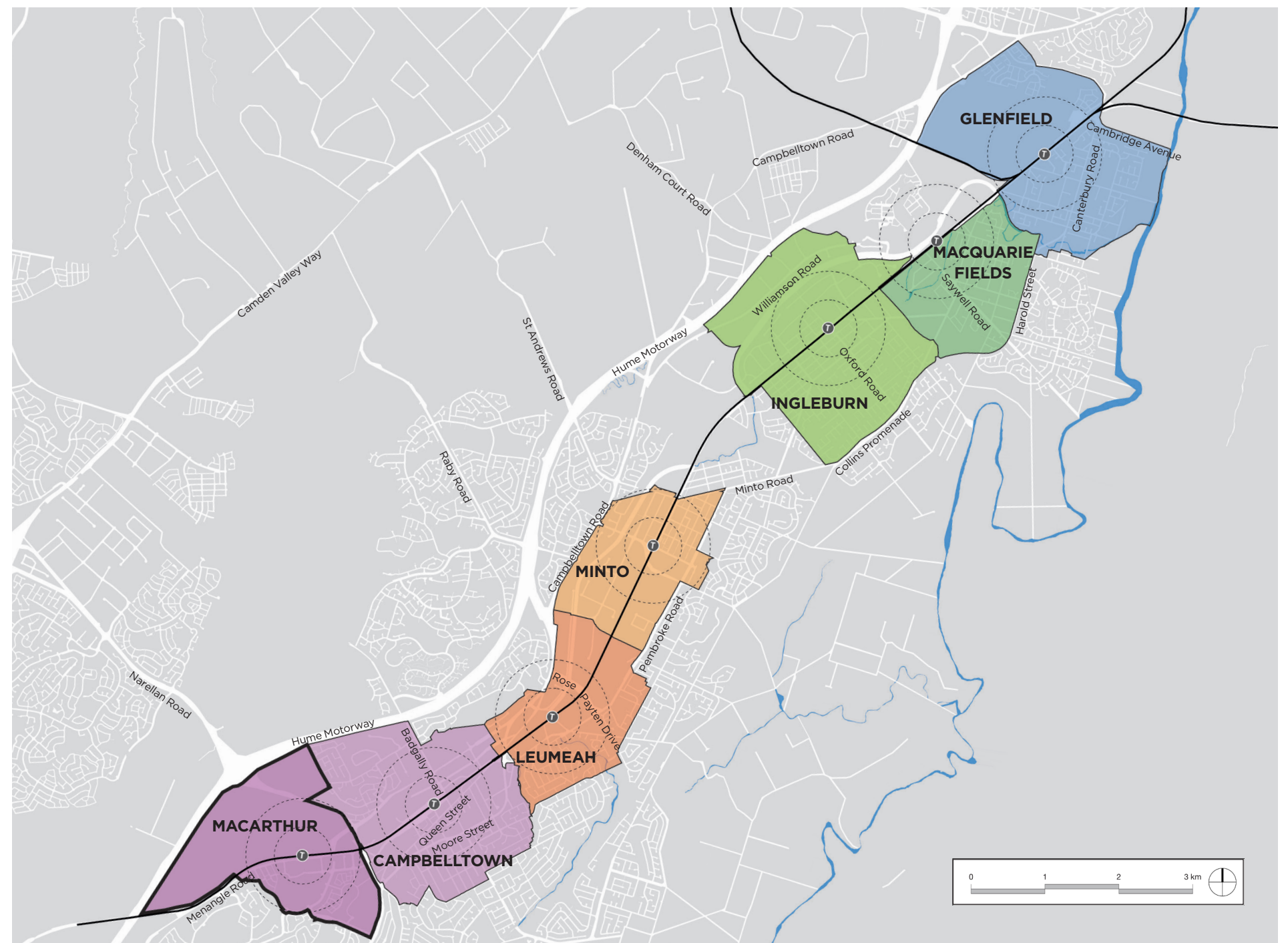


Figure 2: Glenfield to Macarthur Urban Renewal Corridor



## Precinct Character

Macarthur station is located approximately 45 kilometres from Sydney's CBD and is the final station on the Airport, Inner West and South Lines. The station is also on the Southern Highlands Line that provides services further south west as part of the regional heavy rail network.

The precinct is the southernmost precinct in the Glenfield to Macarthur corridor.

The precinct is defined by the Hume Motorway to the north, Narellan Road to the east, Gilchrist Road to the west and Therry Road in the south.

The boundary of the precinct is based on a radius of 800m - 1.5km from Macarthur Station, which represents a 10-20 minute walking trip.

Macarthur is complementary to Campbelltown precinct, and together comprise Campbelltown-Macarthur Regional City Centre.

The precinct is the major destination for retail, tertiary education and health services in the region.

The precinct is characterised by residential development in the south, retail and bulky goods directly south of the station, health services to the east and educational uses in the north.

It is home to Macarthur Square, the major retail centre for the region and contains a number of major educational and health facilities, including Campbelltown Hospital, Campbelltown Private Hospital, the University of Western Sydney and Campbelltown TAFE.

Recent residential development is characterised by predominately low rise housing, such as along Gilchrist Road and at Park Central. The precinct also contains a considerable amount of seniors housing. Residential housing is also being constructed on land to the west of the University of Western Sydney.

An aerial image of the precinct is provided in Figure 3. A series of photos that illustrate the existing built form and character of the precinct are provided on page 7.



Legend		Key Landmarks					
<div><div></div></div>	Precinct Boundary	1	Macarthur Square Shopping Centre	4	Marsden Park	7	Barber Reserve
<div><div>T</div></div>	Station	2	Campbelltown Hospital	5	TAFE Campbelltown		
<div><div></div></div>	Train Line	3	Campbelltown Private Hospital	6	University of Western Sydney		

Figure 3: Macarthur precinct, with key landmarks identified



# Demographics and Economy

## Demographics

The population of the precinct was 1,939 people at the last census in 2011, making the precinct one of the least populated in the corridor.

The population differs from those of the other precincts in the corridor and broader Sydney, reflecting the presence of several education facilities, hospitals and a large retirement housing development. Key characteristics of the precinct population include:

- ▶ A higher median age than the corridor, Campbelltown LGA and Sydney
- ▶ A lower proportion of residents aged 0-15 years and 40-64 years than the corridor and Sydney as a whole
- ▶ A higher proportion of 20-39 year olds and people aged over 65 years than the corridor and Sydney
- ▶ A significantly larger proportion of dwellings that are semi-detached/ terrace /townhouse or flat/ unit /apartment and a corresponding smaller proportion of separate houses compared to Campbelltown LGA and Sydney

- ▶ A significantly higher proportion of lone person households and significantly lower proportion of families with children compared to Campbelltown LGA and Sydney
- ▶ A smaller average household size than both Campbelltown LGA and Sydney at 2.1 persons per household
- ▶ A proportion of dwellings owned outright or with a mortgage that was generally consistent with the corridor as a whole and marginally higher than Sydney
- ▶ A higher proportion of residents born overseas than Campbelltown LGA but a slightly lower proportion than Sydney. The top three countries of birth other than Australia include the Philippines, England and New Zealand
- ▶ A smaller proportion of residents travelled to work by car, and a higher proportion of residents used the train or walked to work than in Campbelltown LGA or Sydney.

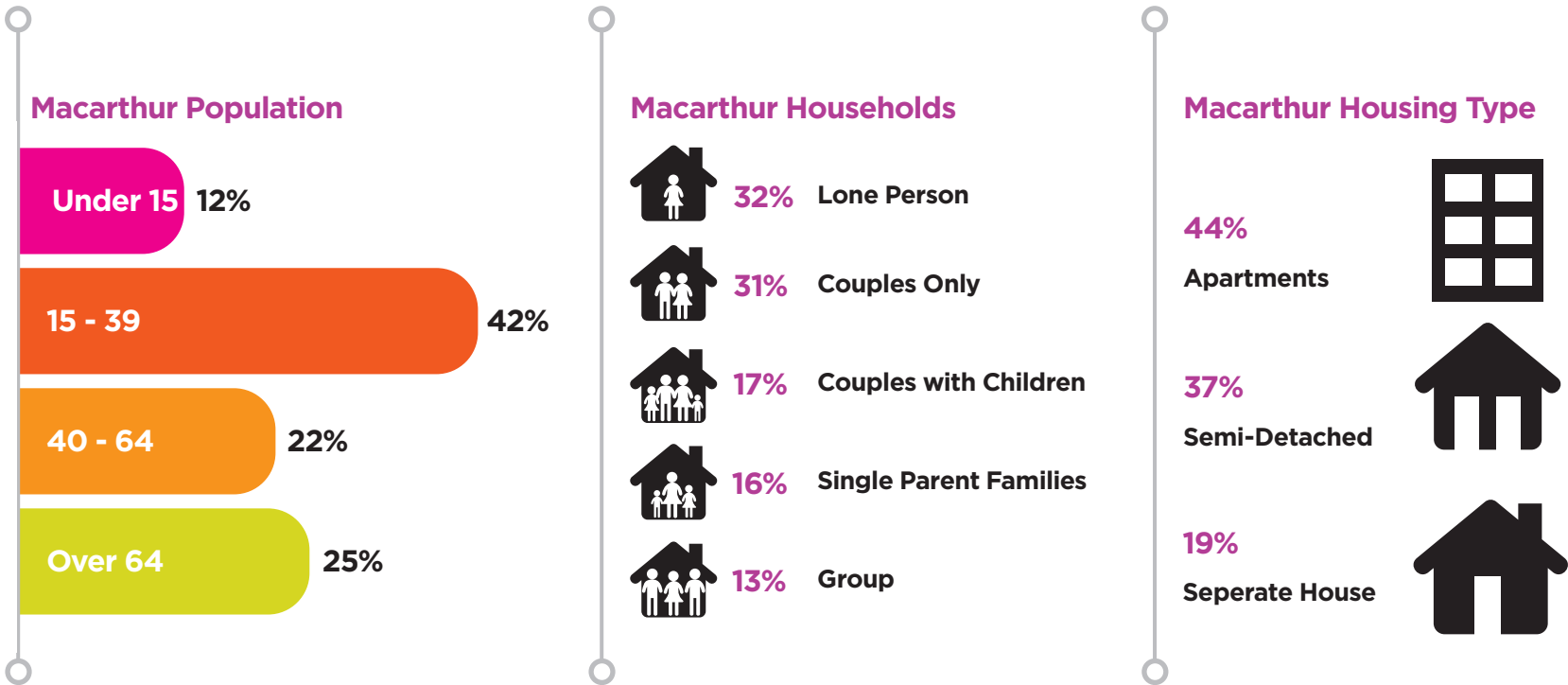


Figure 4: Key demographic facts for the Macarthur precinct

## Economy

The precinct contained 6,788 jobs in 2011. Health and retail made up the largest proportion of jobs, provided by Campbelltown Hospital, Campbelltown Private Hospital and Macarthur Square Shopping Centre.

The precinct contains a large number of education jobs, associated with University of Western Sydney and Campbelltown TAFE. The precinct has a very limited industrial presence and a small but growing business sector.

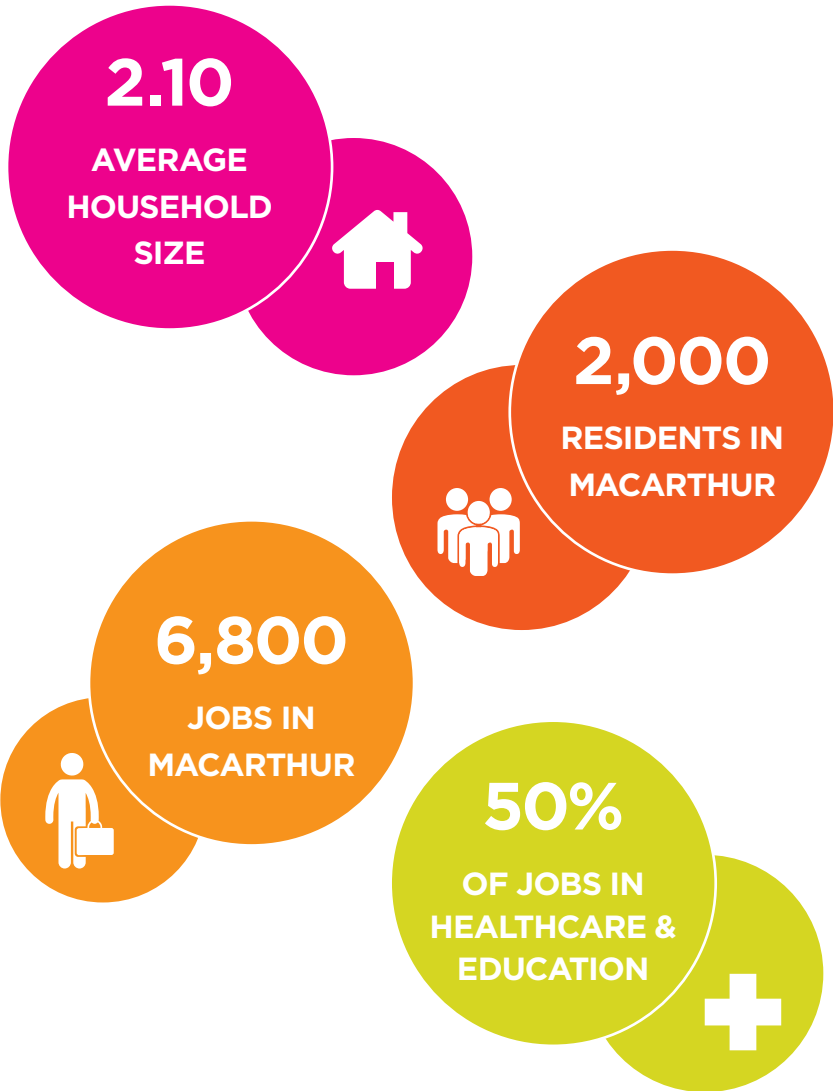


Figure 5: Key demographic facts for the Macarthur precinct



## Constraints Analysis

This section is an assessment of the constraints within the precinct. The physical characteristics of the precinct have been mapped and analysed to identify constrained and unconstrained sites for renewal. These characteristics include: transport and movement; open space; topography; flooding; vegetation; bushfire risk; heritage; recent residential development; land ownership; and social infrastructure.

The combination of these elements reveal the overall level of development constraint within the precinct. However, not all constraints that are identified are necessarily barriers to change, often they are opportunities for renewal in the future.



Figure 6: Images demonstrating the existing character and built form of the Macarthur precinct



# Site Context

## Transport and Movement

Blaxland Road and Moore Street serve as the primary north-south access ways in the precinct, while the Hume Motorway and Campbelltown Road provide the main regional routes for through traffic in the area. The main access points include Narellan Road and Menangle Road.

The southern half of the precinct from Menangle Road contains a poorly connected local road network, largely due to Macarthur Square Shopping Centre that creates a barrier to vehicular and pedestrian movement, particularly in an east-west direction. Traffic signalisation is limited to intersections along Kellicar Road and Narellan Road.

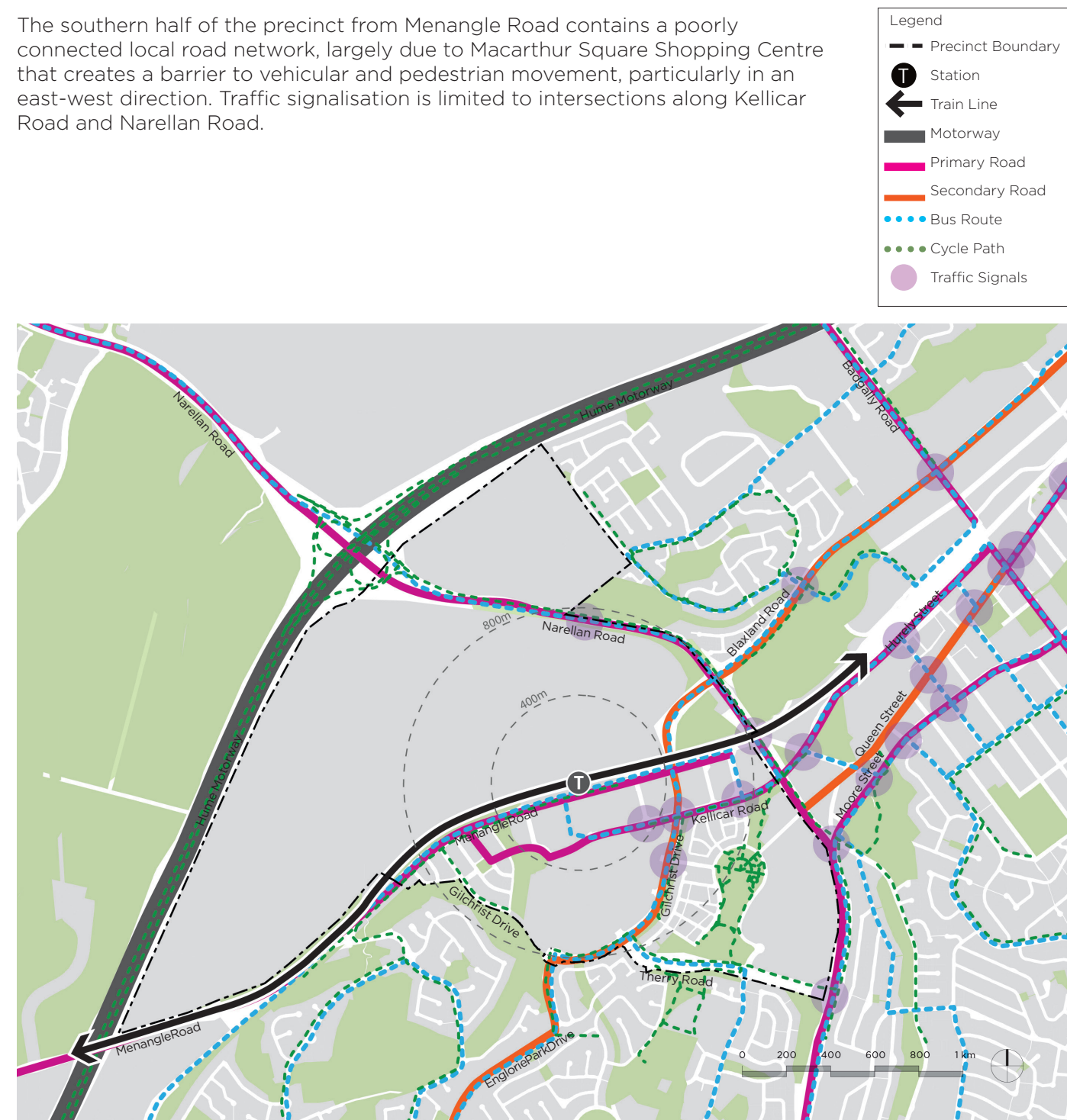


Figure 7: Access and movement within the Macarthur precinct

## Walking Catchment

Figure 8 below demonstrates the 5, 10 and 20 minute walking catchments from Macarthur station. Pedestrian and cycling accessibility is greatly restricted by a number of factors, including the rail corridor and the lack of dedicated and signalised crossings along Narellan Road.

There are also a number of local streets with limited street lighting and pedestrian footpaths that further restrict active modes of transport.



Figure 8: 5, 10 and 20 minute walking catchment within the Macarthur precinct



## Open space network

Macarthur has a good supply of passive and recreational open space. There are a number of local community parks, as well as large tracts of natural vegetation and surrounding bushland.

Local parks in the precinct include Marsden Park, Gilchrist Oval and Barber Reserve.

The Mount Annan Botanic Gardens border the precinct to the west is a regionally significant open space that has both recreational, botanical and landscape value.

Figure 9 identifies the types of open space found in the precinct.



Figure 9(a): Existing open space network in the Macarthur precinct, University of Western Sydney Campus

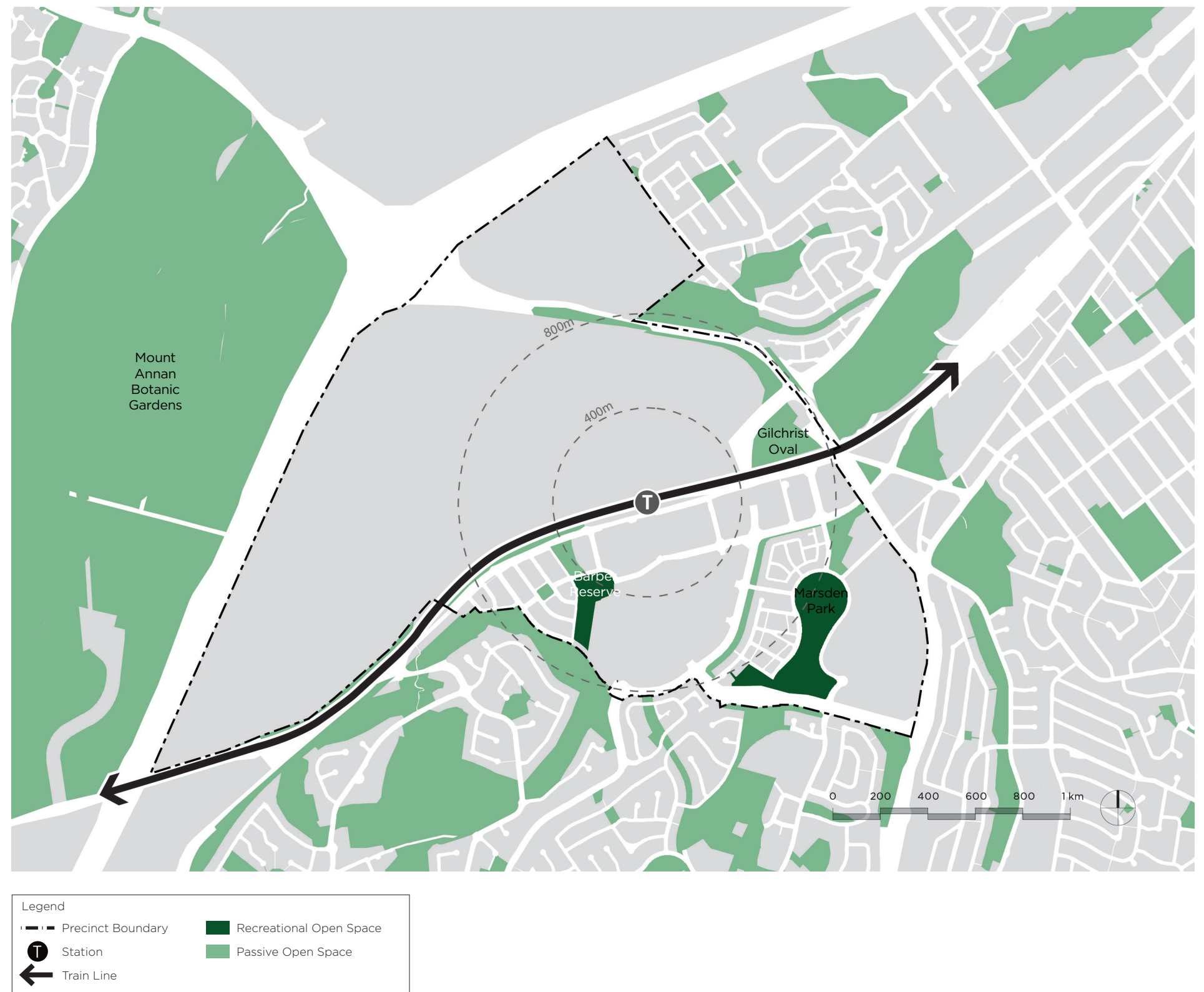


Figure 9(b): Open space network in the Macarthur precinct



# Site Context

## Topography

The topography within the precinct is undulating with a ridgeline that runs along the far western edge of the precinct affording dwellings in the western corners views down into Macarthur and over to the Mount Annan Botanic Gardens in the west.

The eastern half of the precinct has a sharp rise to the east, that slopes down to the Campbelltown Hospital.

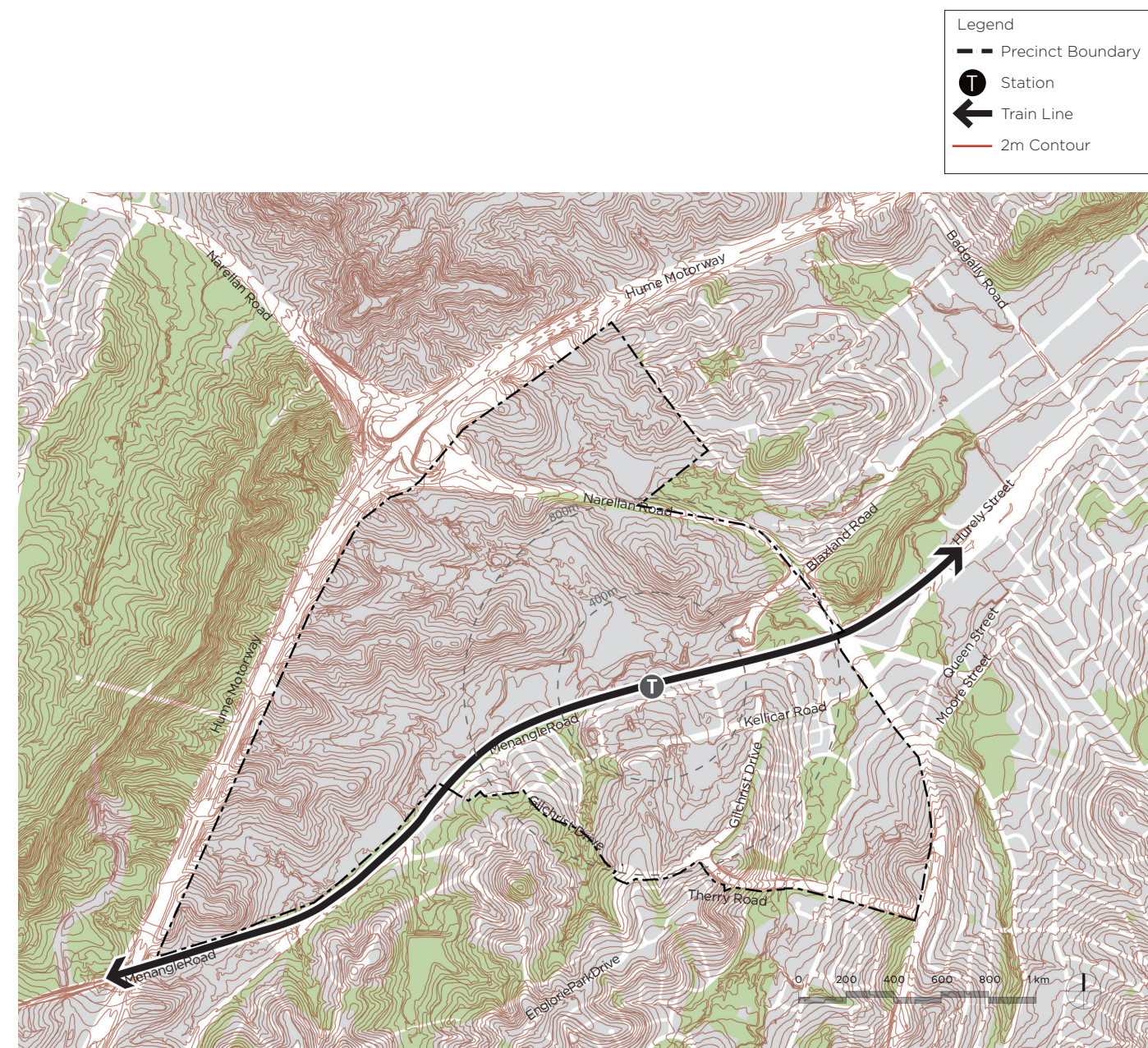


Figure 10: Topography within the Macarthur precinct

## Flooding and Drainage

Figure 11 shows the location of waterways and associated riparian corridors in the precinct.

Campbelltown City Council is currently preparing a Floodplain Management Plan to identify areas subject to flooding. Once finalised, this Plan will be used to manage flood risk and inform future planning for the precinct.

Any development of land within the precinct will need to consider whether the land is flood prone and address any relevant flooding controls.



Figure 11: Riparian corridors and waterways within the Macarthur precinct



## Vegetation and Ecology

The precinct contains some significant tracts of vegetation that are classified as Endangered Ecological Communities under the *Threatened Species Conservation Act 1995*. These include areas of Cumberland Plain Woodland and River Flat Eucalypt Forest on Coastal Floodplains.

The larger spanning tracts of vegetation are found along the northern boundary of the precinct; throughout the University of Western Sydney site, and largely along the largest southern riparian corridor. The River Flat Eucalypt Forest runs along the perimeter of the precinct in the north.

Riparian corridors are identified in Figure 12 below, and these are largely co-located with significant areas of natural vegetation.

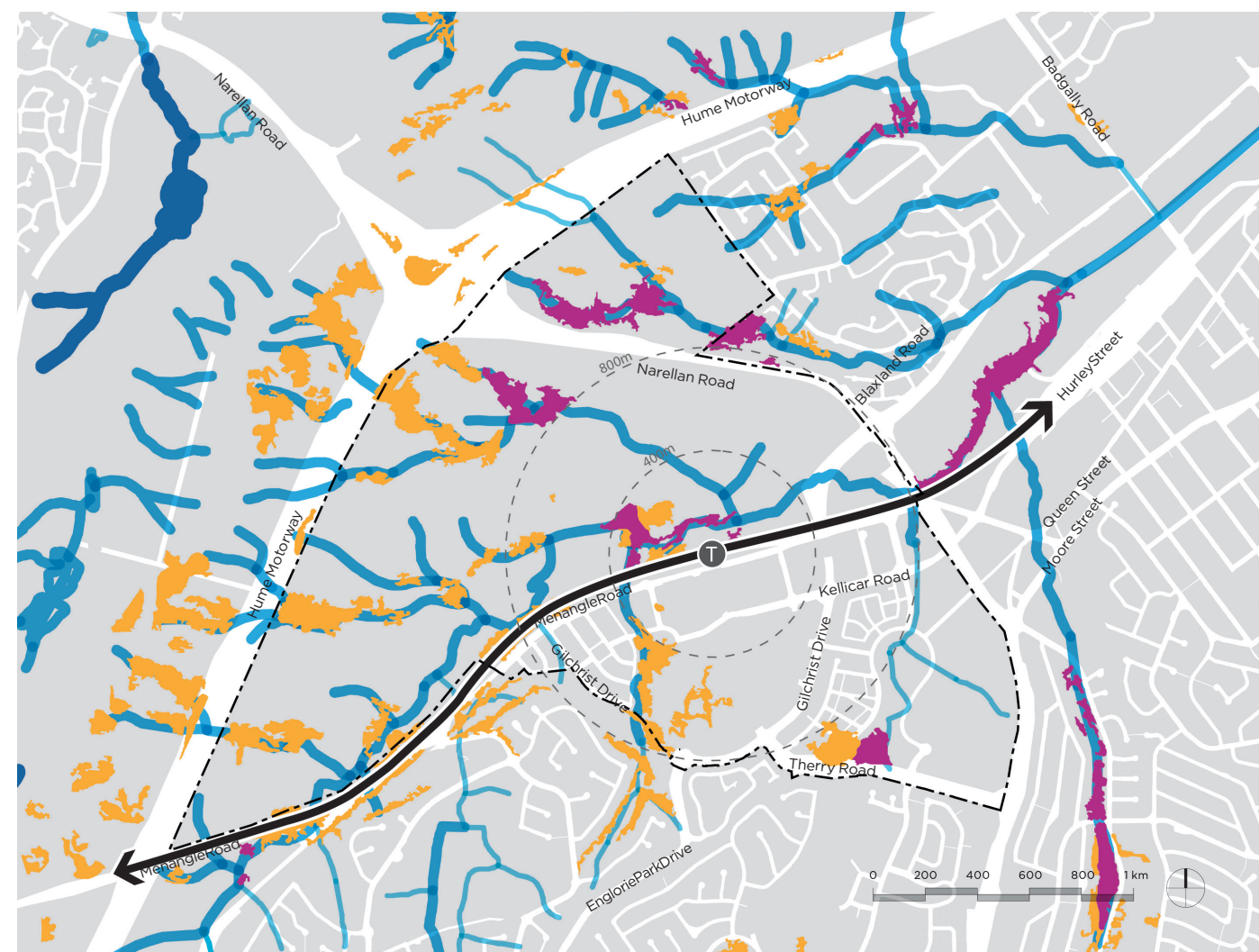


Figure 12: Vegetation and ecology within the Macarthur precinct

## Bushfire Risk

Due to the large amount of existing vegetation in the precinct, there is a relatively large amount of land that is subject to bushfire risk.

However, much of the land to the north-west of the rail line is currently being developed for residential housing. As development occurs, the area of land subject to bush fire risk will reduce significantly in this part of the precinct.

Any redevelopment of land within these bushfire prone areas will need to provide the required asset protection zones in accordance with relevant bushfire protection guidelines.

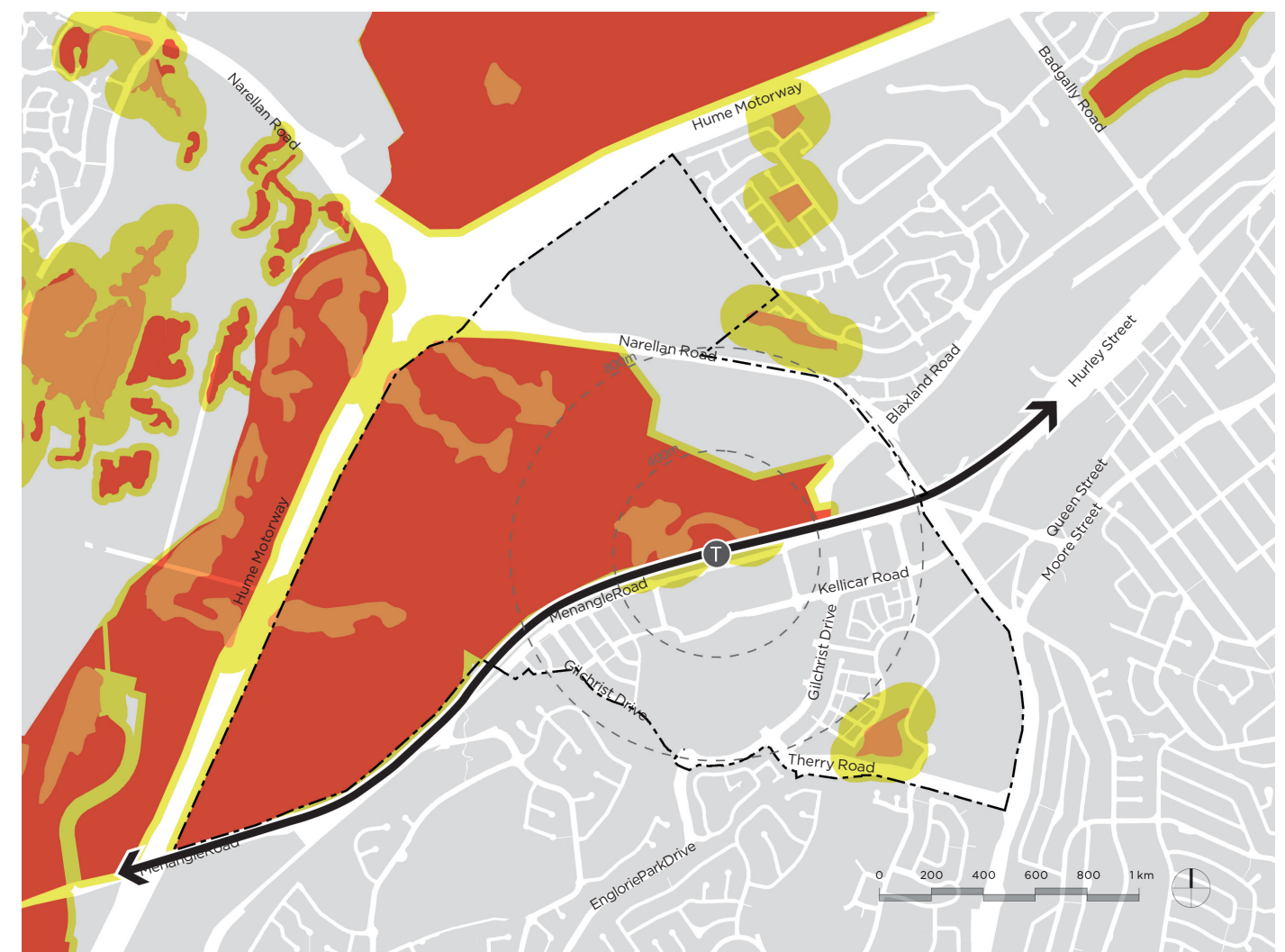


Figure 13: Areas of bushfire risk within the Macarthur precinct

# Site Context

## Heritage

The precinct contains one listed heritage item. On the Poor Clare Nuns Maryfields site in the north of the precinct, the Stations of the Cross statues are a local heritage item and are of historic and social heritage significance.



Figure 14: Heritage items within the Macarthur precinct

## Recent Residential Development

Recent development is considered a short to medium term constraint to development as the average life cycle of a building is generally 30 to 40 years.

Analysis of recent residential development over the last 15 years indicated that incremental low rise development has occurred throughout the precinct. Figure 15 below illustrates where this development has occurred.

Much of the recent development has occurred in the south of the precinct, generally in large residential developments, such as Park Central. Residential development is also currently being constructed on land to the west of the rail line, adjacent to the University of Western Sydney. This provides limited opportunities for renewal in the precinct over the next 20 years.

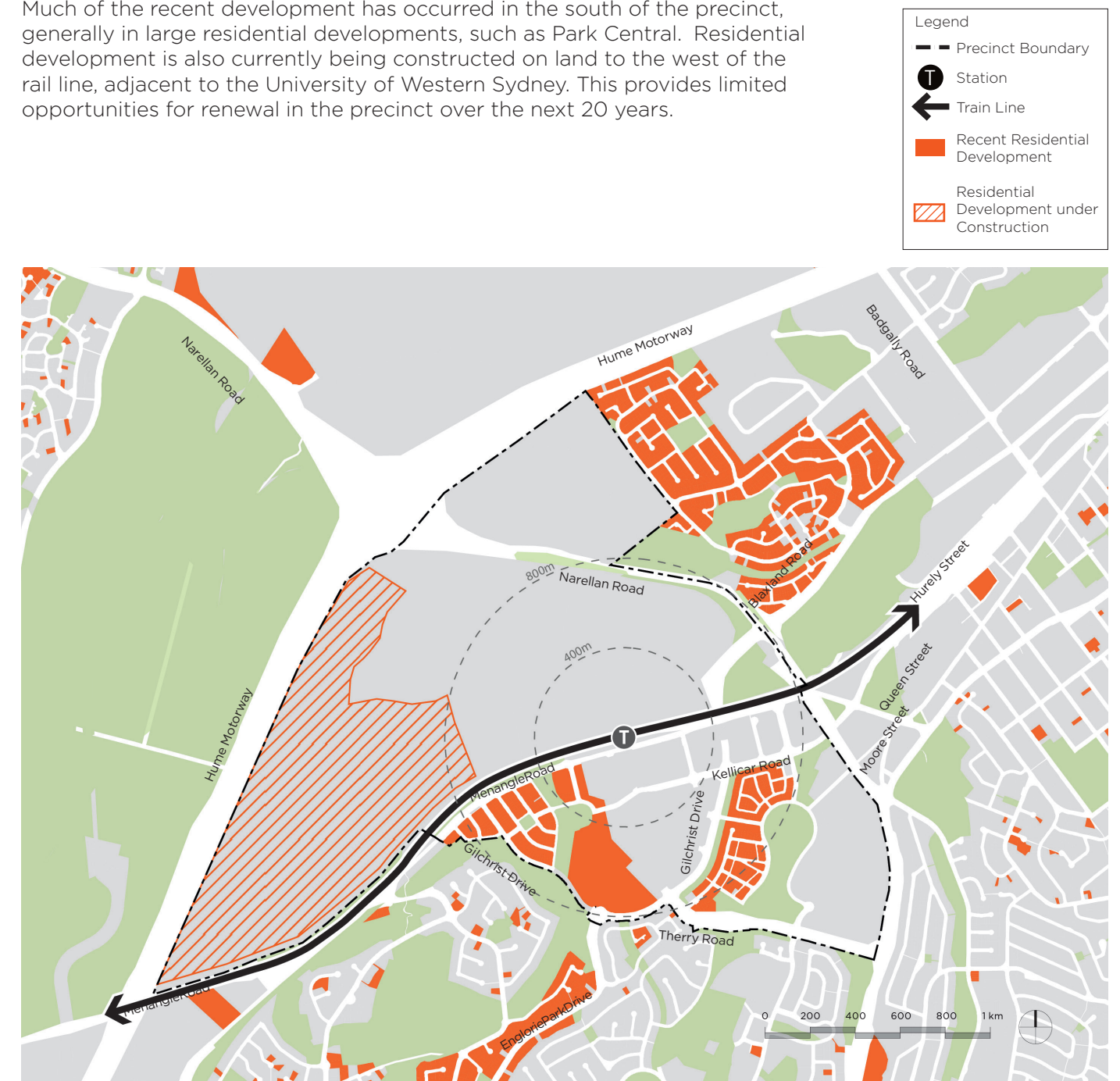


Figure 15: Recent residential development within the Macarthur precinct



# Land Ownership

The following figure illustrates the different land ownership patterns in the precinct. Large tracts of land are owned by the NSW Government, including the University of Western Sydney site and the Campbelltown Hospital, as well as some local parks. There are also many land holdings owned by Campbelltown Council, including the large tract of land bordering the south of the precinct.

There is some strata titled land throughout the precinct, predominantly in the east of the precincts.

Overhead transmission wires and corresponding easements traverse the length of the precinct in the north. This significant utility service and easement corridor represent a constraint to certain types of development within its vicinity.



Figure 16(a): Land ownership within the Macarthur precinct, Campbelltown Private Hospital

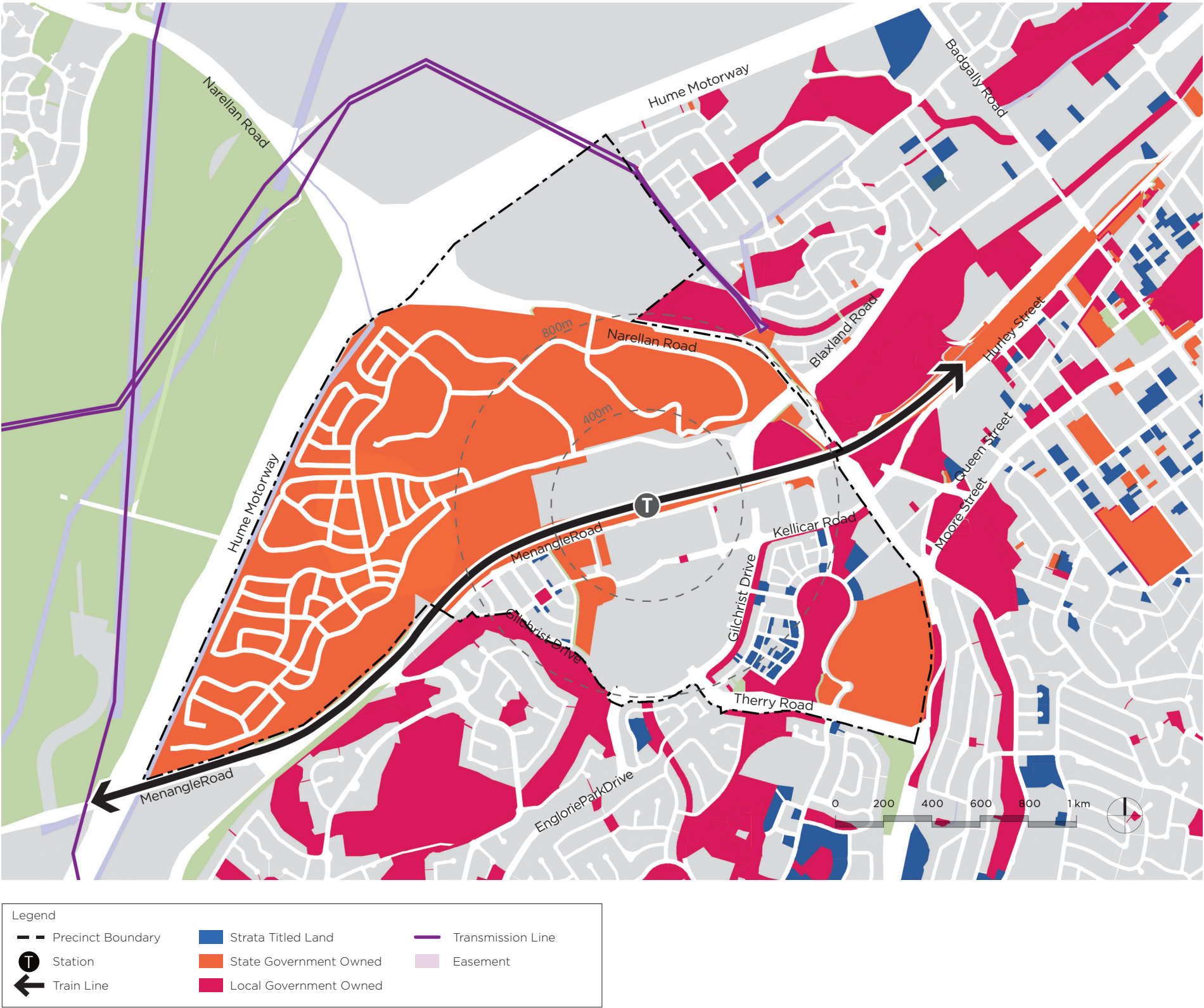


Figure 16(b): Land ownership within the Macarthur precinct



# Site Context

## Social Infrastructure

The precinct is well served by a range of community facilities and infrastructure as indicated in Figure 17. There are over five local open spaces that provide both passive and recreational open spaces, as well as many religious centres, childcare and early learning facilities, and various community services.

Many of these community facilities are located in the eastern half of the precinct within an 800m radius of the station. A large majority of Macarthur's residents live in this eastern half of the precinct.

Local Government Social Infrastructure	Nearby facilities servicing the precinct
1. Gilchrist Oval	19. Ambarvale Masonic Centre
2. Marsden Park	20. Ambarvale Sports Complex
3. Robinson Park	21. Australian Botanic Garden Mount Annan
State Government Social Infrastructure	22. Campbelltown Golf Club
4. Barber Reserve	23. Elgorie Park and CFK Child Care,
5. Campbelltown Hospital and Ambulance Service	24. Elgorie Park
6. Cooper's Cottage drug and alcohol rehabilitation	25. Fieldhouse Park
7. Macarthur Square Early Childhood Health Centre	26. Thomas Reddell High School
Private and Non-government Infrastructure	
10. Bethlehem Monastery and Poor Clare Nuns	
11. Campbelltown Private Hospital	
12. Happy Day Early Learning Centre	
13. KU Macarthur	
14. Macarthur Square Shopping Centre	
15. Macarthur Tenpin Bowling	
16. Unique Kids Child Care Centre	
17. UWS Clinic – medical centre	
18. WILMA Women's Health Centre	

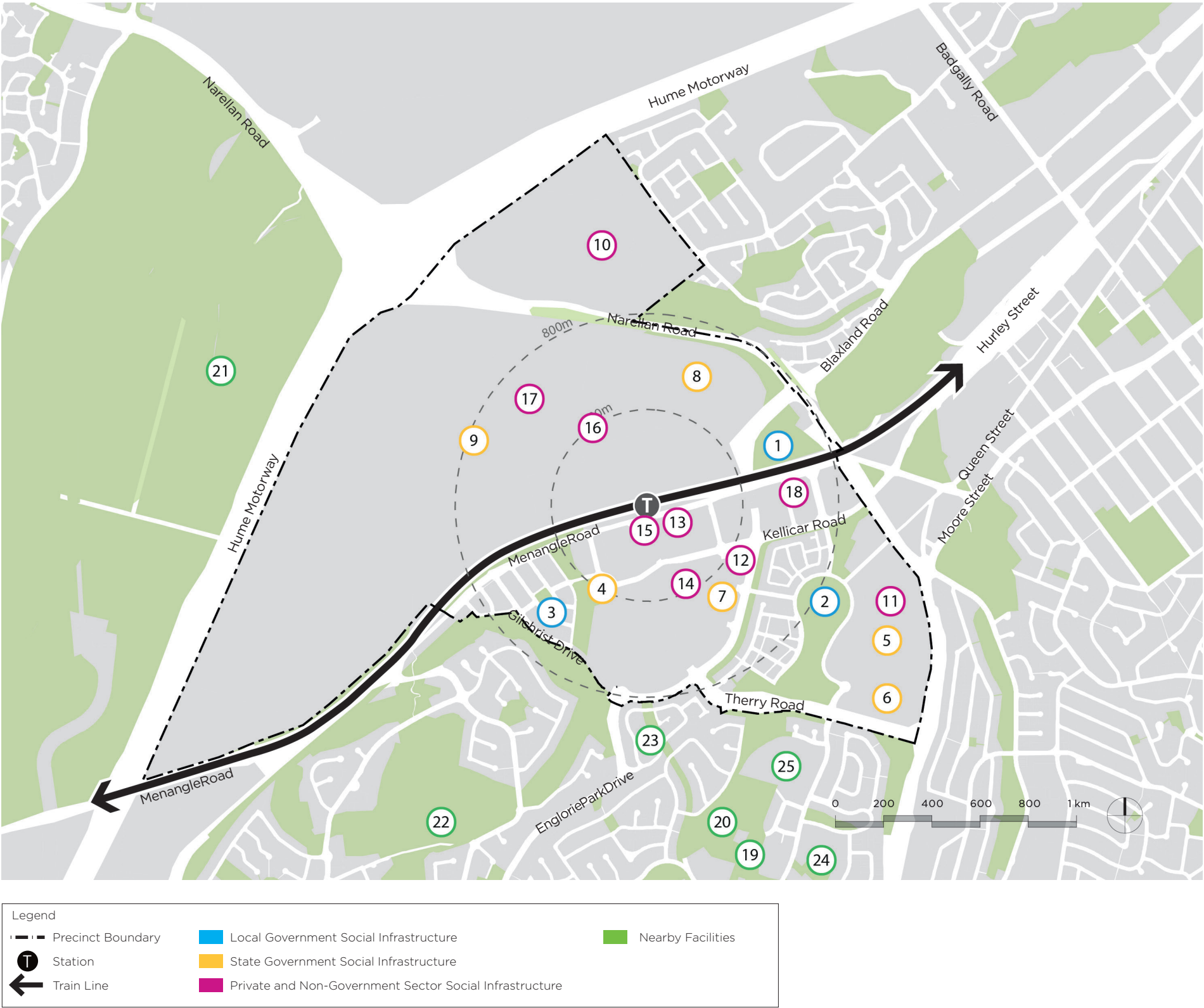


Figure 17: Social Infrastructure within the Macarthur precinct



# Combined Constraints

The combined constraints mapping indicates that there are large portions of the precinct that are constrained.

A considerable amount of the western half of the precinct is constrained due to significant vegetation, riparian corridors and flood prone land.

The land to the south of the rail corridor has seen a considerable amount of recent residential development over the last 5- 10 years, and land to the west of the rail corridor is currently being developed for residential housing. These areas are not likely to accommodate much renewal over the term of this Land Use and Infrastructure strategy.

# Unconstrained Land

Unconstrained land provides the most potential for renewal over the next 20 years, subject to further investigations.

The area of land between Menangle Road and Kellicar Road near the train station is unconstrained and has potential to drive the future renewal of the precinct.

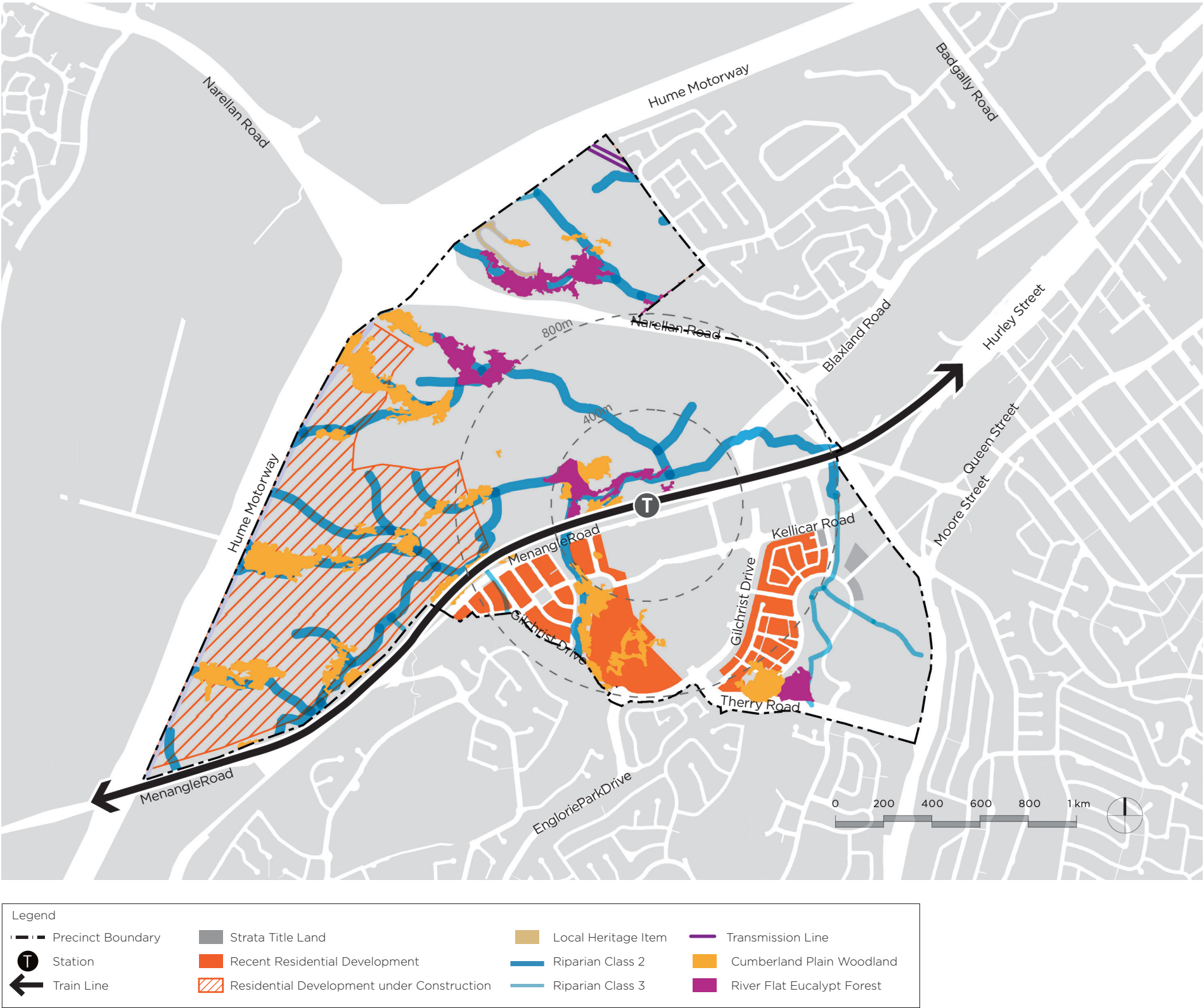


Figure 18: Combined constraints within the Macarthur precinct



# Macarthur Vision

## Built Form



- Provide a range of building heights, with increased heights close to the station to maximise pedestrian activity and increase trade for local businesses.
- Provide opportunities for high rise mixed use development along Kellicar Road, close to the station.
- Large floor plate, campus style office park west of the station.



Figure 19: Existing character for the Macarthur precinct, Macarthur Square at Kellicar Road

## Open Space and Public Domain



- Enhance the activity around Macarthur station with pedestrian friendly streets, outdoor dining, street tree planting, inviting public gathering spaces and attractive street furniture.
- Strengthen connections between the station and the University and TAFE.
- Improve night time safety by increasing lighting of pathways between the station and university.
- Longer term provision of a new primary school servicing the area.

## Housing



- Provide a variety of housing types within walking distance of the station to cater for all members of the community.

## Jobs



- Enhanced role as the retail hub of south west Sydney through a revitalised town square and activated Kellicar Road with high levels of amenity and access to public transport
- Continued expansion of the precinct's world class health and education sectors
- A new prestige campus-style office park will promote opportunities for business clustering and expansion of Campbelltown and Macarthur's knowledge economy in the medicine/health, education and administration sectors.

## Movement Network



- Promote cycling and walking by providing new shared pathways, separated cycleways, footpaths, pedestrian refuges, street tree planting, bicycle storage facilities and lighting.
- Introduce new regional and local cycle routes and walking connections to improve links with Macarthur station and the surrounding area.
- Improve linkages to and through the City Centre through a high quality pedestrian plaza connecting the station, Macarthur Square, Kellicar Road and Bolger Street.
- Improved connections to public spaces within the precinct and surrounding area, such as Marsden Park Barber Reserve and Mount Annan Botanic Gardens to capitalise on the natural assets surrounding the centre.



Figure 20: Existing character for the Macarthur precinct, Macarthur Square at Kellicar Road





**“Macarthur will complement Campbelltown as a Regional City Centre, with world class health facilities, integrated educational institutions, more diverse housing, a premier retail precinct and attractive public spaces”**

Figure 21: Desired future character for the Macarthur precinct, Macarthur Square at Kellicar Road



# Land Use and Infrastructure Plan

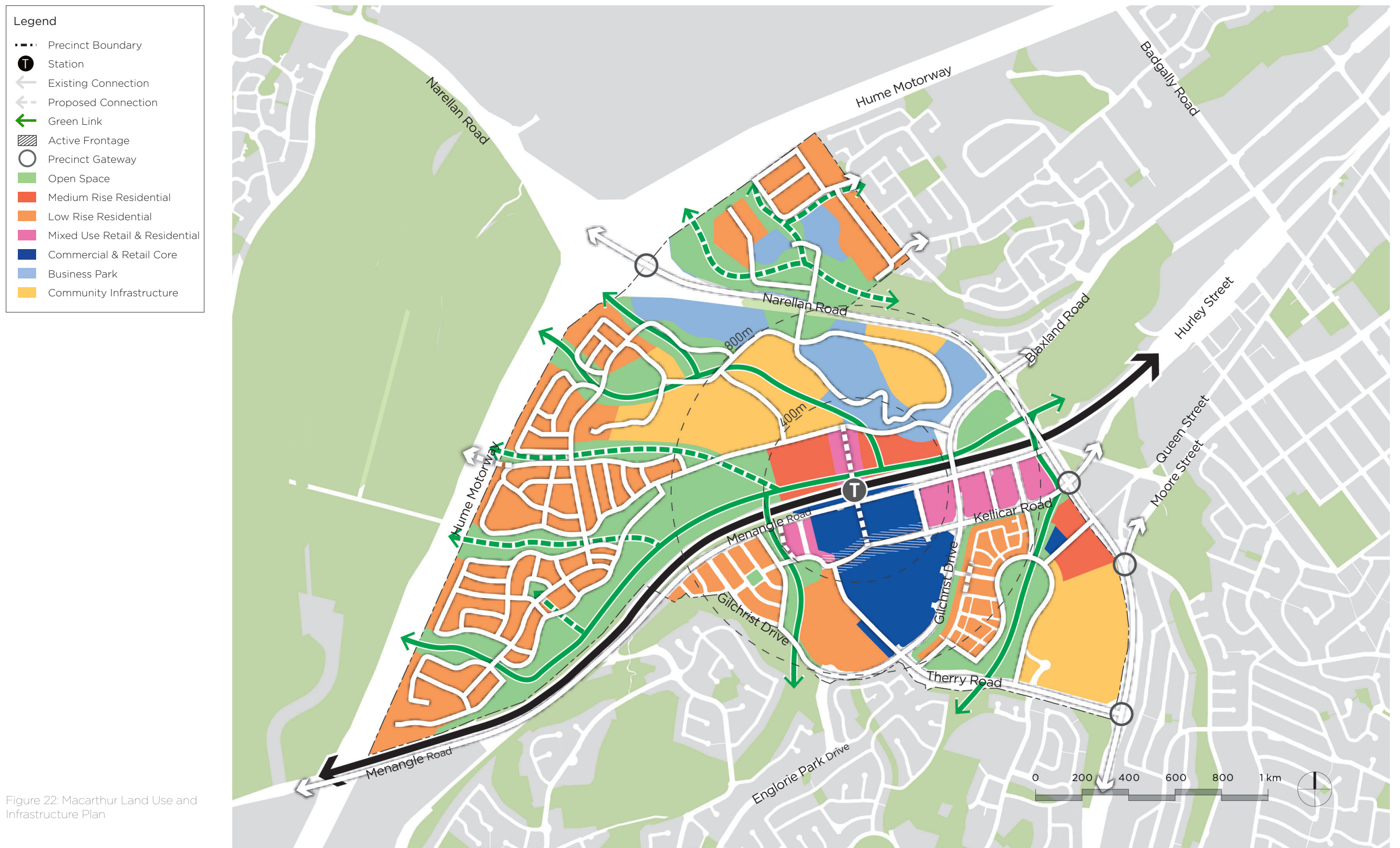


Figure 22: Macarthur Land Use and Infrastructure Plan



## Future Precinct Character

The following diagrams and images demonstrate the desired future character for each area in Macarthur precinct.

### Low Rise Residential

These areas will evolve to become a mixture of single-detached dwellings and town-houses, which will serve as a transition between the existing low rise residential areas beyond the precinct.



Figure 23: Proposed location of low rise residential, and desired character and built form

### Medium Rise Residential

This area could accommodate apartment housing to deliver a high level of amenity for the existing and future residents. The could comprise 4-6 storey apartment buildings, with potential for communal open spaces and shared facilities. The new dwellings should be carefully designed to integrate with the existing streetscape.



Figure 24: Proposed location of medium rise residential, and desired character and built form

### Mixed Use Retail & Residential

This area could accommodate a mix of retail and residential uses that would complement the character of the local area and would be carefully designed to integrate into the surrounding streetscape. Buildings would have ground floor retail that would provide local services for residents and commuters, with apartments above ranging from 7-10 storeys in height.



Figure 25: Proposed location of high density residential, and desired character and built form

### Business Park

This area could accommodate a large floorplate, campus style office park to facilitate business clustering.



Figure 26: Proposed location of business park and desired character and built form



# Land Use and Infrastructure Plan

## Transport and Movement

The proposed transport network aims to:

- ▶ Improve walking and cycling connections from Macarthur Station to the residential areas to the south;
- ▶ Increase direct bus routes and improve suburban bus route travel times to centres; and
- ▶ Improve road and street legibility and permeability throughout the precinct.

Key network improvements are identified on Figure 27 and include:

### Public Transport

- ▶ Investigate opportunities to improve direct connections and reduce travel times for the suburban bus network suburban bus network to create a more connected system that provides direct routes to, from and through the corridor
- ▶ Investigate opportunities for a potential public transport link from Menangle Road to Camden Road, under Narellan Road to improve pedestrian, cycle, and public transport connectivity
- ▶ Kiss and ride facility on the north side of Macarthur station

### Walking and Cycling

- ▶ New regional cycle route parallel and perpendicular to the railway line to provide better connections to the station and surrounding area
- ▶ Series of local cycle network improvements, including:
  - Through the University Basin Reserve and along Goldsmith Avenue, linking to the university residential development to the west and Mount Annan Botanic Garden
  - Bolger Street and Parc Guell Drive, linking to the residential precinct and Campbelltown Hospital to the east
  - Through the Barber Reserve to link to the south
- ▶ Streetscape works, such as footpath improvements and pedestrian crossings, to improve station connections and pedestrian environments.

### Parking

- ▶ Undertake a parking study for the precinct to identify parking demand, develop appropriate parking management strategies and identify opportunities for improved mode share to increase walking, cycling and public transport use.

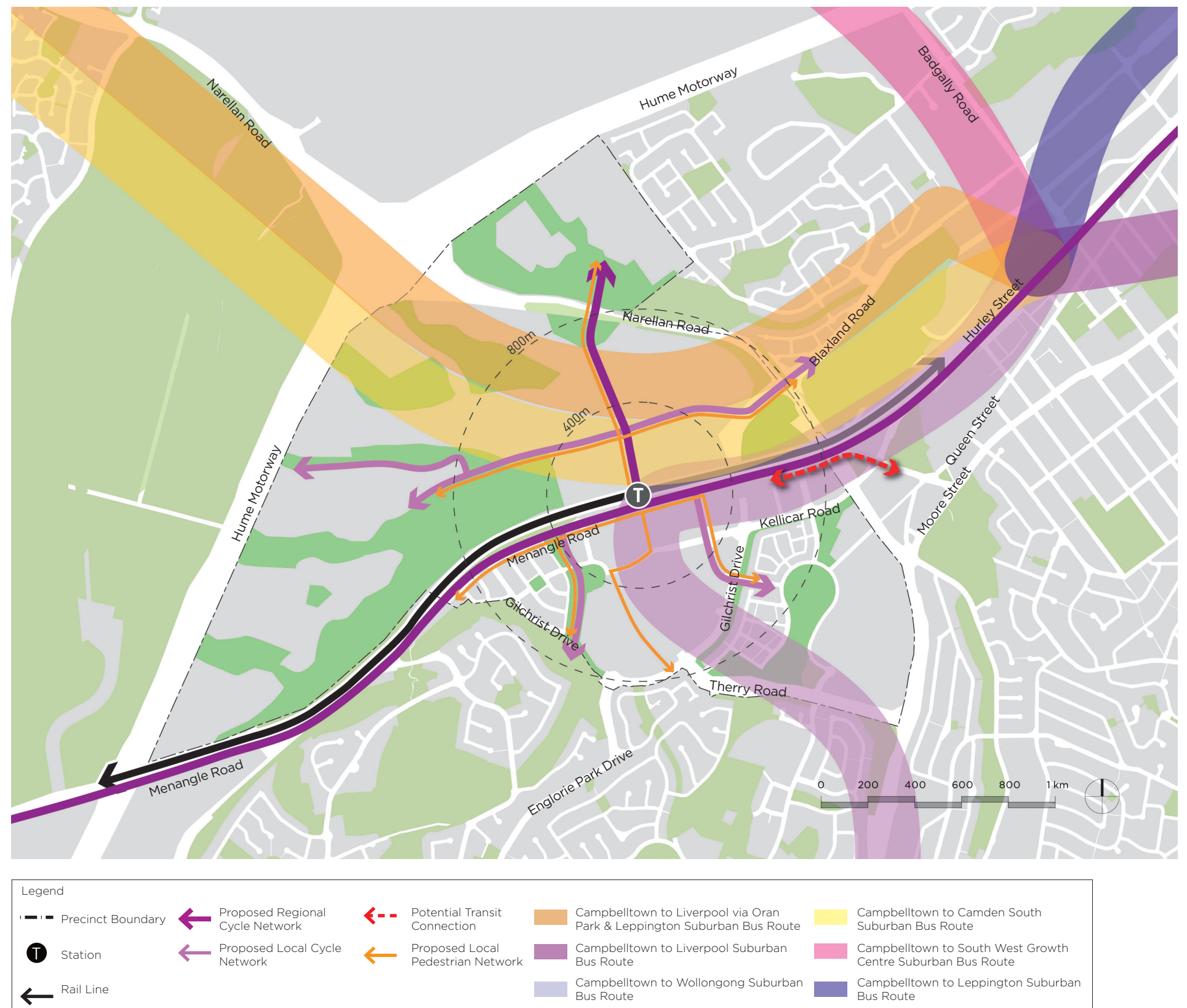


Figure 27: Proposed transport infrastructure improvements in Macarthur



# Environment and Open Space

Enhancing and improving access to open space on the western side of the railway line is a key priority for the precinct.

Gilchrist Oval is the primary active open space in the precinct. Improving active transport connections across the railway line along Narellan Road and through the university, in addition to upgraded amenity facilities and lighting, would encourage its more intensive use.

On the western side of the precinct, a series of 'green fingers' are also proposed to:

- ▶ Provide a number of places for recreation between future development areas
- ▶ Enhance ecological corridors and green links
- ▶ Improve stormwater runoff and flooding impacts through water sensitive urban design measures
- ▶ Improve connections to the surrounding regional open space at Mount Annan Botanic Gardens through new pedestrian paths and cycle links
- ▶ Increase indigenous tree planting.

# Community Facilities

The precinct does not contain any existing community facilities. As Macarthur and the adjoining Campbelltown precincts develop as a regional city centre, a new district level multi-purpose community centre should be established.

Council's existing HJ Daley Library should also be expanded to meet the combined needs of the regional city, which could be co-located with the new multi purpose community facility.

# Education

There will be strong demand for additional classrooms and associated infrastructure in schools in the precinct. Advice from the NSW Department of Education indicates that a new primary school is likely to be required by 2036 to jointly serve the Macarthur and Campbelltown Precincts.

Existing high school sites serving the precinct have large sites that may be able to accommodate requirements and no new schools are likely to be required by 2036.

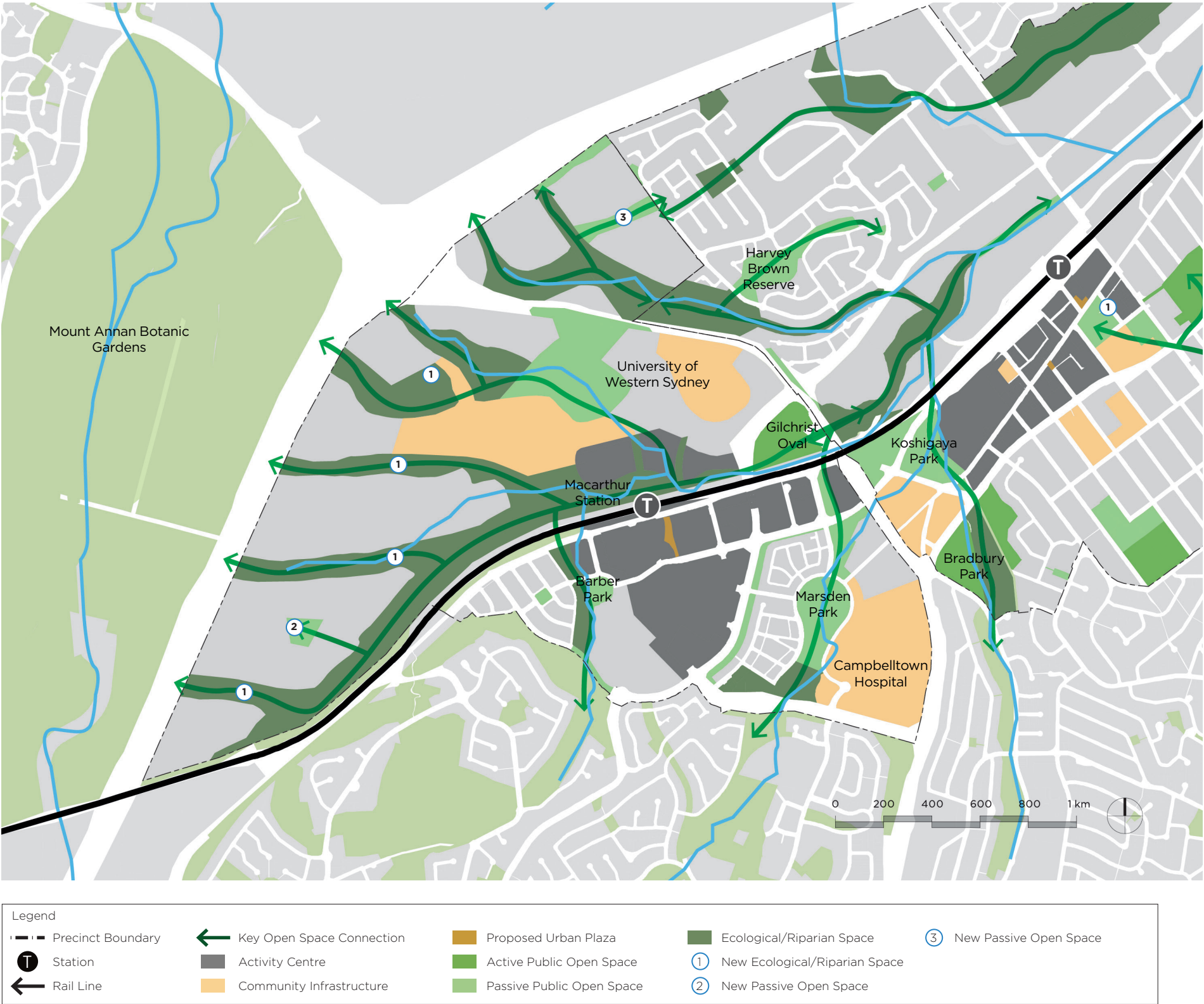


Figure 28: Proposed social infrastructure improvements in Macarthur



# Public Domain Options

## Macarthur Square and Mainstreet Public Domain Vision

A new public square and streetscape upgrade of Kellicar Road 'mainstreet' would transform the area as the focal point of the precinct. The square will be a highly social, safe, inclusive and relaxed urban space with the capability to meet everyday needs and programmed events.

Future development of the public square would be informed by the following design principles:

### Design Principle 1

Create a locally-responsive public space with attractive retail edges that facilitates the 'everyday experience' - places to sit, lawn, trees, shade structures and outdoor dining areas - and also functions as a canvas for community gatherings, events and civic meetings.

### Design Principle 2

Provide streets and a square with a high quality pedestrian amenity, including comfortable micro-climate conditions, wide and accessible footpaths, street trees, good lighting and additional road crossings.

### Design Principle 3

Reveal the precinct's unique natural and cultural qualities through interpretation, materials selection and artworks.

### Design Principle 4

Establish a consistent materials palette that is attractive and robust and responds to local precinct character and the practical demands of everyday use.

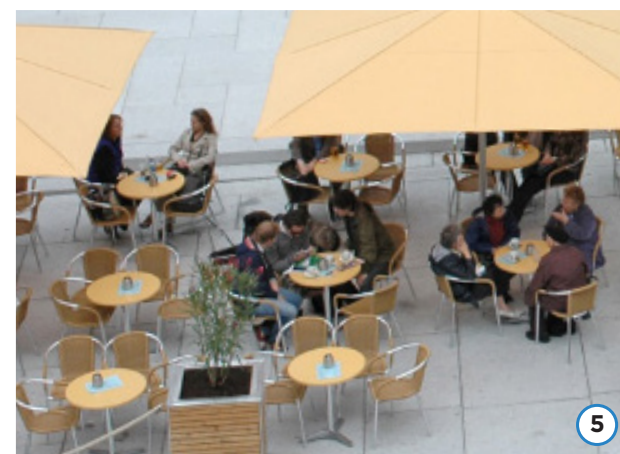
### Design Principle 5

Create a safe, vibrant pedestrian friendly street by narrowing Kellicar Road to two traffic lanes, locally raising the street level, introducing alternative roadway materials and providing excellent lighting throughout.

### Design Principle 6

Implement best practice environmental and social sustainability by first, creating a quality design with longevity and physical robustness, through appropriate materials selection and maximising tree planting including local species.

## Public Domain Character



Active Retail

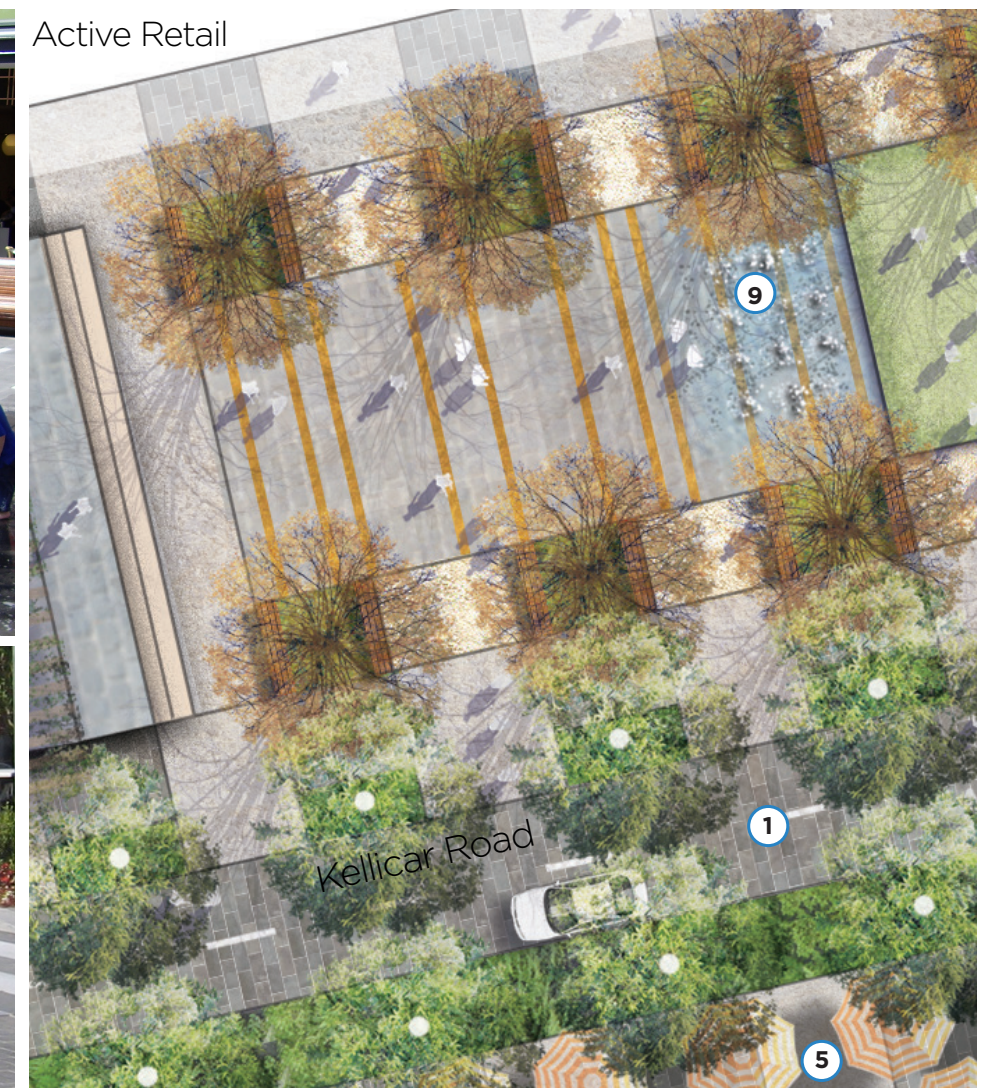


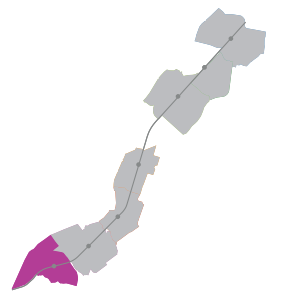
Figure 29: Desired public domain outcomes for the precinct

## Materiality



Figure 30: Desired material finishes for the precinct





# Macarthur Square and Mainstreet Concept Plan



Figure 31: Proposed Macarthur public space and mainstreet concept



# Projected Growth

## Projected Growth

Macarthur precinct's projected growth is a calculation of the amount of residential and employment development that is expected to take place by 2036. The outcome of these projected growth calculations is provided below.

### Residential

The Department applied the Urban Feasibility Model (UFM) to determine the precinct's development potential under existing market conditions. Macarthur has been one of the strongest performing precincts in the Glenfield to Macarthur corridor from a market take-up and sale price perspective. The underlying demand for new dwellings in Macarthur remains strong and this is projected to continue over the next twenty years. Additional market demand analysis indicated that in the short to medium term, feasibility may increase as land values and property prices increase and the availability of detached homes decreases.

It is anticipated that around 5,000 additional dwellings could be delivered in the precinct by 2036. This equates to around 200 dwellings per year, which has been used to assess future infrastructure requirements in the precinct. Over time, there is likely to be increasing demand for medium and high rise residential housing close to the station, which will facilitate more retail investment and employment opportunities. This is consistent with broader market trends. Further from the station, low rise housing will remain the predominant housing type.

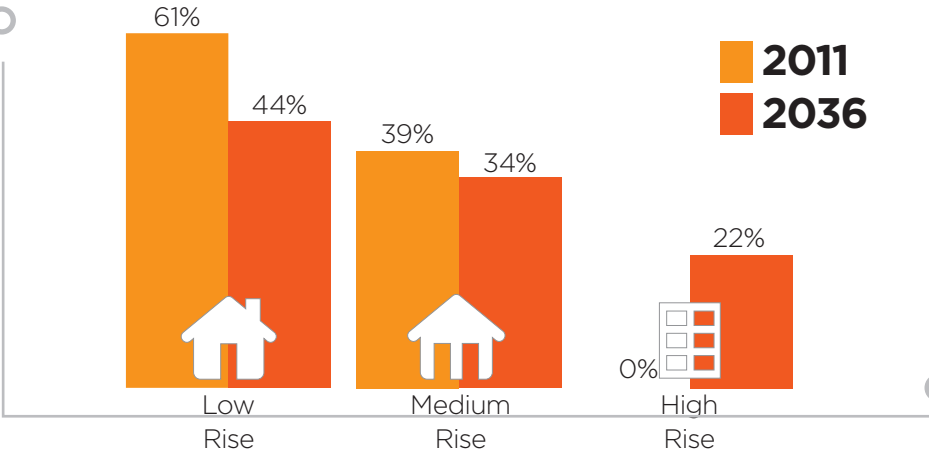


Figure 32: Existing and projected dwelling growth by typology in Macarthur

Dwelling Type	2021	2031	2036
Low Rise	400	1,500	2,200
Medium Rise	1,600	1,700	1,700
High Rise (Mixed Use)	0	800	1,100
Total Dwellings	2,000	4,000	5,000

Figure 33: Cumulative projected dwelling growth in Macarthur

### Employment

An employment lands analysis projected demand for an additional 348,000m2 of employment lands within the precinct to 2036. This will deliver around 4,300 additional jobs, predominately in education and healthcare (174,000m2) and retail (59,000m2).

The Land Use and Infrastructure Plan provides appropriate employment floorspace to ensure there is capacity to accommodate this employment growth.

The Land Use and Infrastructure Plan identifies significant areas for education and health uses, based around major community assets including the University of Western Sydney School of Medicine, Campbelltown Hospital and Campbelltown Private Hospital. There is also a considerable amount of land proposed for mixed use development around the station, which will provide capacity or additional retail and commercial jobs.

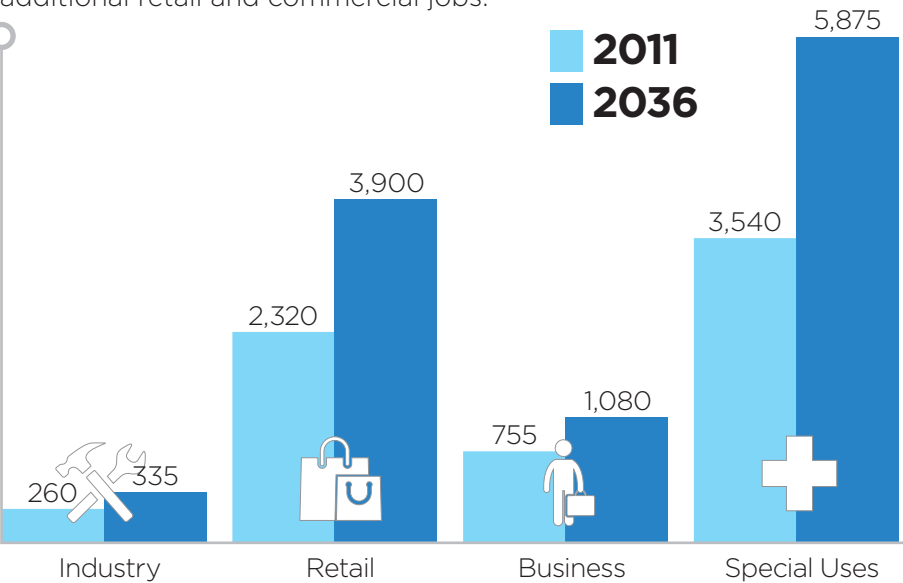


Figure 34: Existing and projected jobs growth by typology in Macarthur

Job Type	2021	2031	2036
Industry	30	60	80
Retail	670	1,250	1,580
Business	200	280	320
Special Uses	870	1,820	2,340
Total Jobs	1,770	3,410	4,320

Figure 35: Cumulative projected jobs growth in Macarthur

### Calculating Growth Potential

Macarthur precinct's projected growth is a calculation of the amount of residential and employment development that is expected to take place by 2036. The projected growth calculations take into consideration the following factors:

- **Development on unconstrained sites.** Development is projected to occur on the unconstrained sites identified on page 15 of this report.
- **The Proposed Future Character and Built Form.** The Land Use and Infrastructure Plan on page 18 identifies the desired future character and built form throughout the precinct. These building types have been applied to the precinct's unconstrained sites.
- **Assumptions.** A series of assumptions have been applied to calculate the land areas required for each development type, and the number of dwellings and jobs that could be provided. These assumptions are documented in Figure 5 of the Glenfield to Macarthur Urban Renewal Corridor Strategy.
- **Economic Feasibility.** An analysis of the housing potential and development feasibility of the precinct's unconstrained sites was undertaken using the Department's Urban Feasibility Model (UFM). The UFM is a strategic planning tool used to determine the likelihood of the current market to deliver various types of dwellings.
  - Assessed the desired future character, built form and densities proposed under the Land Use and Infrastructure Plan, against market conditions and demand; and
  - Identified take-up/realisation rates for each land use within the precinct, which informed the calculation of the projected growth.
- **Market Demand.** A high level demand analysis has been undertaken to determine the demand for different dwelling types on unconstrained sites within the precinct. The analysis:
  - Assessed the desired future character, built form and densities proposed under the Land Use and Infrastructure Plan, against market conditions and demand; and
  - Identified take-up/realisation rates for each land use within the precinct, which informed the calculation of the projected growth.
- **The 'take-up' or 'realisation' rates** were informed by several factors, including broader population growth, property sub-markets, historic dwelling activity, the development pipeline, the precinct's dwelling capacity and current market feasibility.



## Infrastructure Analysis

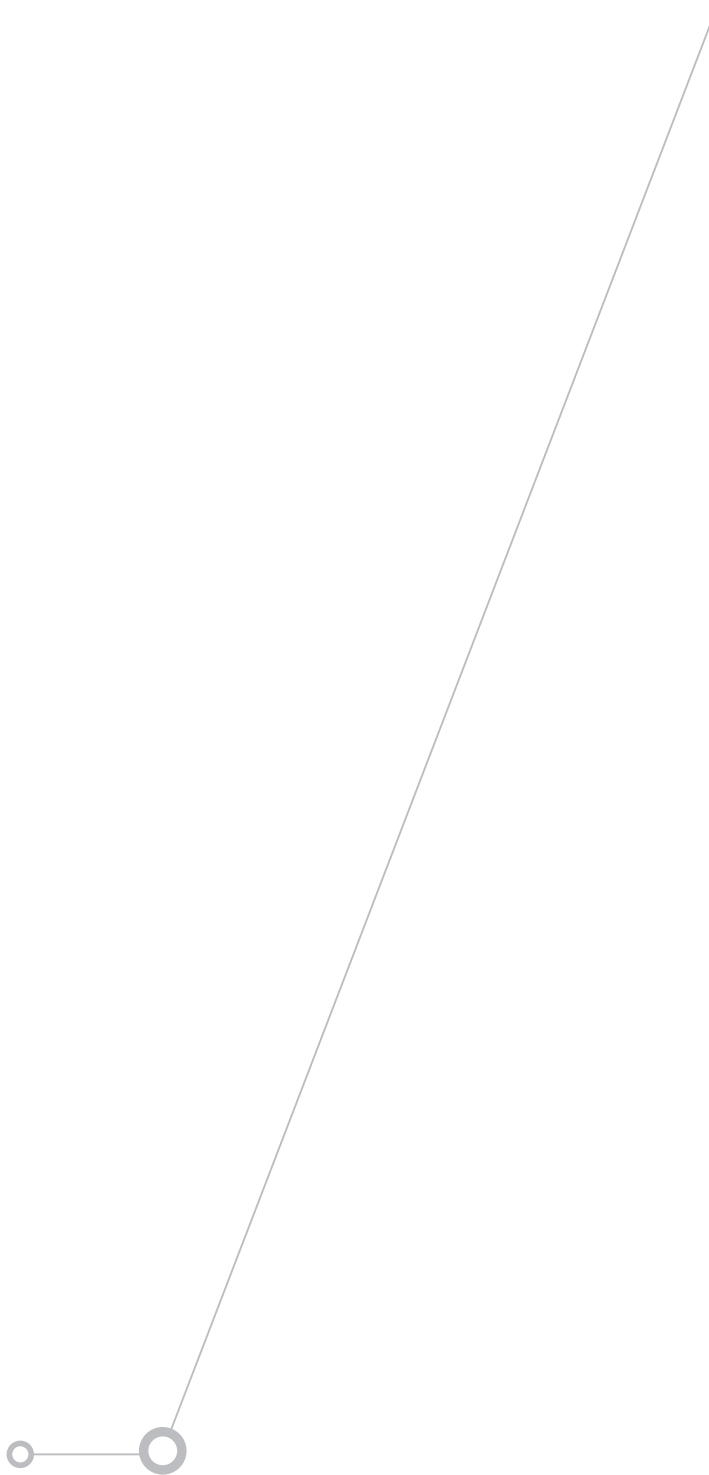
Figure 36 provides a summary of the infrastructure items required to support the projected growth in the precinct. This includes public transport, walking and cycling upgrades, roads and community infrastructure. Services utilities such as water, sewage, electricity and gas will also be upgraded as the growth occurs.

The infrastructure items would be funded and delivered by a range of sources as identified in Figure 36 and would be subject to more detailed investigations to inform the delivery time frames, design and costings.

Item	Measure	Planning Responsibility	Timing	Funding Mechanism
<b>Public Transport</b>				
1	Increased rail services to meet the needs of the precinct's growth	TfNSW	Train service levels are reviewed continually by TfNSW. The stopping patterns and level of service will be matched to the growth of the precinct	TfNSW delivery responsibility
	Investigate opportunities to improve direct connections and reduce travel times for the suburban bus network suburban bus network to create a more connected system that provides direct routes to, from and through the corridor	TfNSW	Bus service levels are reviewed continually by TfNSW and RMS. Detailed planning for a new suburban bus route to be investigated based on development in the area	TfNSW delivery responsibility
3	Investigate opportunities for a potential public transport link from Menangle Road to Camden Road, under Narellan Road	Council/TfNSW	To be determined as precinct develops	Subject to further funding and delivery mechanisms
<b>Walking &amp; Cycling</b>				
4	New regional cycle routes parallel and perpendicular to the railway line to provide better connections to the station and surrounding area	TfNSW	To be determined as precinct develops	TfNSW funding responsibility
5	Series of local cycle network improvements, including at: <ul style="list-style-type: none"> <li>Through the University and along Basin Reserve Goldsmith Avenue, linking to the university residential development to the west</li> <li>Bolger Street and Parc Guell Drive, linking to the residential precinct and Campbelltown Hospital to the east</li> <li>Through the Barber Street Reserve to link to the south</li> </ul>	Council	To be determined as precinct develops	Delivery as part of Council's Section 94 Plan/VPA
6	Streetscape works such as footpath improvements, pedestrian crossings and refuges, street tree planting, bicycle storage facilities and lighting.	Council	To be determined as precinct develops	Delivery as part of Council's Section 94 Plan/VPA
<b>Education &amp; Community Infrastructure</b>				
7	Potential longer term need for a new primary school to service the Campbelltown and Macarthur precincts	Department of Education and Communities	To be determined as precinct develops	Delivered as part of DEC's School Cluster Asset Plan
8	Potential development of a multipurpose community centre and expanded central library servicing the Campbelltown and Macarthur precincts	Council/ developer	To be determined as precinct develops	Delivery as part of Council's Section 94 Plan/VPA

Figure 36: Infrastructure servicing required in the Macarthur precinct





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