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# WARWICK FARM STRUCTURE PLAN URBAN DESIGN REPORT

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## WARWICK FARM STRUCTURE PLAN

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Revision	Date	Description	By	Chk	App
01	22/06/2020	Draft Urban Design Report	WW/DW	DA	
02	30/06/2020	Final Draft Urban Design Report	WW/DW	WVJ	

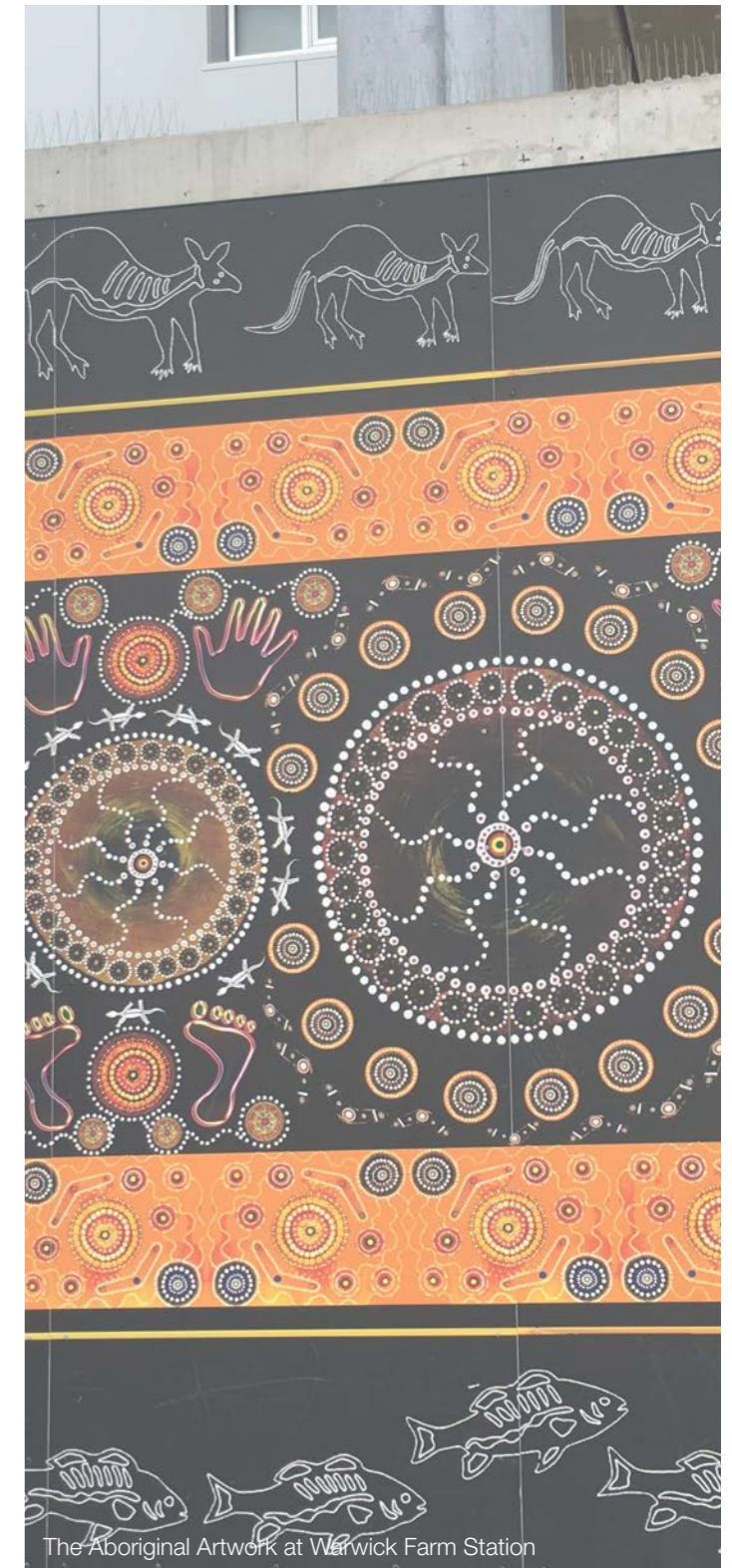
Prepared for:  LIVERPOOL CITY COUNCIL

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Warwick Farm

T

Warwick Farm Station

## 1.0 Introduction

### 1.1 Background Introduction

Conybeare Morrison International (CM<sup>+</sup>) and the consultant team are engaged by Liverpool City Council (LCC) to conduct a study of the Warwick Farm Precinct (the precinct) and develop a Structure Plan as well as the associated Planning Proposal and Contributions Plan to submit to the Department of Planning, Industry and Environment (DPIE) for Gateway determination.

In the December 2019 Council meeting, Liverpool City Council decided to support a B4 Mixed Use zoning within the precinct and deliver a high quality Urban Renewal Precinct with optimal urban design outcomes. Council has also resolved to support in principle the Planning Proposal at No. 240 Governor Macquarie Drive (GMD), lodged by SJB Planning on behalf of Warwick Farm Central (Projects) Pty Ltd, with reduced height and density as well as a new VPA offer. Subsequently, Council prepared and lodged a Planning Proposal to the DPIE on the 25<sup>th</sup> of February 2020 seeking to amend the Liverpool Local Environmental Plan 2008 (LLEP 2008), including:

- Rezone No. 240 GMD from B5 Business Development to part B4 Mixed Use and part R4 High Density Residential.
- Increase the maximum floor space ratio development standard applying to No. 240 GMD from 0.75:1 to 2:1.
- Increase the maximum height of buildings development standard applying to No. 240 GMD from 15m to 50m.
- Reduce the minimum lot size development standard applying to No. 240 GMD from 2ha to 1,000 m<sup>2</sup>.
- Add a site-specific clause to the LEP, which would enable development of No. 240 GMD to access bonus FSR provisions equivalent to Clause 4.4 (2B) of LLEP 2008 up to a maximum of 3:1.

To inform the development of the Structure Plan and the Planning Proposal for the whole precinct, CM<sup>+</sup> and the consultant team have conducted a thorough background review and analysis of the precinct and its strategic and local context. The team has also considered the latest Council resolutions relevant to the precinct and the Planning Proposal at No. 240 GMD by LCC. The detailed review, Urban Design analysis and the proposed Structure Plan is provided in the following chapters of this report.



Figure 1: Aerial view of the Warwick Farm Precinct

### Planning Proposal

#### 240 Governor Macquarie Drive (Lot 1 DP1162276), Warwick Farm

Amendment to the Liverpool Local Environmental Plan 2008:

- Rezone the site from B5 Business Development to part B4 Mixed Use and part R4 High Density Residential;
- Increase the maximum floor space ratio development standard applying to the site from 0.75:1 to 2:1;
- Increase the maximum height of buildings development standard applying to the site from 15m to 50m;
- Reduce the minimum lot size development standard applying to the site from 2ha to 1,000 m<sup>2</sup>; and
- Add a site-specific clause to the LEP, which would enable development of the site to access bonus FSR provisions equivalent to clause 4.4 (2B) of LLEP 2008 up to a maximum of 3:1

25 February 2020

LIVERPOOL  
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## 1.0 Introduction

### 1.2 The Study Area

The Warwick Farm Precinct is located in the Liverpool Council Local Government Area (LGA), in the suburb of Warwick Farm. The Liverpool CBD, which is the third largest CBD of Metropolitan Sydney, is approximately 1.5km (10-minute drive) to the southwest of the precinct. The Warwick Farm Racecourse is across Governor Macquarie Drive to the northeast of the precinct.

The precinct has an area of approximately 28.4 hectares and is bounded by the Hume Highway to the northwest, the railway corridor to the west, Priddle Street to the south, Horseshoe Pond to the east and Governor Macquarie Drive to the northeast.

It is well connected to the surrounding suburbs, parks, sport and recreational facilities as well as educational facilities. Rosedale Oval, located within the precinct, is an 'A-Grade' Cricket Ground. A children's playground is located within Rosedale Oval along National Street. Hart Park is across the railway corridor to the west of the precinct. Liverpool Hospital is approximately 800m to the southwest of the precinct.

The precinct is also well served by the Hume Highway, major roads, local roads and public transport. Warwick Farm Station, which is serviced by T2 Inner West / Leppington, T3 Liverpool / Lidcombe and T5 Richmond / Leppington lines, provide frequent train services to the major strategic and local centres, including Liverpool CBD, Parramatta CBD and Sydney CBD.

The Warwick Farm Precinct currently has a mix of uses, however most are related to the equine business. Residential, hotel and motel accommodation is scattered within the precinct. A general industrial area is immediately adjacent to the Warwick Farm Precinct to the south, which generates a large amount of heavy vehicle traffic movements through Manning and Munday Streets to Governor Macquarie Drive and the Hume Highway. The conflict of uses between small vehicles, heavy vehicles, pedestrian and horses is one of the major issues within the precinct.

Council, at its December 2019 meeting, has identified the Manning Street Bypass as a priority project to redirect heavy vehicles from entering the core of the precinct, therefore facilitating the redevelopment of the precinct to mix of uses, including B4 Mixed Use zone. The Manning Street Bypass project is at the preliminary stage. Detailed information regarding the proposed Manning Street Bypass will be made available to the public once the design is finalised.



Figure 2: The Warwick Farm Precinct



## 1.0 Introduction

### 1.3 Project Objectives

The project aims to:

- Rezone the Warwick Farm Precinct to a mix of uses, including B4 Mixed Use, R4 High Density Residential and RE1 Public Recreation consistent with the Liverpool Local Strategic Planning Statement (LSPS).
- Incorporate the Council endorsed Planning Proposal at No. 240 Governor Macquarie Drive into the overall precinct planning.
- Develop a well considered Structure Plan for the precinct to guide future development.
- Achieve the objectives and actions identified in the Liverpool Local Strategic Planning Statement (LSPS).
- Mitigate the potential traffic and flooding impacts.
- Improve the public domain, including pedestrian / cycling linkages, wayfinding and new public spaces.
- Deliver public benefits as a result of the redevelopment.
- Provide appropriate height and density across the precinct based on the analysis of constraints and opportunities.
- Prepare a Planning Proposal and Contributions Plan based on the Structure Plan to submit to the DPIE for a Gateway Determination.

### 1.4 The Team

The CM<sup>+</sup> led Consultant Team includes the following expertise:

- Project Management - CM<sup>+</sup>
- Urban Design - CM<sup>+</sup>
- Strategic, Statutory Planning and Contributions Plan- GLN Planning
- Transport Planning - SCT Consulting
- Flood Management - WMA Water
- Social and Community Planning - Cred Consulting
- Economic and Land Valuations - Atlas Urban Economics
- Quantity Surveying - Mitchell Brandtman

The Consultant Team has worked closely with Liverpool City Council to deliver this project. The team structure is illustrated in Figure 3.

### 1.5 Methodology

The development of the Structure Plan has been undertaken using the following methodology:

- Attend an Inception Meeting with Council to familiarise with the background information and confirm the project objectives, program and deliverable.
- Conduct a site visit of the precinct and its surrounding context to familiarise with the area.
- Undertake background information review.
- Conduct Urban Design Analysis, planning study, traffic and transport study, flood study and social infrastructure study to identify constraints and opportunities.
- Establish the Urban Design Vision and Principles for the precinct.
- Develop Structure Plan options based on the Urban Design Vision and Principles as well as the input from the Consultant Team.
- Workshop with Council on the Structure Plan options.
- Develop and document the preferred Structure Plan option, based on the feedback from Council and the Consultant Team.
- Present the Structure Plan to Councillors and refine it based on the feedback received.
- Present the Structure Plan to Liverpool Local Planning Panel and finalise the plan addressing comments received.



Figure 3: The team structure

	2020							
	Feb	Mar	Apr	May	Jun	Jul	Aug	
Stage 1 Research + Urban Design Analysis + Master Plan Options	█							
Stage 2 Draft Structure Plan + Planning Proposal			█					
Stage 3 Final Structure Plan + Contribution Plan + Planning Proposal						█		

Figure 4: The program



## 2.0 Planning Context

### 2.1 Strategic Context

#### A Metropolis of Three Cities

The Greater Sydney Regional Plan - A Metropolis of Three Cities by the Greater Sydney Commission is a 40 year vision for Metropolitan Sydney. It envisions a 30-minute city, where residents live within 30 minutes travel of their jobs, education and health facilities, services and great places. The three cities identified in the Plan are:

- The Eastern Harbour City
- The Central River City
- The Western Parkland City

The Regional Plan projects that almost half of the population growth in Greater Sydney over the next 40 years will reside west of Parramatta in the Central River City and the Western Parkland City. It is projected that the population of Western Parkland City will grow from 740,000 in 2016 to 1.1 million by 2036 and to over 1.5 million by 2056.

The Regional Plan promotes the ongoing growth of the Western Parkland City. It emphasises the role of collaboration, and encourages urban renewal and new neighbourhood establishment close to the existing centres, including the Liverpool CBD. A place-based approach, that provides great public spaces, and Transport-Oriented Development (TOD), is encouraged to deliver high quality neighbourhoods and a healthy lifestyle in the Western Parkland City.

The Warwick Farm Precinct will contribute to the Liverpool Metropolitan Cluster which comprises civic, health, education, residential, retail and commercial uses. The Hume Highway connects the precinct to the M5 Motorway, which forms part of the Sydney Orbital Network. The precinct is approximately 1.5km to the Liverpool CBD (10-minute drive), 14km to the Parramatta CBD (30-minute drive), 27km to the future Western Sydney Airport (35-minute drive) and 40km to the Sydney CBD (40-minute drive). The precinct is also close proximity to Warwick Farm Station. The revisioning of the precinct presents a TOD opportunity and enables the creation of a high-quality new neighbourhood that fulfils the 30-minute city vision in the Regional Plan.

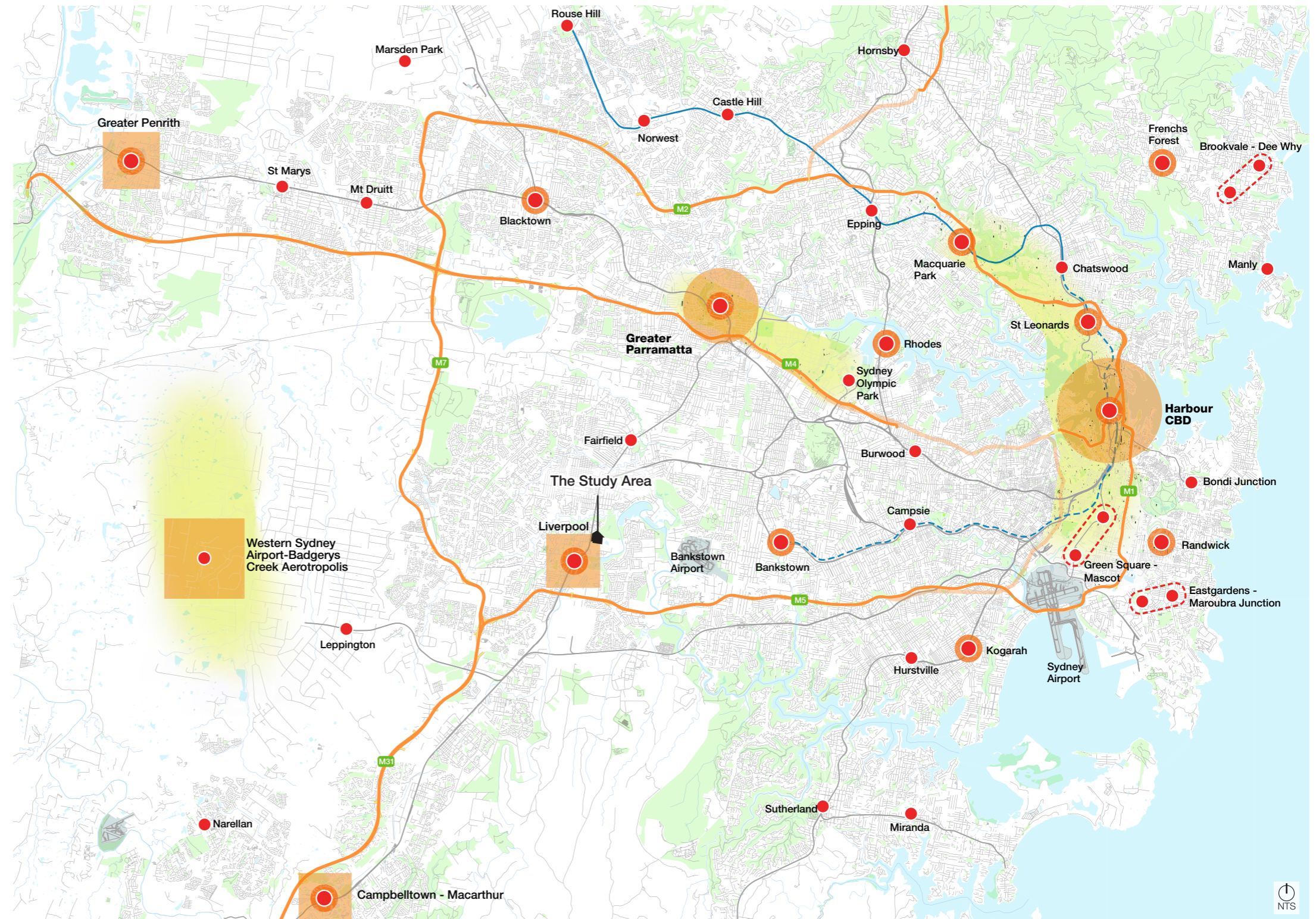


Figure 5: The Study Area in strategic context

## 2.0 Planning Context

### Western City District Plan

The Western City District Plan (the District Plan) is a 20-year plan to manage growth and achieve the 40-year vision identified in the Regional Plan. The District Plan will guide the growth of the Western Parkland City to year 2036.

The District Plan covers eight individual councils, including Liverpool City Council. It is projected that the Western City District will have a population of 1,534,450 by 2036, which is an additional 464,450 people compared with 2016. The Western City District will accommodate 27% of the total population growth in Greater Sydney. An additional 184,500 dwellings are projected by 2036, which comprises 25% of the total housing increase in Greater Sydney. The District Plan also estimates that an additional 370,200 jobs will be created which is 15% of the Greater Sydney total.

The District Plan emphasises the importance of transport infrastructure to facilitate the population and job growth of the district. It promotes housing diversity and easy access to public transport and infrastructure, including schools, hospitals and community facilities. Active transport, including walking and cycling paths, and green links will improve the district's livability.

### Collaboration Area - Liverpool Place Strategy

The Liverpool CBD and the Warwick Farm Precinct are identified as part of the Collaboration Area, which promotes rezoning land for additional housing, improving connections, and undertaking urban renewal of the Warwick Farm Precinct. The District Plan nominates a five year housing target of 8,250 for Liverpool. In addition to the housing target, a baseline job target of 36,000 by 2036 (7,000 increase compared with 2016) is nominated for Liverpool.

The 2019 NSW Population Projections by DPIE estimates the population of Liverpool will increase by 229,450 and reach 441,450 people by 2041. A total of 156,800 dwellings is projected by year 2041.

### The Liverpool Collaboration Area Place Strategy

The District Plan has identified the Liverpool area as a Collaboration Area as it involves complex urban challenges. The Place Strategy sets out the vision and actions to enable the redevelopment of the area.

The Warwick Farm Precinct is identified as an Innovation / Research / Health / Advanced Manufacturing area under the Place Strategy. The Place Strategy also identifies the need to upgrade the

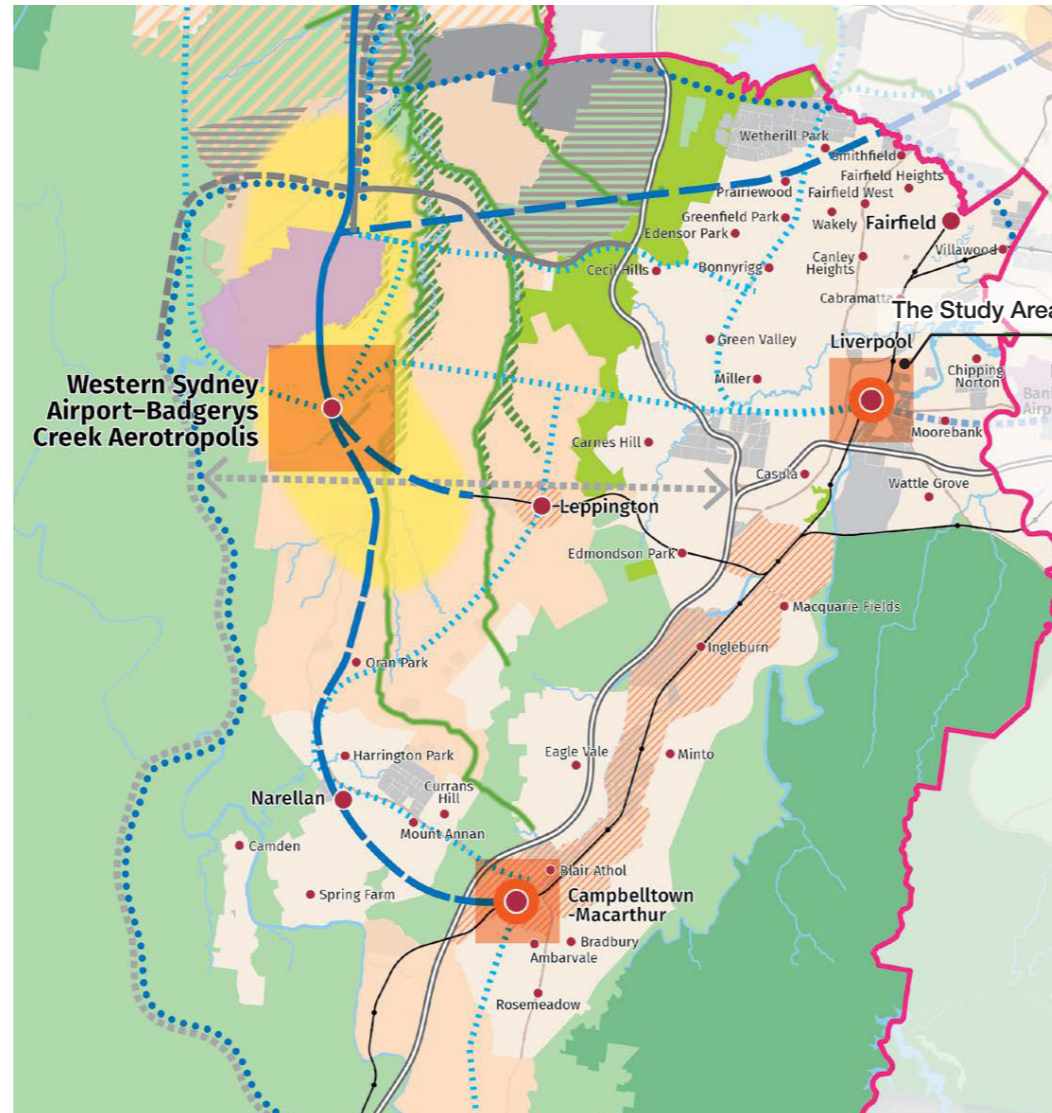


Figure 6: West District Plan

Warwick Farm Station Interchange underpass, the commuter car park and its access as a priority. The vision outlined in the Liverpool Collaboration Area Place Strategy for the Warwick Farm Precinct is included in the Liverpool Local Strategic Planning Statement which has been endorsed by the Greater Sydney Commission.



Figure 7: Liverpool Collaboration Area Plan

### Key

- Liverpool City Centre – Core
- Eco / Utility / Recreation
- Mixed use
- ◀▶▶▶ Green connections
- Diverse residential
- Business development
- Existing use
- ||||| Rail line
- High density residential
- Industrial
- Green space
- ||||| Bus priority
- Equine
- Innovation / Research / Health / Advanced manufacturing

## 2.0 Planning Context

### River Sensitive Liverpool: Cool, Comfortable, Connected Ideas for the Liverpool Collaboration Area

In February 2019, a two-day workshop was co-hosted by Liverpool City Council and Sydney Water. The workshop intended to explore opportunities to deliver Council's Water Management Policy and implement the priorities and actions of the Liverpool Place Strategy. A report was published by the Cooperative Research Centre for Water Sensitive Cities (CRC) summarising the workshop outcomes.

There were 35 participants from eleven organisations that attended this workshop, including:

- NSW Department of Planning, Industry and Environment (DPIE)
- NSW Office of Environment and Heritage (now a part of DPIE)
- Greater Sydney Commission
- NSW Department of Health
- NSW Environmental Protection Authority
- Sydney Water
- Liverpool City Council
- CRC
- Property developers

The workshop envisaged providing public access to both Horseshoe Pond and the Georges River foreshore area within the Liverpool Sewage Treatment Plant, which are currently owned by Sydney Water (refer to Figure 8).

The workshop also identified the next steps to realise the ideas proposed. It identified that Council and Sydney Water co-develop the strategic masterplan for the Sydney Water site.

Council has been working with Sydney Water to deliver the masterplan for the Sydney Water Site.

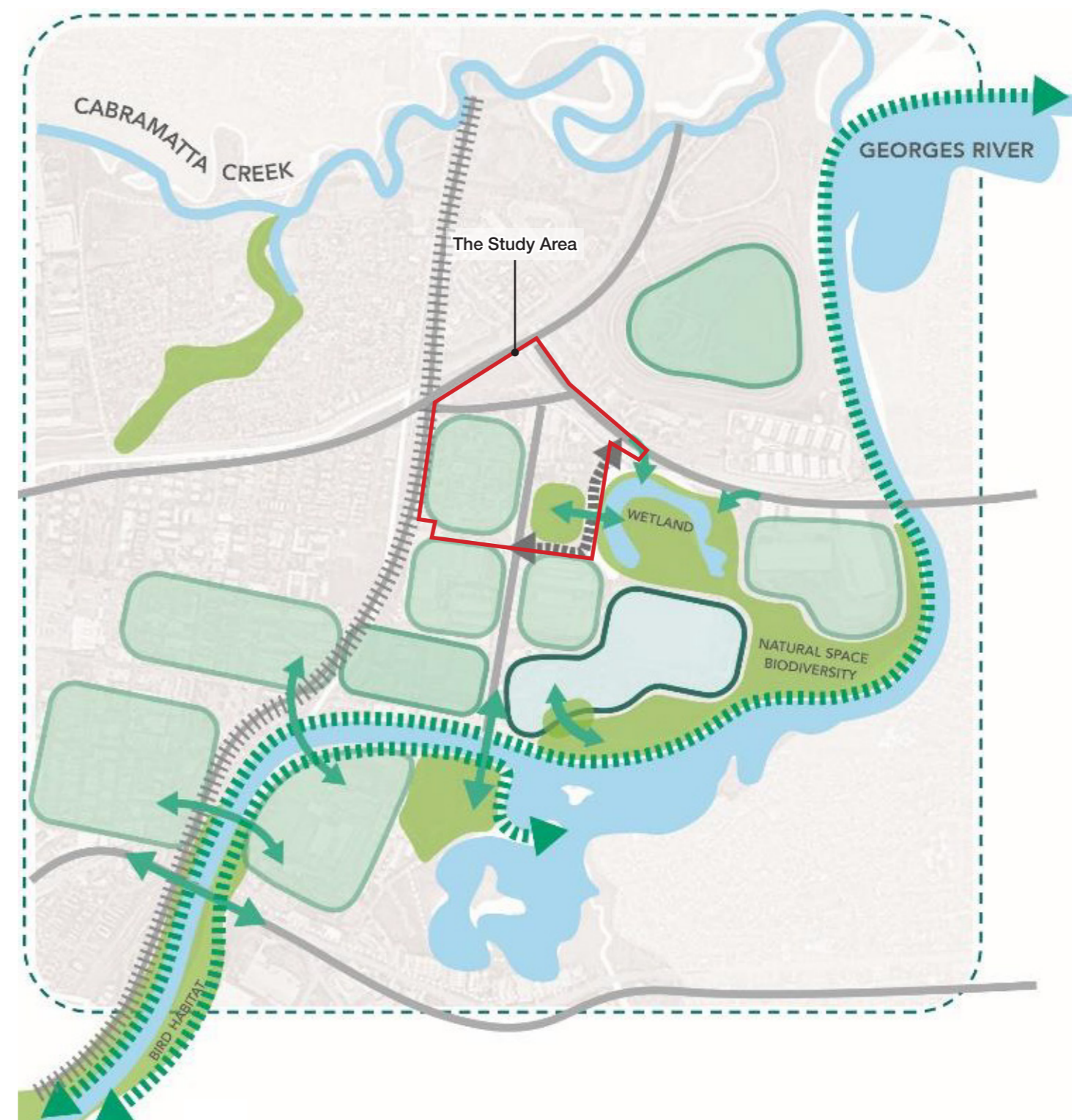
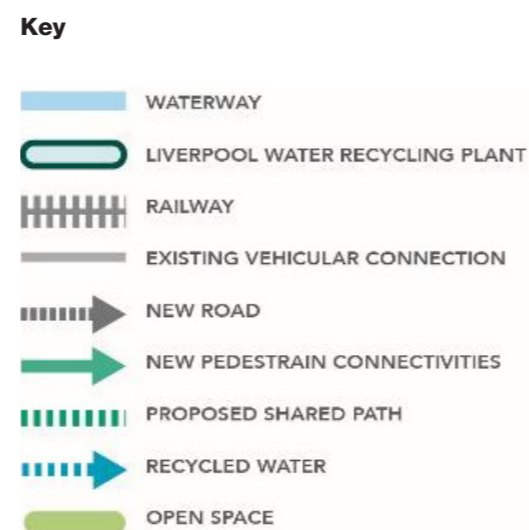


Figure 8: Ecology and accessibility Ideas for the Liverpool Collaboration Area (Courtesy of CRC Water Sensitive Cities)

## 2.0 Planning Context

### Liverpool Local Strategic Planning Statement (LSPS)

In 2018, the DPIE introduced a new requirement for local councils in NSW to prepare an LSPS, which sets out a 20-year land use vision to manage future growth and realise the regional / district plans. The LSPS will also inform the changes to the local level plans including the Local Environmental Plan (LEP) and Development Control Plan (DCP). The LSPS will need to be endorsed by the DPIE or the relevant planning authority (e.g. the Greater Sydney Commission).

Liverpool City Council endorsed the Liverpool LSPS - Connected Liverpool 2040 in December 2019. The Greater Sydney Commission (GSC) has accepted the Liverpool LSPS through its assurance review process. The Liverpool LSPS provides a 20-year vision for the Liverpool Local Government Area (LGA) to facilitate the continuous growth of the area. It identifies 16 priorities across connectivity, livability, productivity and sustainability to realise the vision:

'A vibrant place for people that is community focused, walkable, public transport-oriented, sustainable, resilient and connected to its landscape. A place that celebrates local diversity and history, and is connected to other Sydney centres. A jobs-rich city that harnesses health, research, education, innovation and growth opportunities to establish an inclusive and fair place for all.'

Warwick Farm is identified as a Town Centre. The overall Structure Plan and Action 10.2 identifies the necessity of preparing a Structure Plan and Planning Proposal to rezone the land to a mix of uses, including B4 Mixed Use (Figure 9).

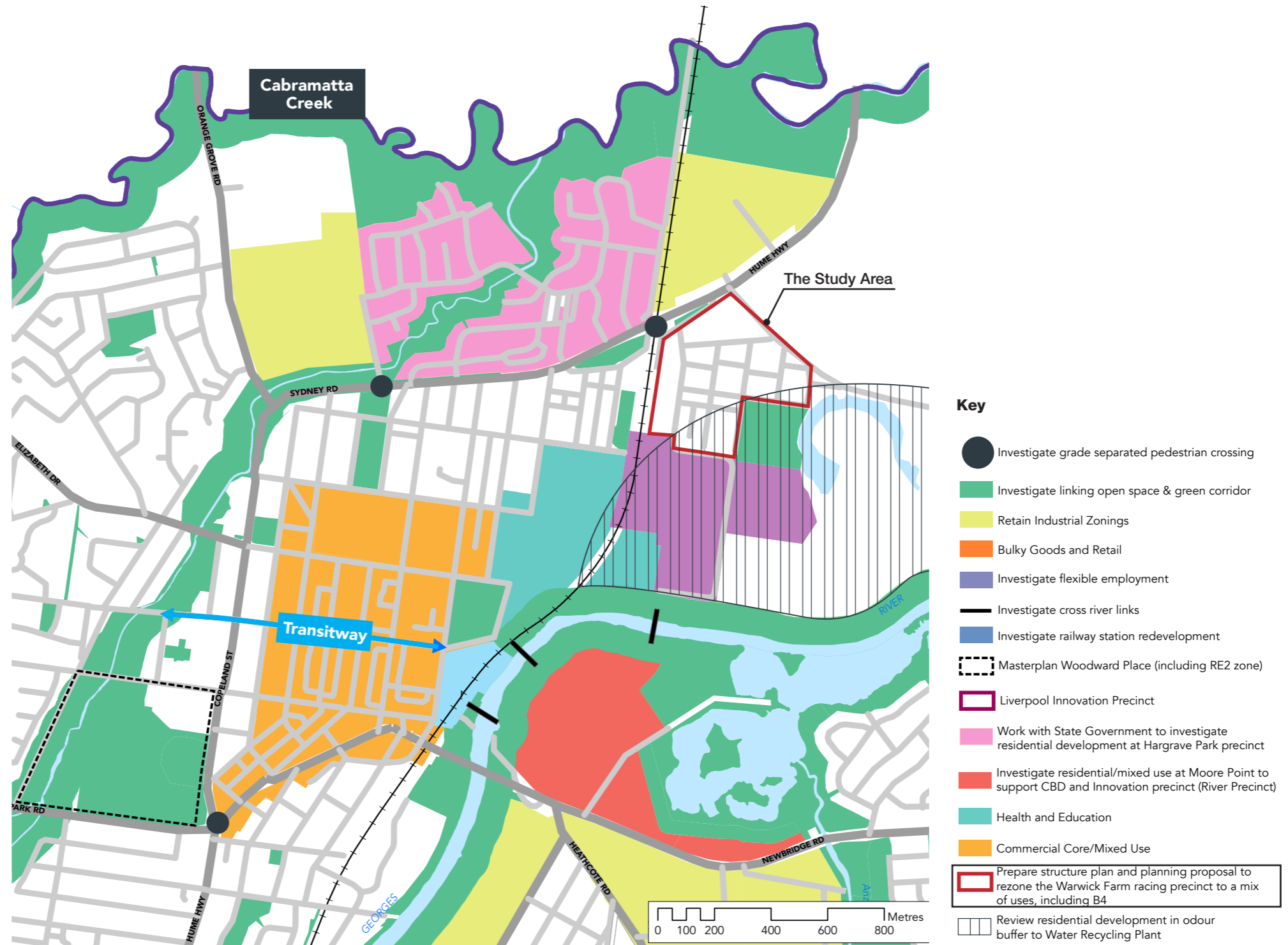


Figure 9: Liverpool LSPS

## 2.0 Planning Context

### 2.2 Liverpool Local Environmental Plan 2008 (LLEP 2008)











#### Land Zoning

The current zoning that applies to the precinct is illustrated in Figure 10. The majority of the precinct is zoned low to medium density residential. Rosedale Oval is zoned RE1 Public Recreation, providing a recreational facility to the general public. The triangular land along Governor Macquarie Drive is zoned B5 Business Development, in which warehouse-type businesses are permitted. RE2 Private Recreation zoning can be found along Governor Macquarie Drive close to the Warwick Farm Racecourse.

There is a parcel of land along Rosedale Oval zoned SP2 Infrastructure - Sewage System. SP2 Infrastructure zoning can also be found along the Hume Highway and the railway corridor.

A General Industrial area (zoned IN1) is situated immediately to the south of the precinct.

#### LEGEND

	Study Area
	B1 Neighbourhood Centre
	B5 Business Development
	IN1 General Industrial
	R2 Low Density Residential
	R3 Medium Density Residential
	R4 High Density Residential
	RE1 Public Recreation
	RE2 Private Recreation
	SP2 Infrastructure

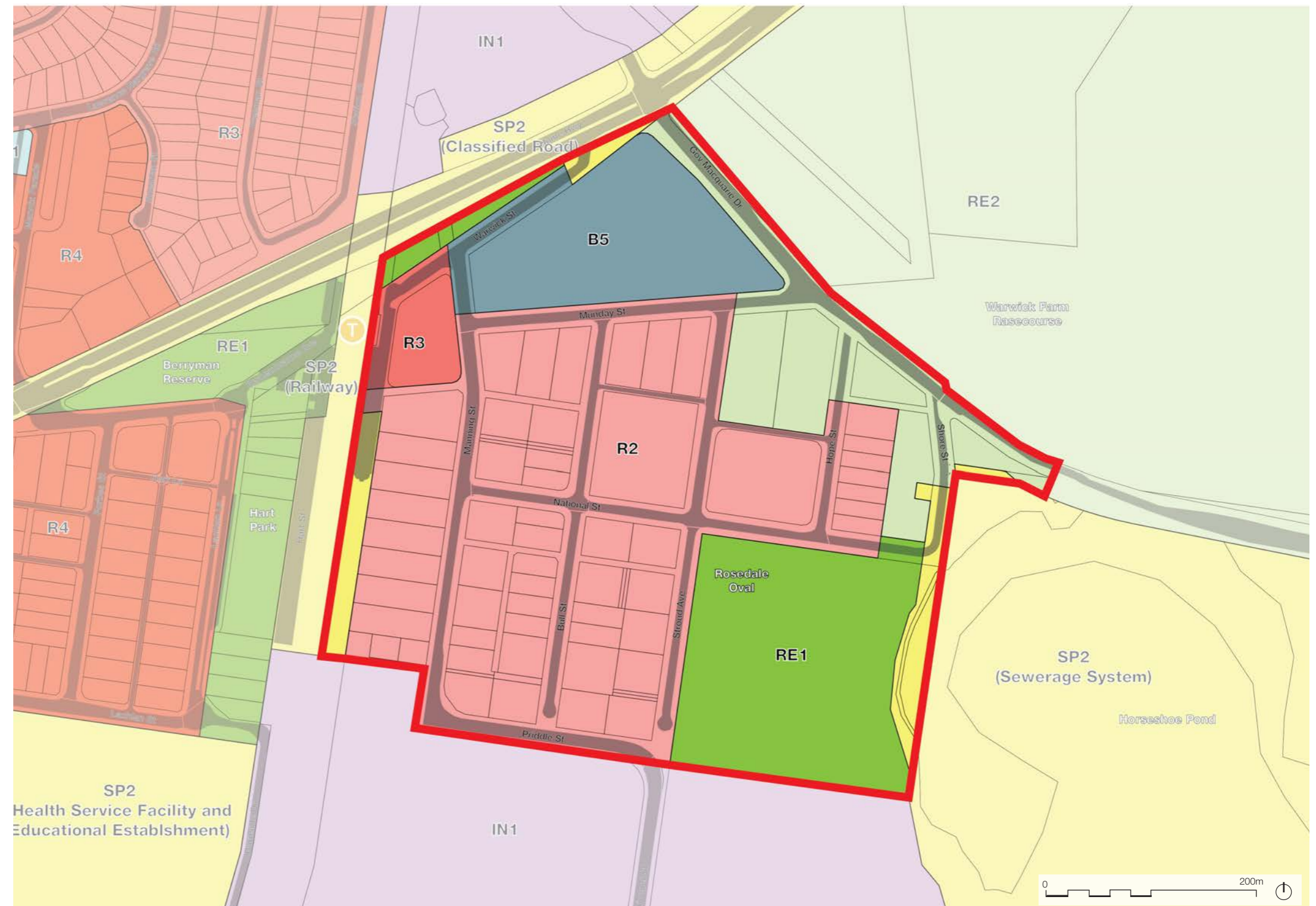


Figure 10: Existing zoning map

## 2.0 Planning Context

### Building Height

The majority of the precinct has a maximum building height of 8.5m (2.5 storeys), with the triangular site along Governor Macquarie Drive with a maximum allowable height of 15m (4 storeys).

The general industrial area to the south has a height control of 15m (4 storeys). The Warwick Farm Racecourse adjacent to the precinct has a height limit of 30m, equivalent to about 9 storeys. The land to the west of the railway corridor has a height limit of 35m which is about 10 to 11 storeys.

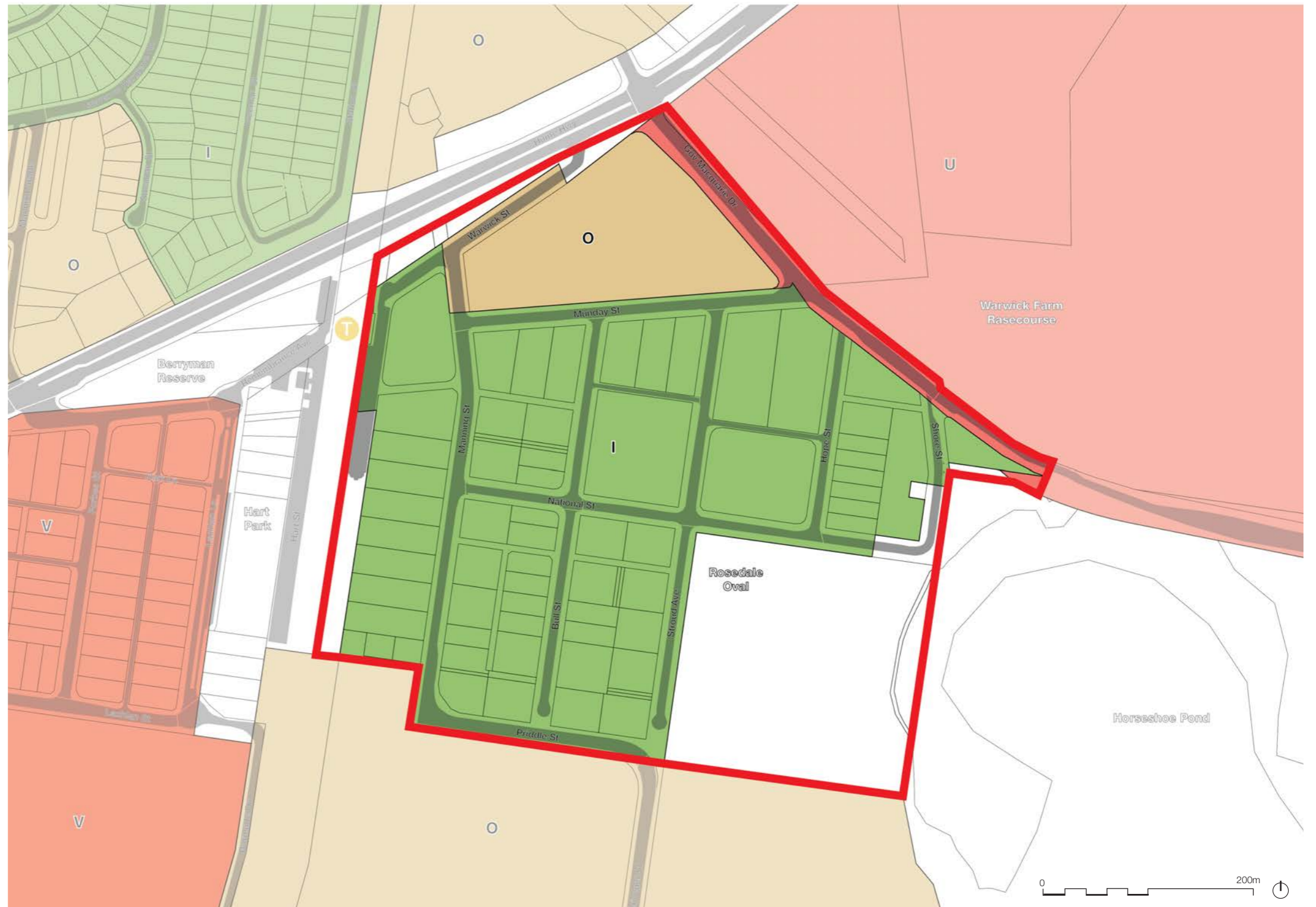


Figure 11: Existing building height map

### LEGEND

I	8.5
O	15
U	30
V	35



## 2.0 Planning Context

### Floor Space Ratio (FSR)

The precinct is relatively low in density. FSR 0.5:1 applies to the majority of the land, with the highest FSR of 0.75:1 applicable to the triangular site along Governor Macquarie Drive.

The area to the west, across the railway corridor enjoys a higher FSR, ranging from 2.0:1 to 2.5:1. There is no FSR control for the industrial land to the south of the precinct.

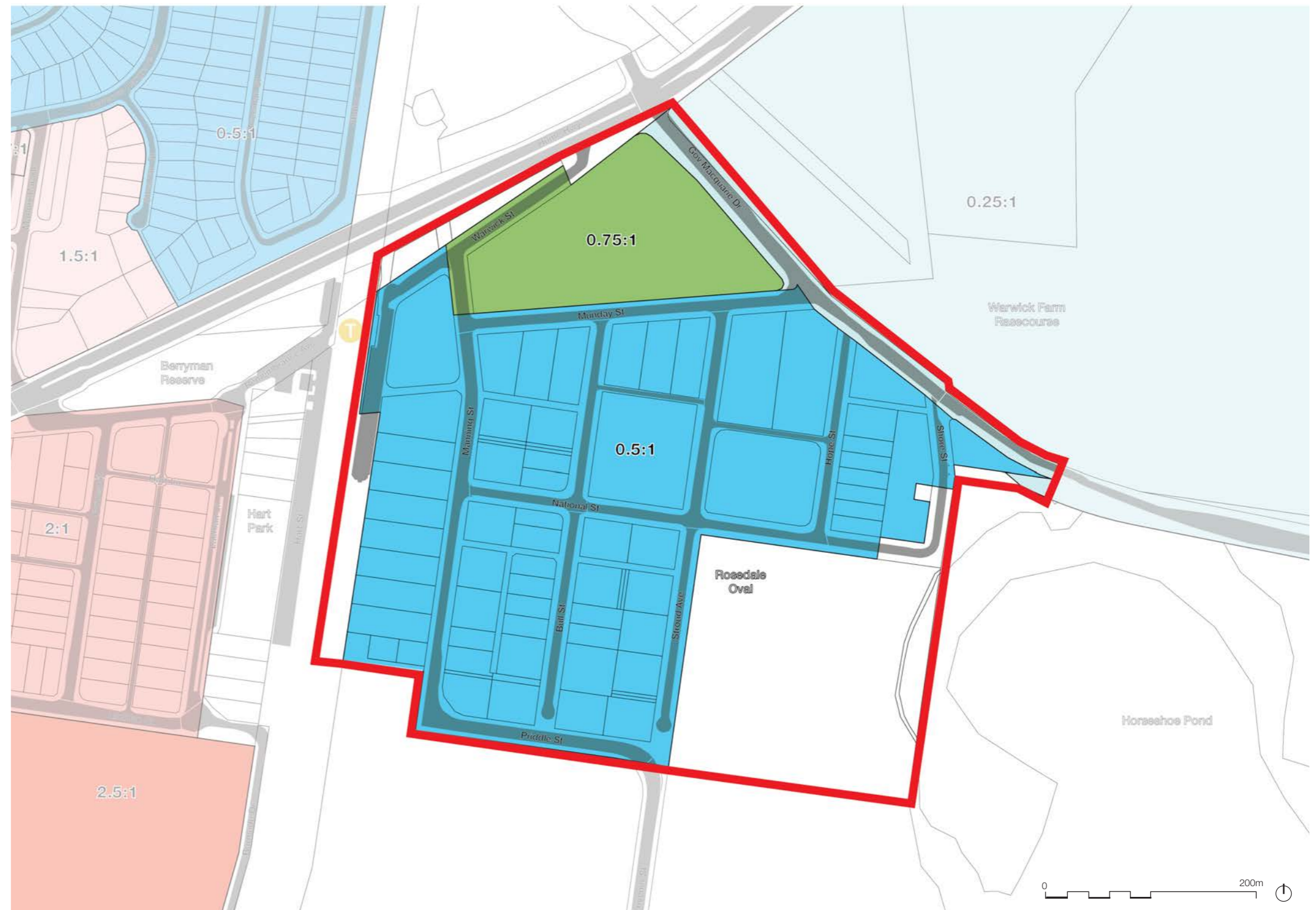


Figure 12: Existing FSR map

### LEGEND

- Study Area
- 0.25:1
- 0.5:1
- 0.75:1
- 1.5:1
- 2:1
- 2.5:1

## 2.0 Planning Context

### Heritage Item

There is no heritage item or Heritage Conservation Area (HCA) within the precinct. Warwick Farm Racecourse, which is across Governor Macquarie Drive to the northeast of the precinct, is identified as a heritage item with State level significance.

Berryman Reserve along the Hume Highway has a local landscape heritage. The grid of streets to the west of the railway corridor are identified in LLEP 2008 as local heritage, which represent the early Liverpool Town Centre layout which dates back to the 1800s.

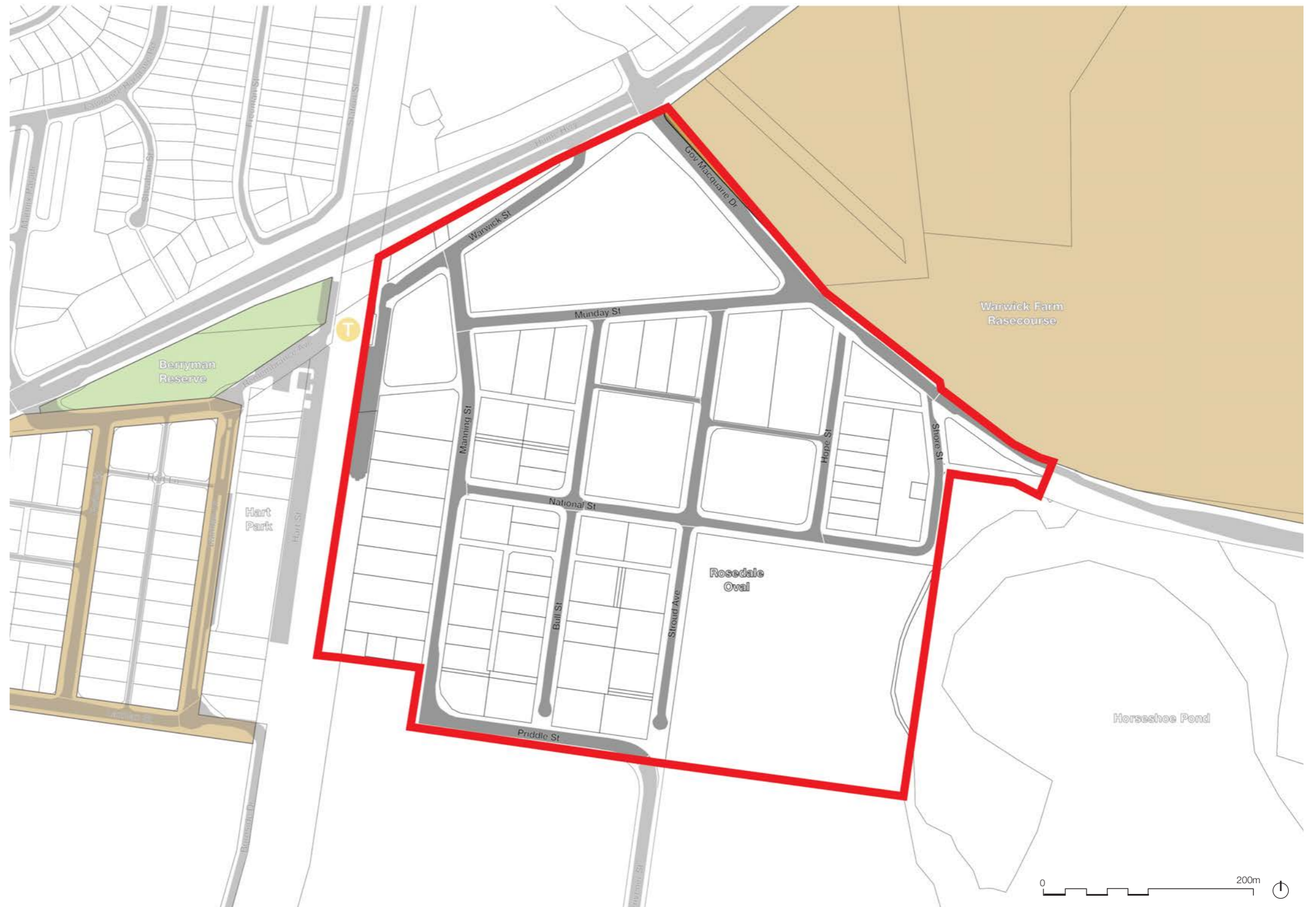


Figure 13: Heritage map

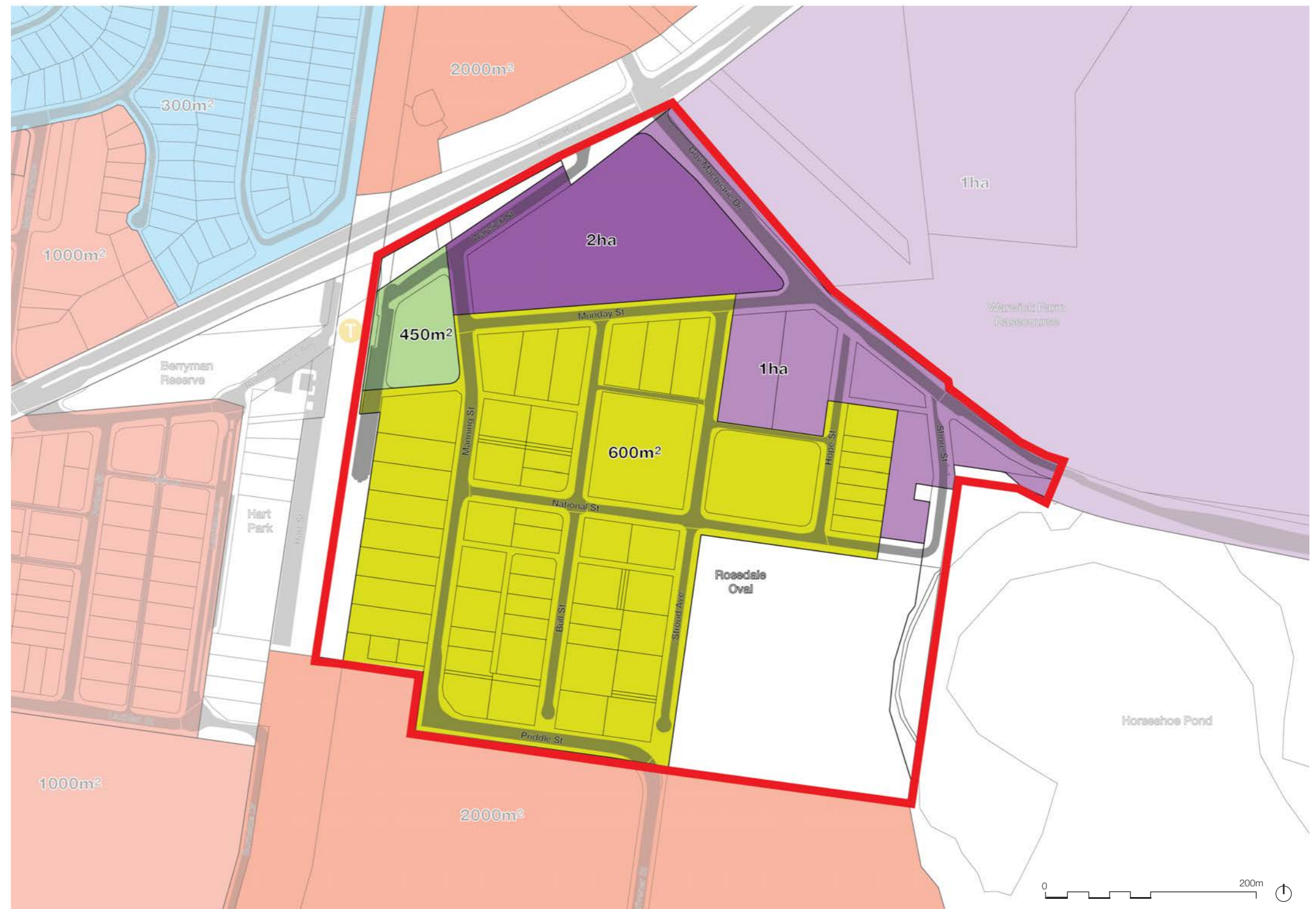
### LEGEND

- Item - General
- Item - Landscape

## 2.0 Planning Context

### Minimum Lot Size

The minimum lot size controls ensure that subdivisions and associated developments promote the desired future character of the neighbourhood through consistent lot size, shape, orientation and housing density. The minimum lot size controls within the precinct vary. The land within the R2 Low Density Residential Zone are set at 600m<sup>2</sup>. The site adjacent to Warwick Farm Station, which is zoned R3 Medium Density Residential has a minimum lot size of 450m<sup>2</sup>. Larger lot sizes apply to the sites zoned B5 and RE2, with minimum lot sizes of 2ha and 1ha respectively.



### LEGEND

- Study Area
- 300m<sup>2</sup>
- 450m<sup>2</sup>
- 600m<sup>2</sup>
- 1000m<sup>2</sup>
- 2000m<sup>2</sup>
- 1ha
- 2ha

Figure 14: Existing minimum lot size map



Dense mature trees along the edge of Rosedale Oval

## 3.0 Local Context

### 3.1 Local Context

The Warwick Farm Precinct is located within the Liverpool Metropolitan Cluster identified in the Western City District Plan. The precinct is close to the Liverpool CBD (about 1.5km), which has a mixed use character, providing civic, educational and recreational facilities as well as retail, commercial and residential uses.

The precinct is well connected to the surrounding areas via public transport and main roads. Warwick Farm Station provides frequent services to Liverpool, Leppington and other major centres including Sydney CBD and Parramatta. The Hume Highway links the precinct to the M5 Motorway. Governor Macquarie Drive provides a crossing point of the Georges River and links the Hume Highway and Newbridge Road, which is another east-west state route providing access to Central River City and Eastern Harbour City. It is envisaged that the whole stretch of Governor Macquarie Drive will be widened to accommodate four-lane traffic, which will further improve the precinct's connectivity and traffic capacity.

Educational facilities, including Warwick Farm Public School, Liverpool Girls High School and Liverpool Public School are within 2km of the precinct to the west of the railway corridor. The precinct is well serviced by sport and recreational facilities. Rosedale Oval and Warwick Farm Racecourse provide sport facilities for both local residents and the broader community. Public open spaces along the Georges River foreshore, Chipping Norton Lake and Cabramatta Creek provide regional level open spaces. Liverpool Hospital and associated medical facilities provide the precinct easy access to public health facilities.

The future public domain improvement projects, including the development of the Georges River Parklands and Chipping Norton Lake Masterplan and Liverpool Water Treatment Facility Masterplan (LCC is currently working with Sydney Water to deliver this masterplan), coupled with the proposed additional bridges across Georges River (refer to Liverpool LSPS) will further improve the precinct's access to surrounding open space. The proposed new bridges will also provide easy access from the Liverpool CBD and the precinct to the future masterplan area - Moore Point Mixed Use Development.

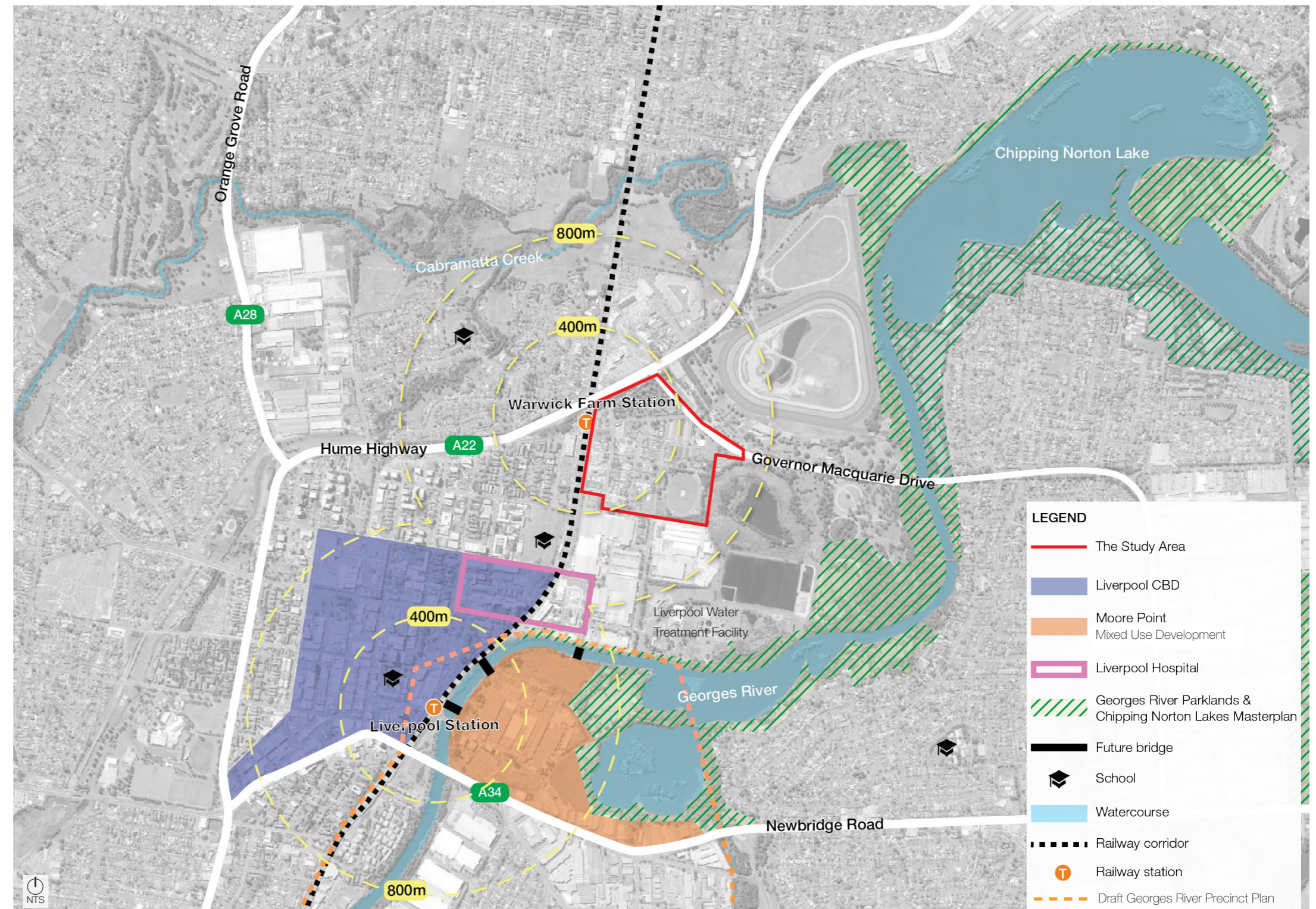


Figure 15: The study area and its context

## 3.0 Local Context

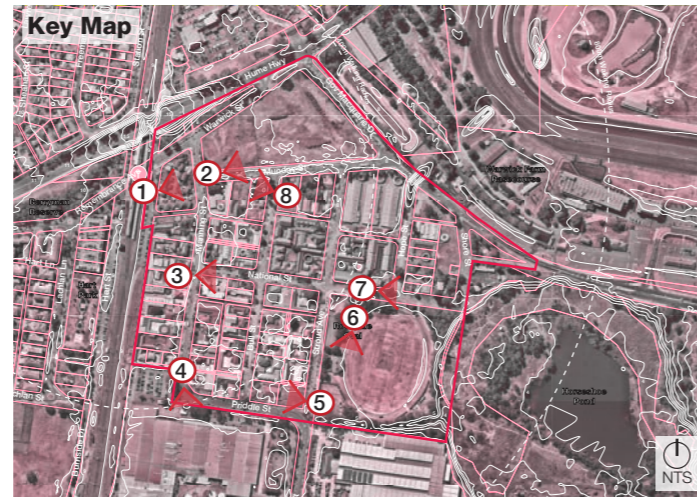
### 3.2 Existing Site Conditions

The Warwick Farm Precinct is predominantly occupied by equine related facilities (View 5). However, there is a mixture of character and built form within the precinct.

The precinct has a low scale character, with buildings ranging between one to two storeys in height. Low density residential houses spread throughout the precinct and are generally associated with horse training facilities. Poorly maintained houses also exist in the precinct, which contribute negatively to the streetscape character (View 8). Medium density residential dwellings are scattered along Manning Street close to Warwick Farm Station (View 1 and 3).

The industrial area to the south of Priddle Street generates heavy vehicle traffic in the precinct (View 4), as Priddle - Manning - Munday Street provide the only access to Governor Macquarie Drive and the Hume Highway from the industrial area. Conflict of uses among light and heavy vehicles, and pedestrian and horse movement is a major issue (View 2, 4 and 7).

Rosedale Oval (View 6) is the major open space within the precinct, which provides sport facilities and a children's playground. Dense mature Eucalyptus trees define the edge of the oval to its south and east.



## 4.0 Urban Design Analysis

### 4.1 Introduction

CM<sup>+</sup> has conducted a thorough Urban Design Analysis, informed by the site visit, and a background document review. The Urban Design Analysis assesses the existing conditions of the Warwick Farm Precinct, identifies the constraints and opportunities and establishes the future vision and Urban Design principles to guide the redevelopment of the precinct.

### 4.2 Topography

The precinct is relatively flat with most of the area at RL 8m Australian Height Datum (AHD). Rosedale Oval is lower than the rest of the precinct and sits at RL 7m AHD.

The Hume Highway is higher than the precinct. It rises up gradually towards the railway corridor, and reaches its highest point at RL 15m AHD above the railway line

The land to the west of the railway corridor is higher than the precinct, and sits at RL 9m AHD and above.

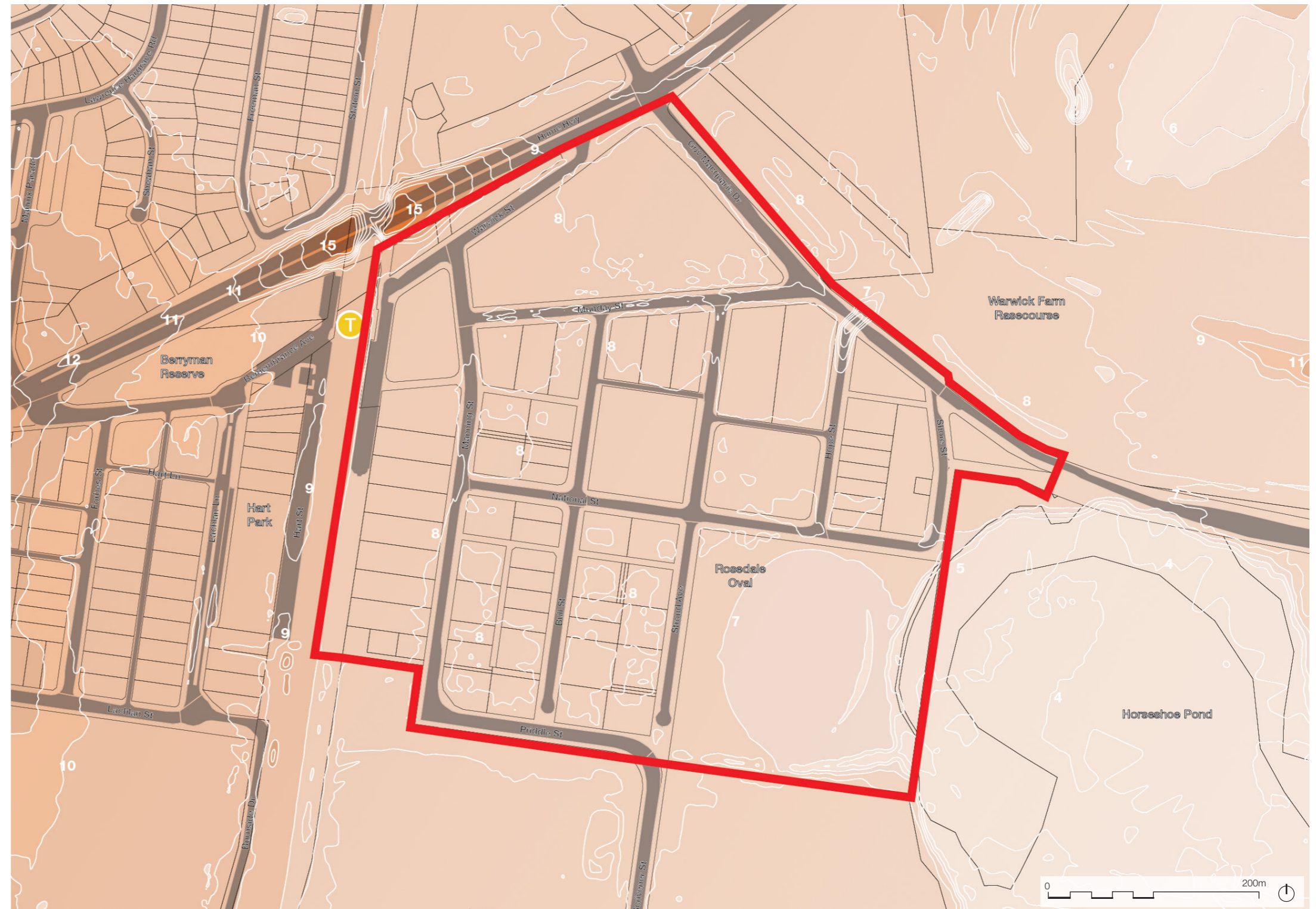


Figure 16: Existing topography

## 4.0 Urban Design Analysis

### 4.3 Flooding

The existing peak flood depths and extents within the study area are derived from the 2004 Georges River Floodplain Risk Management Study and Plan and are shown in Figures 17 and 18, and are summarised below:

1. 1% Annual Exceedance Probability (AEP) is 8.5m AHD
2. Probable Maximum Flood (PMF) is 10.8m AHD

A key issue with this development is the evacuation of residents during a flood. Shelter in place is not appropriate and therefore there must be appropriate access from every building in events larger than a 1% AEP. The key features of the evacuation approach are:

1. All floors to be at or above 9m AHD (1% AEP + 0.5m).
2. All floors must be at least 0.3m above the surrounding ground / road to allow for local drainage.
3. All internal roads to be at or above 8.5m AHD (1 % AEP).
4. All roads or pedestrian access used for evacuation must rise to the PMF.
5. There must be either pedestrian or vehicle access from all floors that is always at or above 8.5m AHD (1 % AEP) to above the PMF.

Please refer to Warwick Farm Structure and Planning Proposal Flooding Assessment report by WMA Water.

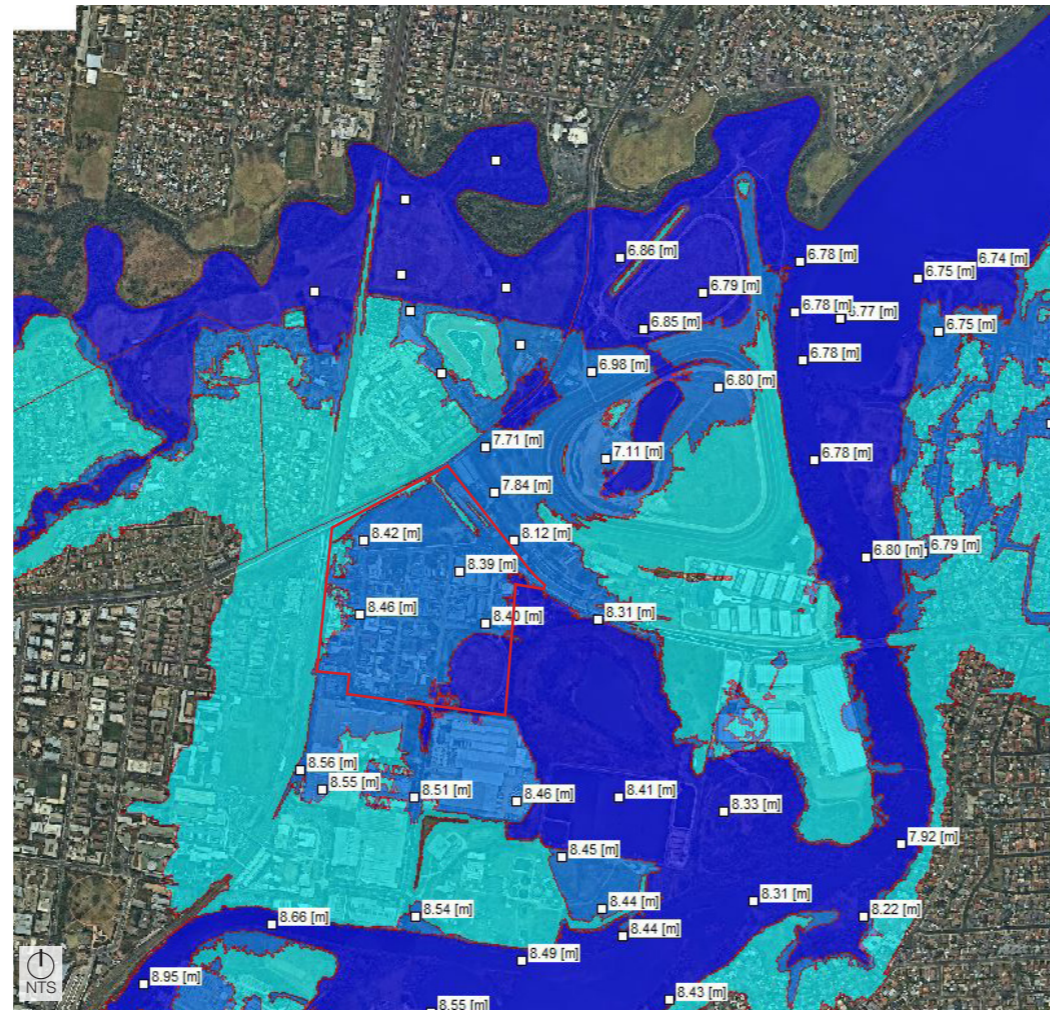


Figure 17: 1 in 100 flood level (Source: MIKE-11 model)

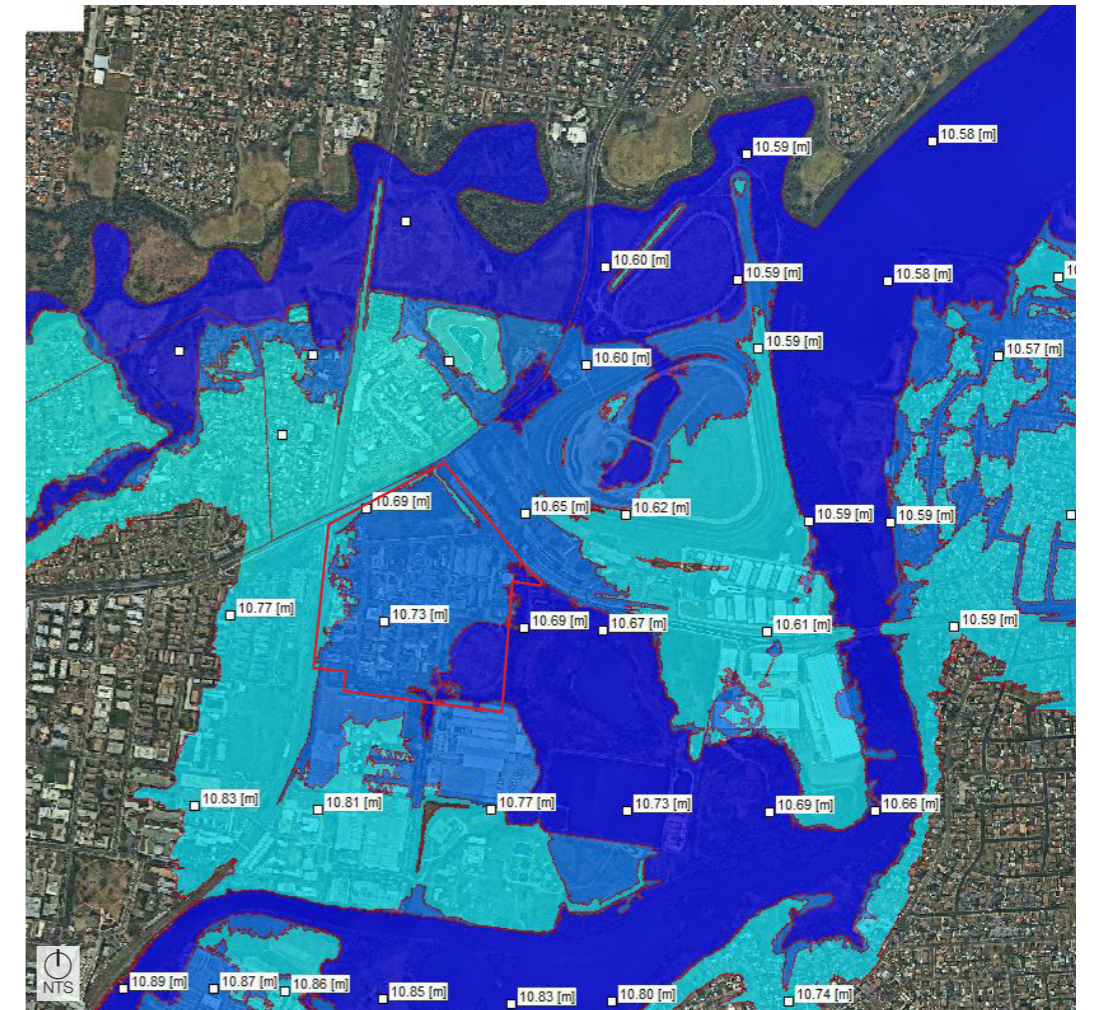


Figure 18: PMF level map (Source: MIKE-11 model)

Note in both diagrams: Light blue = PMF extent, mid blue = 1% AEP extent



## 4.0 Urban Design Analysis

### 4.4 Community Facility, Open Space and Significant Landscaping

Social infrastructure and open space have significant impacts on the wellbeing of the local community, as they provide community services, places for social gathering and recreational uses. Landscaping plays an important role shaping the character of the precinct and has significant impacts on the visual and residential amenity.

There are no multipurpose or hireable community facilities within the precinct. The closest one - Warwick Farm Community Hub is about 800m to the northwest of the precinct; however, it is ageing and is not available for general community hire.

Rosedale Oval, which is approximately 5ha in size, is a major open space within the precinct providing recreational uses and a children's playground. There are no local parks within the precinct; however, smaller parks, including Hart Park and Berryman Reserve are immediately to the west of the precinct.

A cluster of dense mature Eucalyptus trees are located within Rosedale Oval, especially along its southern and eastern boundaries. Munday Street and National Street present some consistency in street tree planting. However, the trees cover within the precinct is generally low.



#### LEGEND

- The Study Area
- Major open space recreational facility
- Tree canopy
- Surrounding Parks

Figure 19: Existing tree canopies and open space

## 4.0 Urban Design Analysis

### 4.5 Traffic and Transport

#### Road Network

The characteristics of the roads surrounding the subject precinct are:

- Hume Highway is a primary road connecting Liverpool to Sydney's Inner West. It is a state road (A22) and has three lanes in each direction. In the vicinity of the precinct, there is a footpath on the northern side and a shared pedestrian/cycle path on the southern side. Pedestrian crossings are provided at the intersection of Hume Highway / Governor Macquarie Drive (except on the east side) and an underpass is available to the west of Warwick Farm Station to connect Warwick Farm to the south of Hume Highway with Station Street to the north of Hume Highway.
- Governor Macquarie Drive is a distributor road. It intersects with Hume Highway to the north and Newbridge Road to the south. The road has only one lane in each direction between Munday Street and the signalised access to Warwick Farm Racecourse. The road has recently been upgraded to two lanes in each direction plus turning lanes between the Warwick Farm Racecourse and Georges River. The section of the road between Georges River and Newbridge Road remains one lane in each direction, with future plans to be upgraded to two lanes in each direction. Footpaths are not provided on the west side in the vicinity of No. 240 Governor Macquarie Drive. Pedestrian crossings are present on all approaches of the Munday Street intersection.
- Warwick Street is a local road that connects Warwick Farm Station and Manning Street with Hume Highway. It has one lane in each direction. Except for the recently completed shared path on the south side of the road close to the station, there is no footpath on either side of the road, making it unattractive for walking.
- Munday Street / Manning Street / Priddle Street is the local collector road that connects Governor Macquarie Drive with the industrial area to the south of the Warwick Farm precinct. It has one traffic lane and one parking lane in each direction. A recently completed shared path is provided on the northern side.
- Shore Street is a one way (northbound) one lane local road that mainly services the residences and visitors of the Rosedale Oval and nearby racecourse. It currently terminates at a left-out only intersection with Governor Macquarie Drive.

#### Active Transport

Shared pedestrian / cycle paths are provided on the southern side of Hume Highway, on the northern side of Munday Street, and a small section of Manning Street and Warwick Street connecting to the station. A shared path crossing of Hume Highway is provided via an underpass located to the west of the Warwick Farm Station, although the underpass is in poor condition. There is an extended shared path network to the southwest of the precinct to connect to Liverpool CBD, providing potential opportunity to promote cycle use in the local area.

Footpaths are provided on some internal streets within the precinct in various qualities. Along Governor Macquarie Drive, there is no footpath on the western side between Munday Street and Hume Highway and on the eastern side between Munday Street and Shore Street.

Please refer to Traffic and Transport Impact Assessment by SCT for more information.

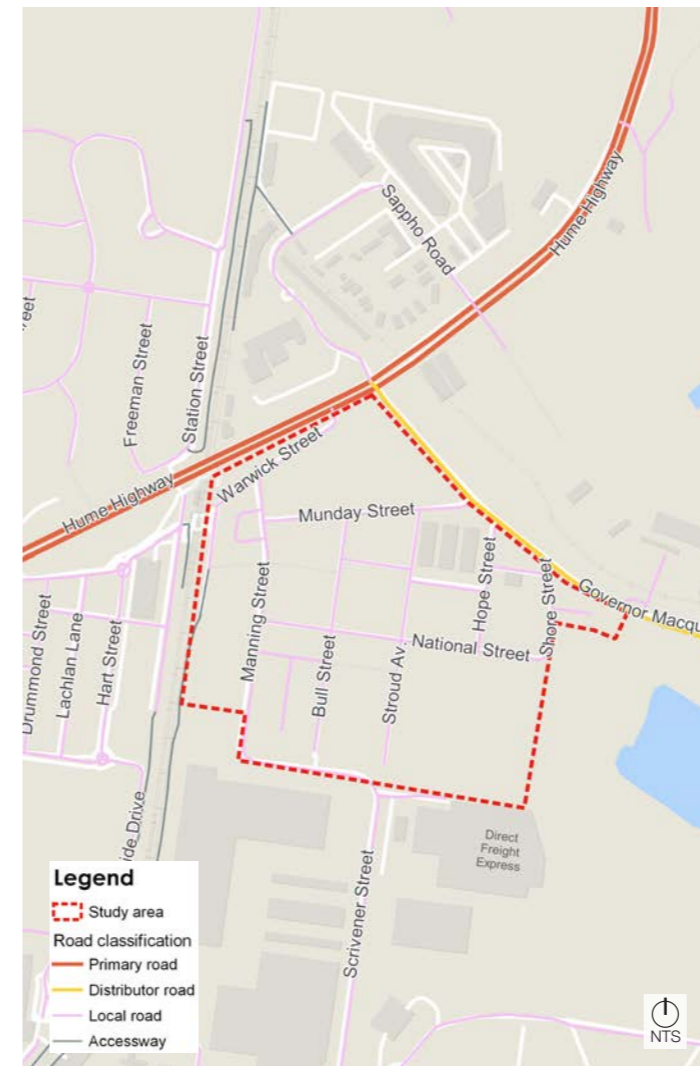


Figure 20: Road network (Source: SCT Consulting)

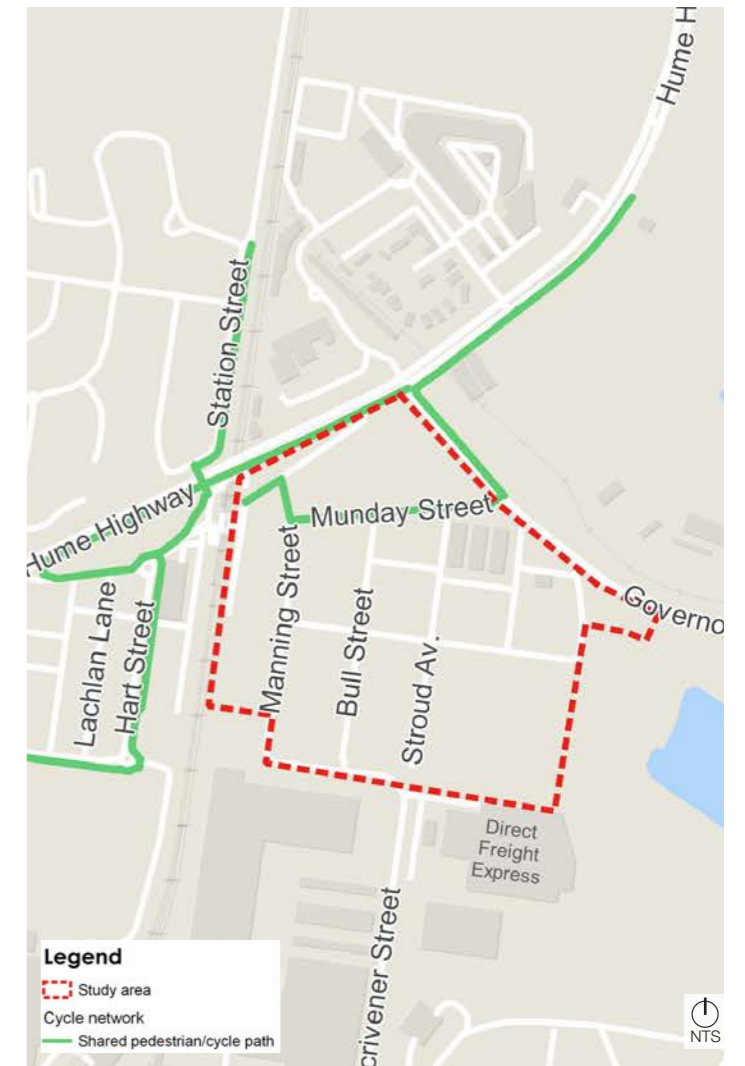


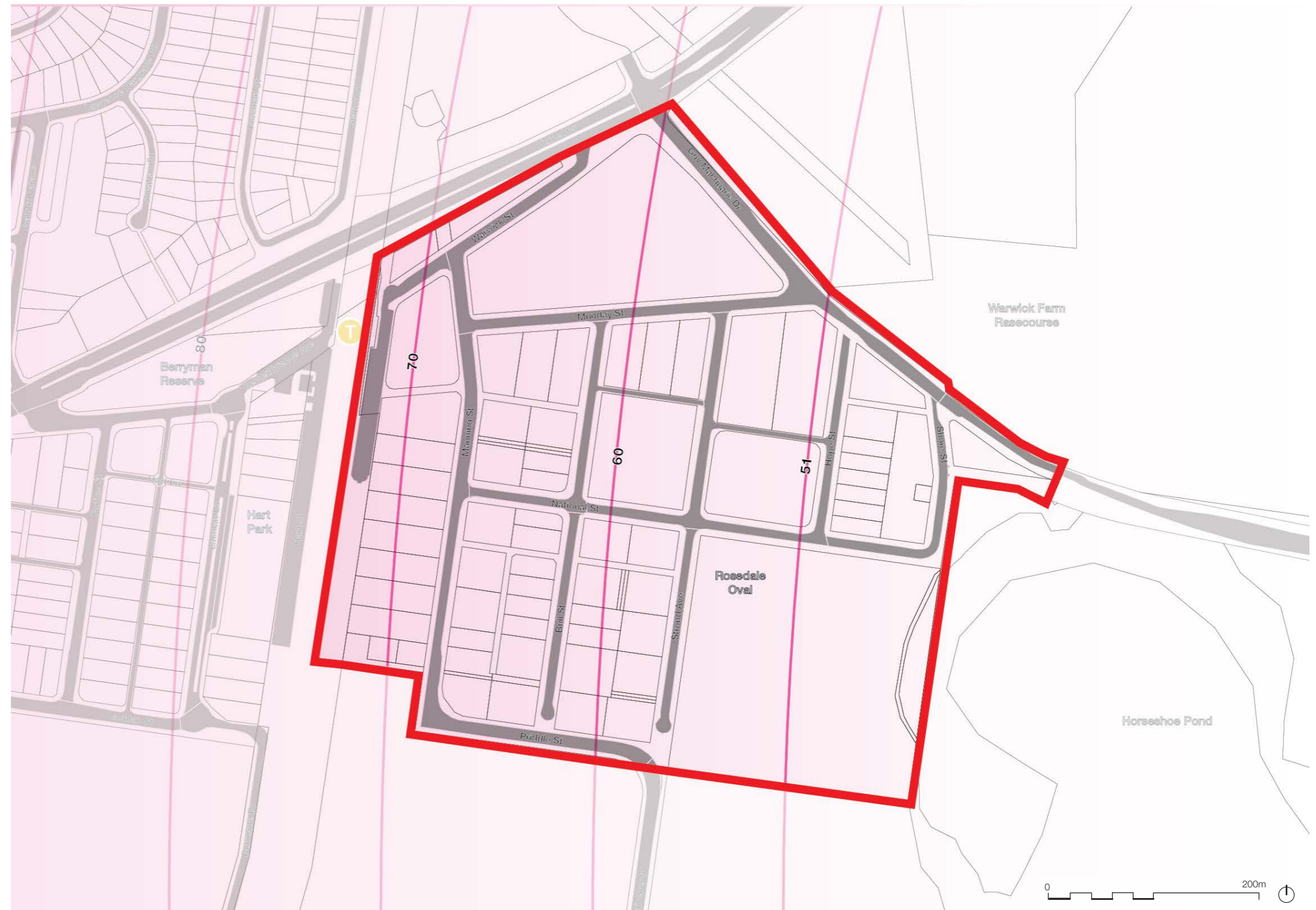
Figure 21: Existing shared pedestrian / cycle path (Source: SCT Consulting)

## 4.0 Urban Design Analysis

### 4.6 Bankstown Airport Obstacle Limitation Surface (OLS)

The Warwick Farm Precinct is in an area affected by the operational requirements for Bankstown Airport, which is located approximately 9.5km to the east of the precinct. Obstacle Limitation Surface is used to define the airspace that is protected from obstacles to ensure the safety of aircraft during takeoff and landing phases.

The nominated Bankstown Airport OLS ranges between RL 51m AHD and RL 70m AHD. Considering the existing ground level height of RL 8m AHD, the Bankstown Airport OLS limits the building height within the precinct to a maximum of 62m (about 20 storeys) close to Warwick Farm Station.



#### LEGEND

- The Study Area
- Bankstown Airport Obstacle Limitation Surface Contours (m AHD)

Figure 22: Bankstown Airport OLS contours

## 4.0 Urban Design Analysis

### 4.7 Odour Buffer

Liverpool Sewage Treatment Plant is situated adjacent to the Warwick Farm Precinct and generates odour that impacts surrounding areas. The odour buffer zone provided by Sydney Water indicates that the southeast portion of the site is within the odour buffer zone, including Rosedale Oval.

The LSPS and Sydney Water Guidelines seek to avoid residential development within the odour buffer. A reduction of the odour buffer size may be achievable as a result of upgrading the Sewage Plant facilities.

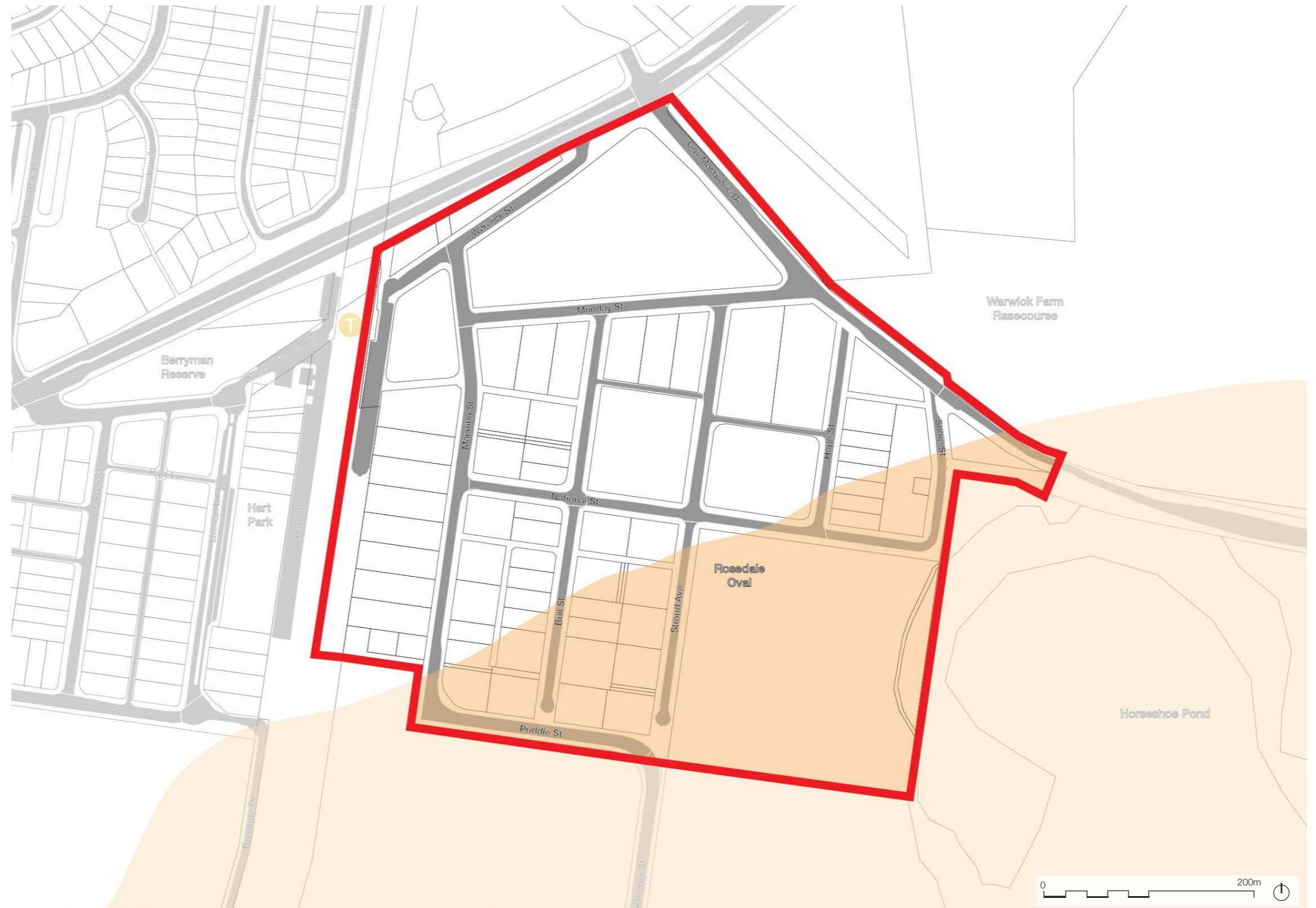


Figure 23: Sydney Water Treatment Facility odour buffer

## 4.0 Urban Design Analysis

### 4.8 Planning Proposal and Development Applications

The study has identified sites that are subject to a Planning Proposal or an approved Development Application (DA). The Planning Proposal site is:

1. 240 Governor Macquarie Drive (refer to Figures 25-27)

Recently approved DAs include:

2. 12 Munday Street
3. 2 Stroud Avenue
4. 6 Manning Street
5. 8 Manning Street
6. 13 Bull Street
7. 21C Manning Street
8. 1 Stroud Avenue
9. 11 Manning Street
10. 7 Bull Street
11. 9A Bull Street
12. 11A Bull Street
13. 10 Stroud Avenue
14. 14 Manning Street
15. 12 Bull Street
16. 17 Stroud Avenue
17. 14 Bull Street

The majority of the DAs listed above are in relation to horse training facilities and alteration and additions to existing residential dwellings.



Figure 24: Currently Planning Proposal and Development Applications

## 4.0 Urban Design Analysis

### 240 Governor Macquarie Drive

This Planning Proposal was endorsed by Liverpool City Council and submitted to the DPIE for 'Gateway' determination on 25 February 2020. Please note that this Planning Proposal has not received any determination from the DPIE at this point in time.

The plan and 3D views on this page illustrates the Council endorsed built form and height strategy for No.240 Governor Macquarie Drive.



Figure 25: Concept Masterplan (Courtesy of SJB)



Figure 26: Massing modelling view to the north (Courtesy of SJB)

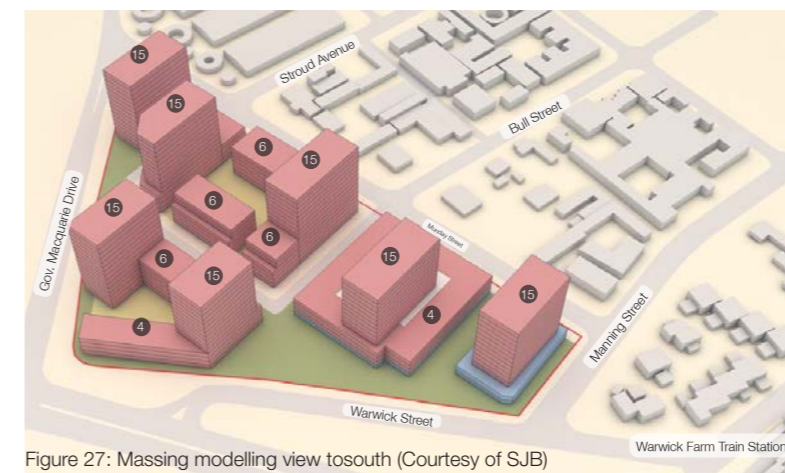


Figure 27: Massing modelling view to the south (Courtesy of SJB)

## 4.0 Urban Design Analysis

### 4.9 Ownership Pattern

The Warwick Farm Precinct has a relatively fragmented ownership, with some large land holdings in the precinct.

Rosedale Oval and a strip of land along the Hume Highway are Council owned land. There are some small land parcels close to Warwick Farm Station that are owned by Transport for NSW (TfNSW). Sydney Water owns a piece of land adjacent to Rosedale Oval, which is known as Liverpool Sewage Treatment Plant. Another Sydney Water facility is located along Shore Street.

The large vacant site at No. 240 Governor Macquarie Drive is under one ownership and currently has a Planning Proposal lodged with DPIE for assessment. The Australian Turf Club (ATC) owns several properties along Governor Macquarie Drive, which are currently occupied by horse training facilities.

Darley is another private landowner within the precinct. It owns two large lots along National Street, close to Rosedale Oval, which are also occupied by equine related uses.

The land opposite Warwick Farm Station is strata constrained, which has over 20 separate owners. Land with strata constraints presents less opportunity to be redeveloped in the short to medium term; however, there are precedents in the Metropolitan Sydney area where strata titled land has been consolidated and redeveloped.

#### LEGEND

- The Study Area
- Sydney Water owned land
- Transport for NSW owned land
- Liverpool City Council owned land
- Australian Turf Club owned land
- Darley owned land
- Land under one ownership
- Land under one ownership
- Other private owned land
- Strata constrained land
- 240 Governor Macquarie Drive Site

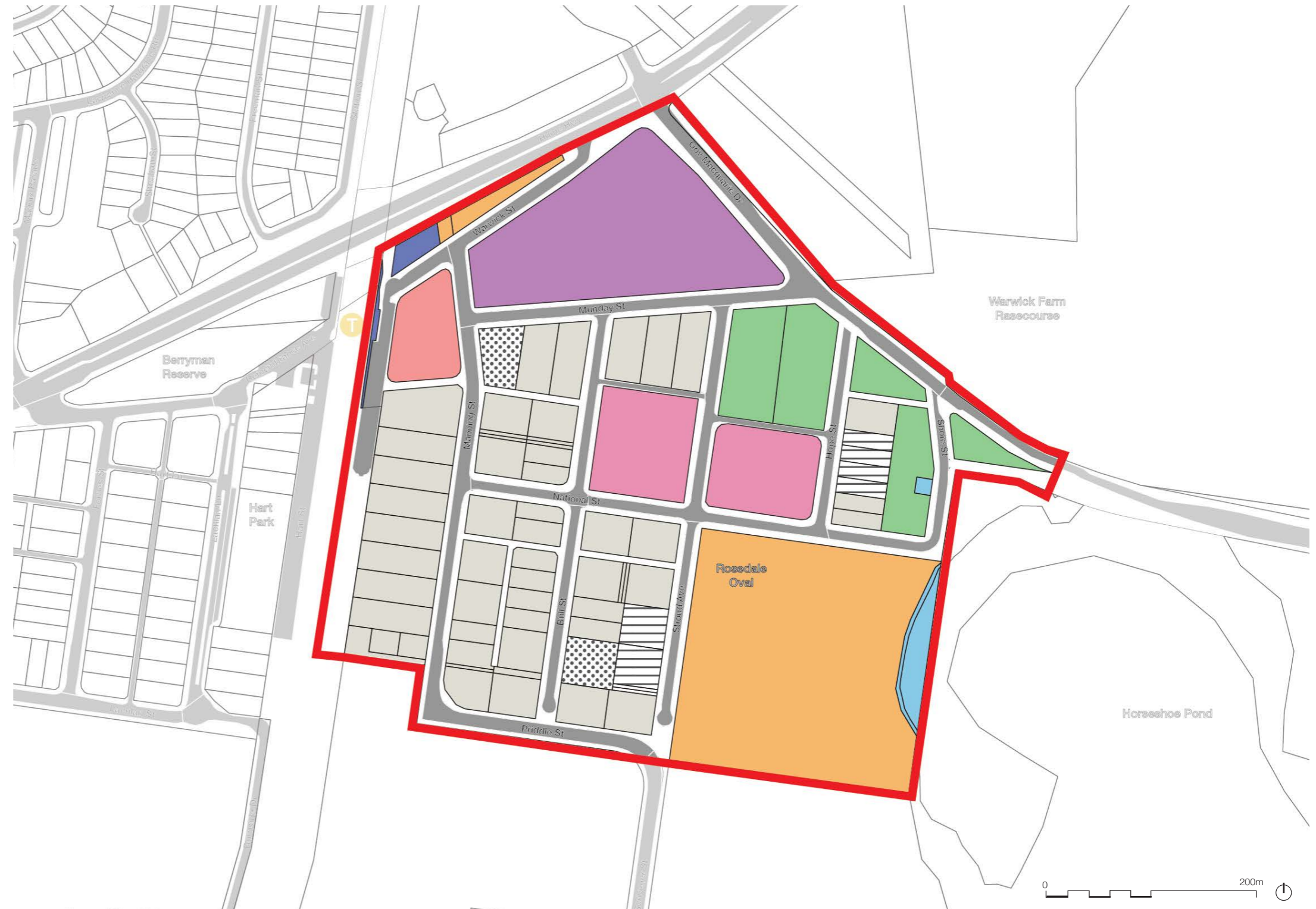


Figure 28: Current landownership pattern

## 4.0 Urban Design Analysis

### 4.10 Constraints and Opportunities

The Urban Design Analysis of the Warwick Farm Precinct in terms of its strategic, local and planning context as well as existing conditions, has identified the following constraints and opportunities to be addressed in the planning of the precinct.

#### Constraints

The constraints include:

- The precinct is prone to flood. The majority of the land is identified as having medium flood risk. Rosedale Oval has high flood risk. Flooding issues would affect the design of buildings, places, land uses and earth works.
- ▨ Residential development within the Liverpool Sewage Treatment Plant odour buffer zone is to be avoided.
- ↔ The only through site vehicular access (Priddle Street - Manning Street - Munday Street) linking the industrial area to the south of the precinct to the Hume Highway limits the area's permeability. It also creates conflicts of uses among pedestrian, light and heavy vehicles.
- ↔ The Warwick Farm Station concourse provides the only east-west cross railway corridor access for pedestrians and cyclists, which limits the precinct's access to surrounding recreational, educational, and health facilities as well as the Liverpool CBD.
- ▣ The Hume Highway underpass adjacent to the precinct is narrow and lacks maintenance, which provides an unsafe environment for pedestrians and cyclists.
- 🔊 The vehicular traffic along the Hume Highway and the railway corridor generate noise to the precinct, which affects the area's acoustic amenity.
- Bankstown Airport OLS contours limit the maximum building height within the precinct.
- ▣ The industrial area immediately to the south of the precinct could potentially affect the area's residential amenity.
- ▣ The lots in the precinct are in fragmented ownership. It may be challenging to sequence development.
- The strata constrained land opposite Warwick Farm Station would potentially retain its current form in the short to medium term.

- Governor Macquarie Drive is currently at capacity. Future development within the precinct needs to assess and address the potential traffic impacts to Governor Macquarie Drive.
- There are no multipurpose or hireable community facilities within the precinct. The closest one - Warwick Farm Community Hub, is 800m away from the precinct and is ageing.
- 🌳 Tree coverage along the main streets is minimal.

Please also refer to Figure 29

#### Opportunities

The precinct presents the following opportunities:

- To provide a high quality mixed-use, Transport Oriented Development (TOD) close to Warwick Farm Station.
  - ✳ To create an urban centre close to Warwick Farm Station, providing a mix of uses and community facilities.
  - To activate the main streets close to the urban centre by providing a mixed-use building typology with ground floor retail / commercial uses fronting the streets.
  - To concentrate height and density close to Warwick Farm Station and transitioning down towards Rosedale Oval.
  - ➔ To enable the redevelopment of the precinct by moving horse training facilities and stables to the Warwick Farm Racecourse (subject to agreement with ATC).
  - ▣ To facilitate the future growth of the precinct by improving the capacity of Governor Macquarie Drive.
  - ▣ To provide a bypass road at the edge of the precinct redirecting heavy vehicles from entering the heart of the precinct.
  - To improve the pedestrian amenity and streetscape along Priddle Street - Manning Street - Munday Street and reduce use conflicts in light of the reduced through site heavy vehicle traffic.
  - ➔ To promote active transport (walking and cycling) within and around the precinct.
  - ➔ To improve east-west cross railway corridor connection by improving the station concourse and providing new links.
  - ▣ To upgrade the Hume Highway underpass improving the precinct's access to Warwick Farm northwest and Cabramatta Creek.
- ➔ To provide future pedestrian and cyclist accesses to Georges River Foreshore via Governor Macquarie Drive and Horseshoe Pond.
  - To improve access to Liverpool Boys High School, and the surrounding open spaces via existing and new links.
  - ➔ To create 'green links' connecting east and west of the precinct.
  - 🌳 To protect the existing mature trees and improve the precinct's tree coverage by planting additional street trees along main streets.
  - ▣ To provide flood escape route from the precinct to the flood free area along the Hume Highway.

Please also refer to Figure 30.



## 4.0 Urban Design Analysis

Constraints Diagram

**Legend**

-  The study area
-  The only through site vehicular access.
-  Existing Warwick Farm Station concourse, providing only over rail corridor access
-  Existing Hume Highway underpass
-  Noise impact from the rail corridor and the Hume Highway
-  Odour buffer zone
-  Industrial area to the south of the precinct
-  Fragmented ownership
-  Strata titled property
-  Governor Macquarie Drive is at capacity
-  Bankstown Airport OLS
-  Warwick Farm Station
-  Existing tree canopy
-  Cadastre
-  Rosedale Oval

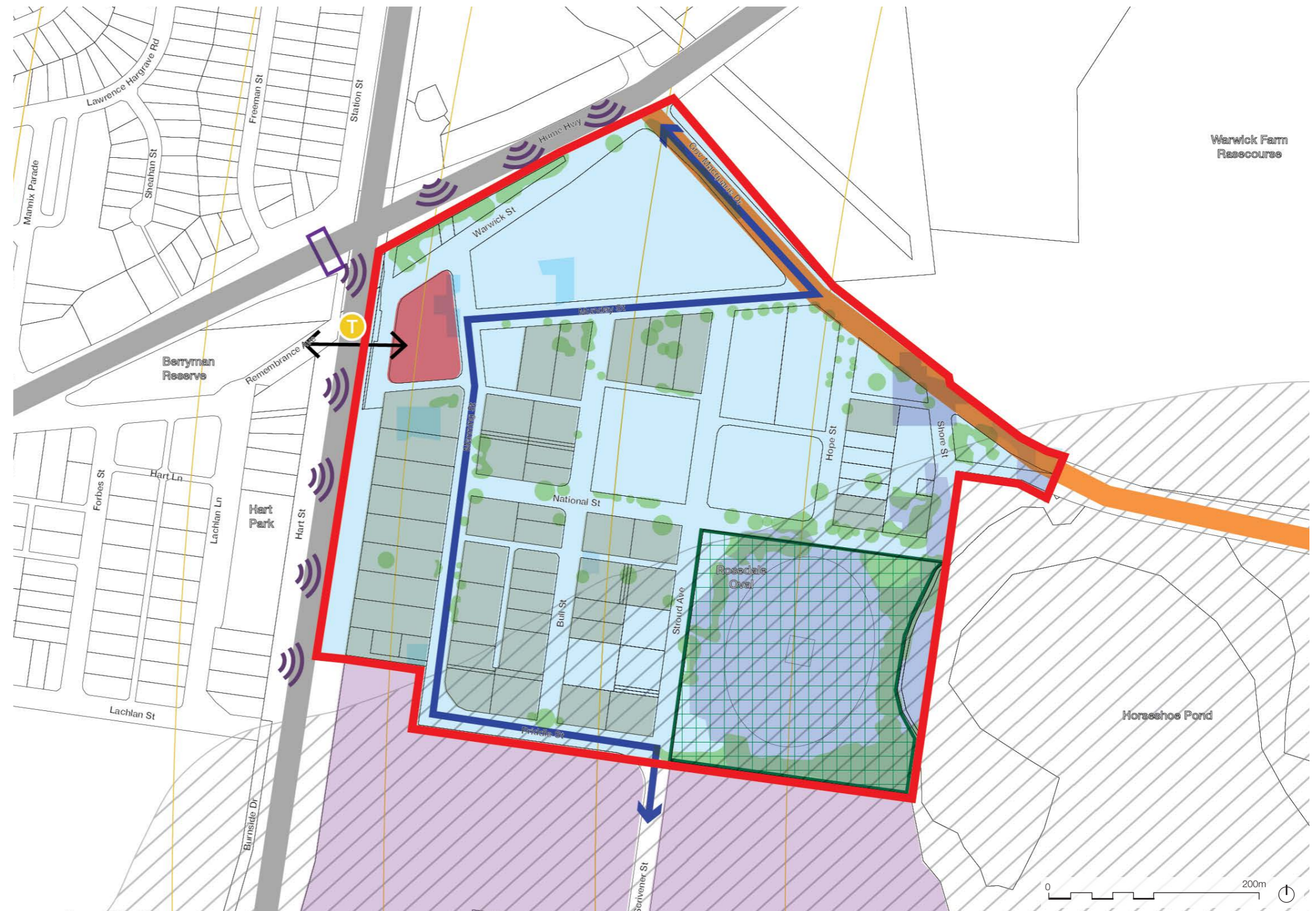


Figure 29: Constraints

## 4.0 Urban Design Analysis

Opportunities Diagram



## 4.0 Urban Design Analysis

### 4.11 Urban Design Vision

#### Urban Design Vision

*The Warwick Farm Precinct will be a new mixed-used community, providing living and employment close to Warwick Farm Station. It will be a precinct that addresses the community needs by leveraging the surrounding natural and built assets as well as delivering new high quality urban spaces. Its rural character will be transferred to a vibrant and multifunctional community that facilitates urban living.*

*Its character will be defined by diverse built forms and uses; and further strengthened by the precinct's rich history. Leafy streets and prime open spaces will complement the high quality urban living and distinct the precinct from the surrounding suburbs.*

A new urban centre will be formed close to Warwick Farm Station, facilitating greater density and height. The new urban centre will become a 'community heart' providing high quality urban spaces and community facilities for the precinct and the suburb of Warwick Farm.

Mixed-use buildings will provide active street frontages and living and working opportunities in convenient proximity. The urban environment will gradually transition down in height towards Rosedale Oval providing a sensitive approach interfacing with the public domain.

The pedestrian and vehicular accessibility of the precinct will be improved. Governor Macquarie Drive will be widened to facilitate the future growth of the area. The proposed bypass road, which is Council's priority project, will provide an alternative route to access to the industrial area, thereby improving the road amenity and streetscapes in the heart of the Warwick Farm Precinct. The east-west connectivity across the railway corridor will be improved via upgrading the existing station concourse and additional crossing.

Active transport, including walking and cycling, will be encouraged, connecting the precinct to the surrounding suburbs, facilities and open spaces. Tree line streets together with active street frontages will improve public domain amenity and passive surveillance.

The precinct's amenity and appearance will be further improved by the proposed local parks, which will be provided within walking distance from any medium to high density development. Local parks coupled with tree-line streets will form 'green grids' linking the precinct to the surrounding regional and local open space networks.

The access to the regional parks will be enhanced. Rosedale Oval will continue to accommodate recreational uses for different age groups. The future pedestrian and cycle link to Horseshoe Pond and Georges River foreshore, through the Sydney Water site, will provide the community with additional access to the picturesque natural assets of the region.

Flooding issues that impact the precinct will be carefully dealt with through managing cut and fill and adopting Water Sensitive Urban Design (WSUD). The proposed open space network will also play an important role, facilitating flood water runoff and water storage.



Rouse Hill Town Centre



The existing child playground near Rosedale Oval

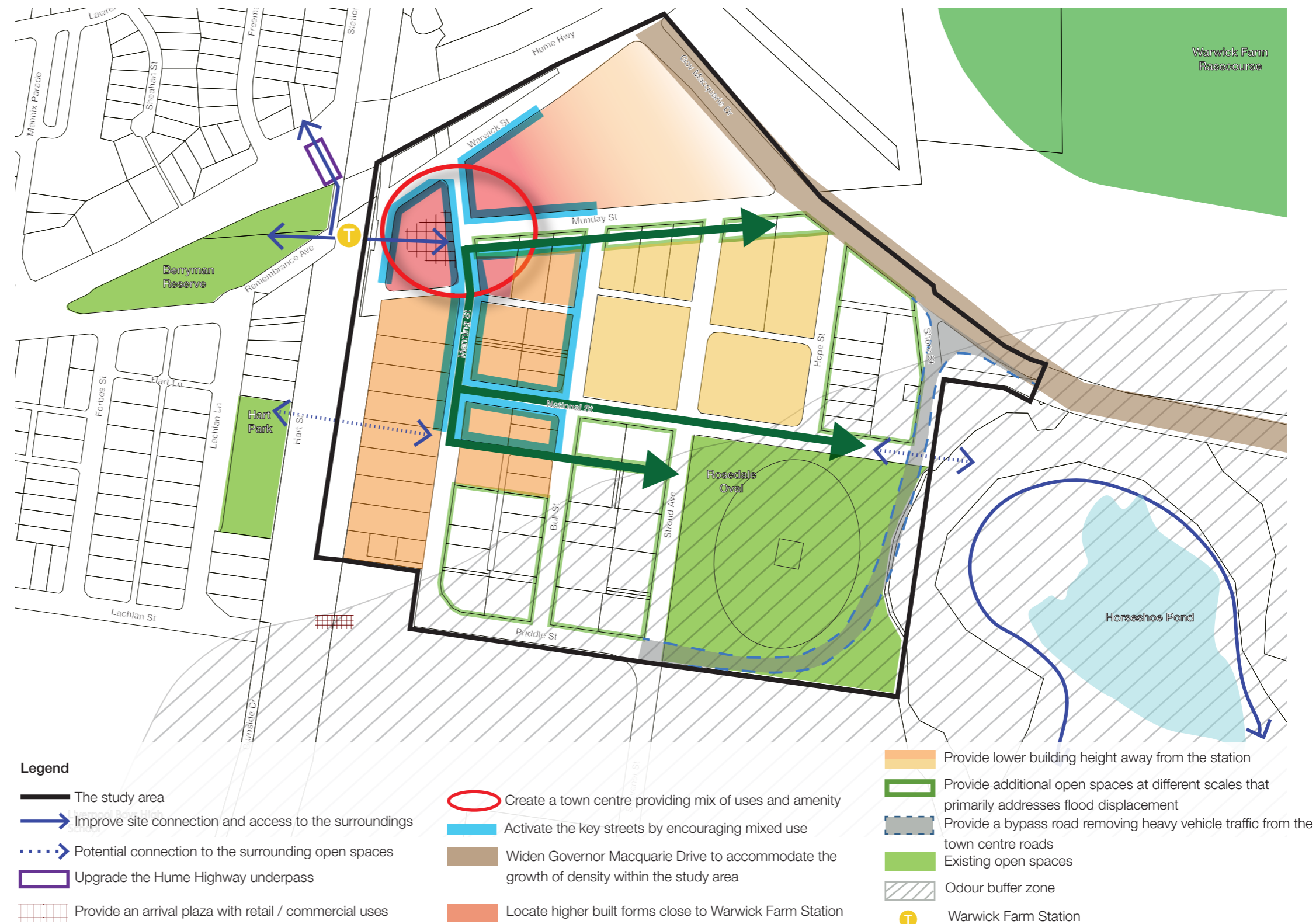
## 5.0 Structure Plan

### 5.1 Introduction

The Urban Design Study and the input received from Council and the consultant team in regard to flooding, traffic and social infrastructure requirements have informed the development of the Urban Design Vision and the structure plan for the precinct.

The Urban Design framework identified below has formed the basic structure and principles to guide the redevelopment of the precinct, as well as fulfilling the Urban Design Vision outlined in Chapter 4.

1. Create a high quality, lively 'community hub' near Warwick Farm Station, comprising new community infrastructure and a mix of uses.
2. Concentrate higher built form and density around the future town centre and transition the height / density down to the lower lying areas to the southeast
3. Create a mixed use town centre in close proximity to Warwick Farm Station providing living and job opportunities.
4. Promote high quality residential living in the precinct, utilising the existing and proposed parks and natural resources.
5. Recognise Rosedale Oval as a valuable asset to the broader community as well as to future residents in the precinct.
6. Deliver new local open spaces throughout the precinct, providing amenity to the future community and to primarily address flood water displacement.
7. Create 'green links', utilising streets, laneways, existing and future open spaces.
8. Improve cross rail corridor accessibility via upgrading the old connection and exploring a new link.
9. Explore opportunities to harness the natural assets of the area, in particular Horseshoe Pond and the Georges River foreshore, to enable the general public access to picturesque areas.
10. Upgrade the road infrastructure in the precinct to prevent heavy vehicles from entering the precinct, whilst promoting active transport and local traffic within the precinct.
11. Improve streetscapes within the precinct via tree planting, footpath upgrades and ground floor activation.
12. Mitigate the flood impact through design and management and implementing Water Sensitive Urban Design (WSUD) measures.



## Precedent Images



## 5.0 Structure Plan

### 5.2 Structure Plan

The Structure Plan is developed based on the nominated Urban Design framework. In developing the Structure Plan, CM<sup>+</sup> and the consultant team have tested several options and conducted strengths and weakness analysis for each option. Please refer to Appendix 1 for the options testing.

The maximum building height in the precinct will be 15 storeys (near Warwick Farm Station), and overall density (FSR) will be approximately 0.8:1. Approximately 2,295 dwellings (including No. 240 Governor Macquarie Drive) and 4.7ha of additional open space is to be introduced to the precinct. Please refer to the yield tables on page 35.

The precinct is subject to flooding issues. The Structure Plan has carefully considered the floodplain water displacement by balancing the associated cut and fill. The purple table on page 35 provides a high level summary of the calculation.

The existing road levels need to be raised slightly to address the flood evacuation requirement. Please refer to Section 5.9 of the report for the detailed information. Section A (Figure 32) indicates the proposed new street levels and the proposed relationships between the future buildings and the streets.

**Notes:**

1. The built forms at No. 240 Governor Macquarie Drive correlate with the Council endorsed Planning Proposal (Planning Proposal No. 81, by Liverpool City Council, dated 25 February 2020)
2. New stormwater pipelines will be introduced to the future Local Sport Venue open spaces to drain the areas during a flood event. We acknowledge that detailed measures in regard to hazard reduction and hydraulic engineering design will need to be undertaken in the detailed design stage.

\* The location of the proposed community facility shown on the plan is indicative only. The final form and location will be determined in the detailed design stage



Figure 31: Preferred Structure Plan

## 5.0 Structure Plan

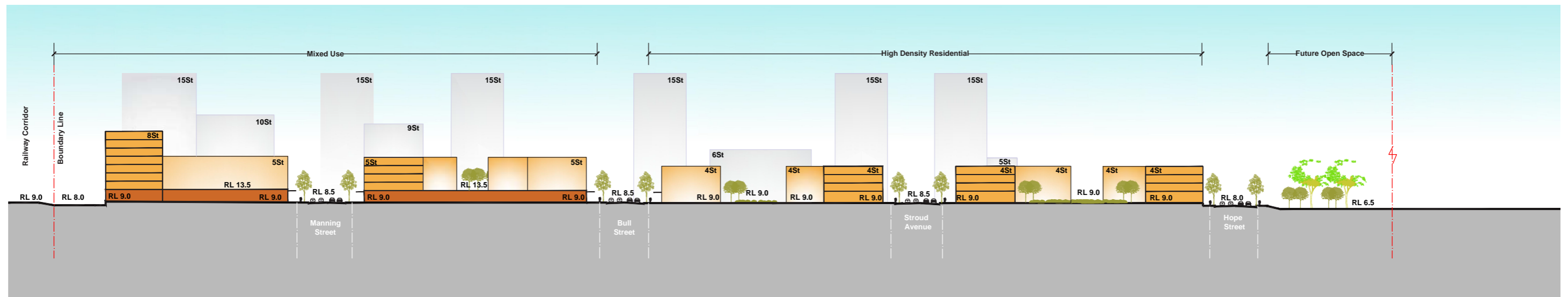
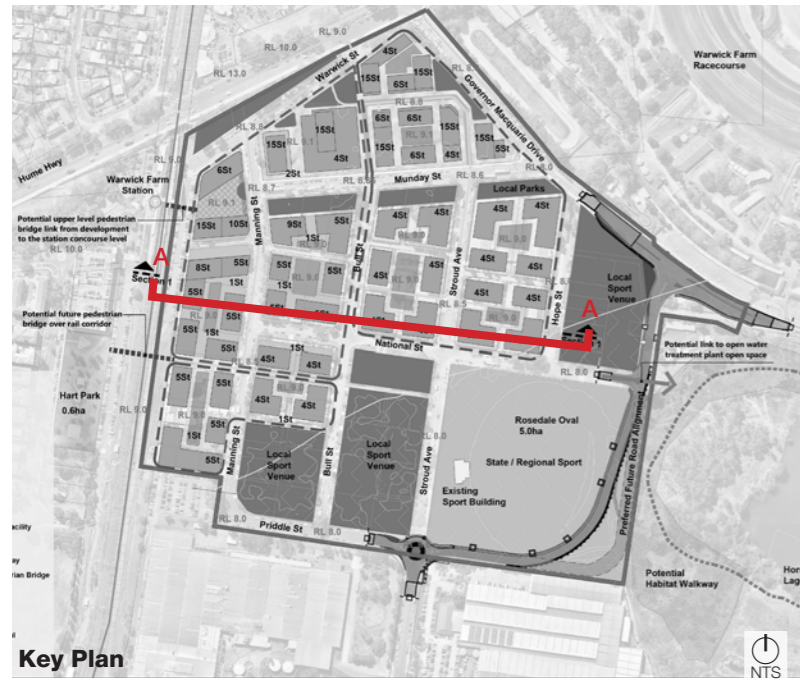


Figure 32: Preferred Structure Plan - Section A



## 5.0 Structure Plan

### Preferred Structure Plan - Yield Calculation

240 Governor Macquarie Drive (GMD) <sup>+</sup>	
Residential GFA	82,300 m <sup>2</sup>
Commercial GFA	5,000 m <sup>2</sup>
Total GFA	87,300 m <sup>2</sup>
Site Area	29,307 m <sup>2</sup>
No. of Dwellings	830
FSR	3.0:1

Development Parameters (Excl. 240 GMD)					
	Total GBA (m <sup>2</sup> )	Efficiency	Total GFA (m <sup>2</sup> )	Dwelling Size (m <sup>2</sup> )	No. of Dwellings
Residential	166,047	75%	124,535	85*	1,465
Commercial (GF)	25,425	70%	17,798	N/A	
Commercial (1st Floor)	2,601	85%	2,211	N/A	
<b>Total GFA</b>			<b>144,544</b>		
<b>Site Area</b>			<b>254,735</b>		
<b>Overall FSR</b>			<b>0.56:1</b>		

Overall Development Parameters (Incl. 240 GMD)	
Residential GFA	206,835 m <sup>2</sup>
Commercial GFA	25,008 m <sup>2</sup>
Total GFA	231,843m <sup>2</sup>
Site Area	284,042m <sup>2</sup>
No. of Dwellings	2,295
FSR	0.82:1

Open Space Calculation	
Open Space 1 (OS1)	2,490 m <sup>2</sup>
Open Space 2 (OS2)	4,948 m <sup>2</sup>
Open Space 3 (OS3)	13,507 m <sup>2</sup>
Open Space 4 (OS4)	26,887 m <sup>2</sup>
<b>Total Proposed Local Open Space<sup>**</sup></b>	<b>47,832 m<sup>2</sup> (16.8% of the site area)</b>
Rosedale Oval	49,927 m <sup>2</sup>
<b>Total Open Space Area</b>	<b>97,759 m<sup>2</sup> (34% of the site area)</b>

Floodplain Displacement Calculation (approximate only)	
Existing Building Footprint (EBF)	50,000 m <sup>2</sup>
Proposed Developed area (PDA)	137,000 m <sup>2</sup>
FILL <sup>**</sup>	43,500 m <sup>3</sup>
CUT (in OS3 & OS4) <sup>***</sup>	44,300 m <sup>3</sup>

+ The yield is extracted from the approved Planning Proposal Urban Design Report by SJB dated 27/06/2018.

+ + This does not include Hart Park, which has an area of approximately 0.66ha. The total local open space percentage will be approximately 18.8%.

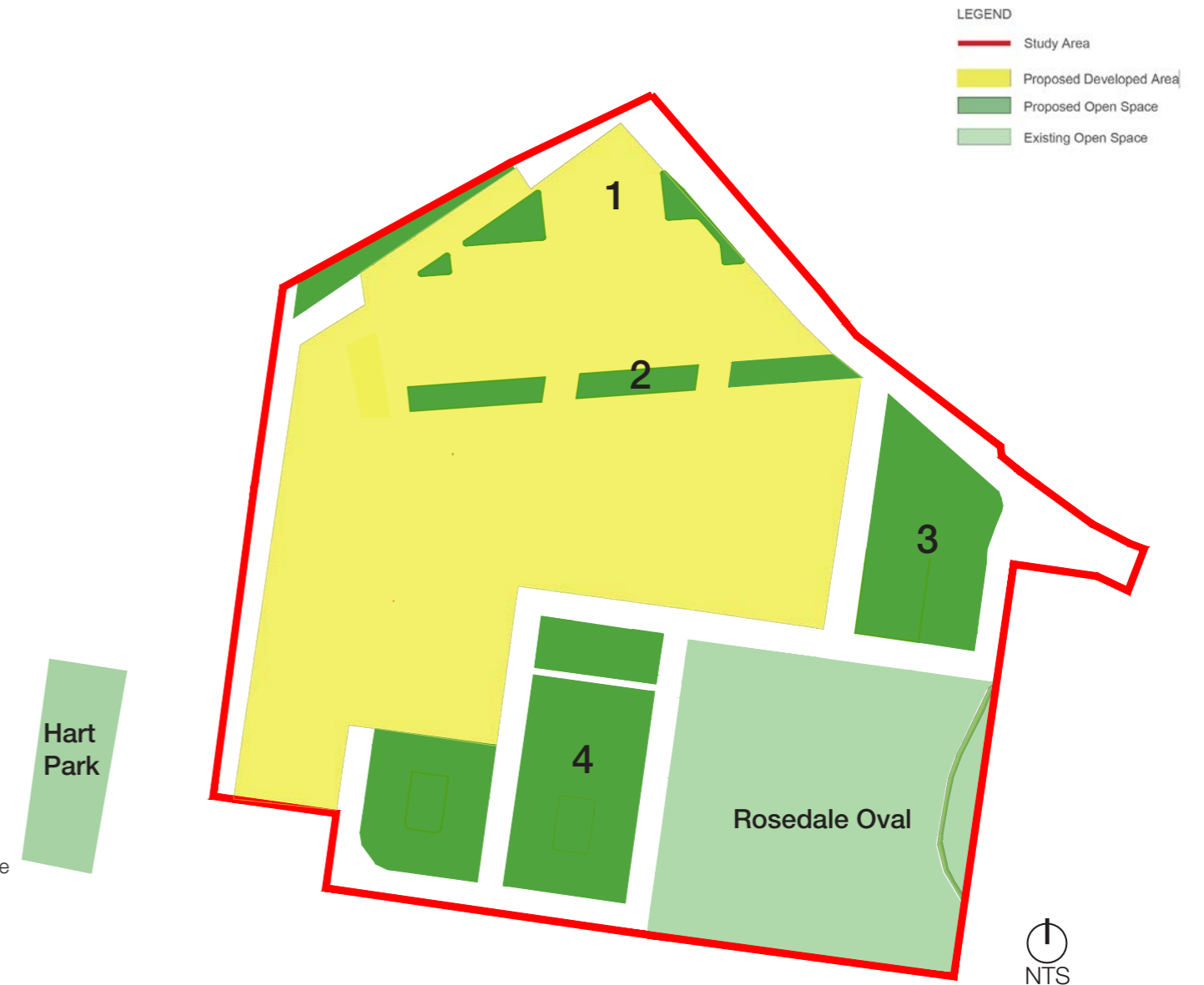
\* The average dwelling size does not apply to 240 GMD.

\*\* The volume of fill = (PDA-EBF) X 0.5m

\*\*\* The volume of cut = OS3 Cut Volume + OS4 Cut Volume

Note: 0.5m is an average depth calculated based on the level difference between 1%AEP (RL8.5) and average existing level of the site (RL8.0). Detailed floodplain displacement will need to be undertaken in the detailed design stage.

### Key Plan



## 5.0 Structure Plan

### 5.3 Proposed Land Zoning Map

The proposed structure plan intends to change the current zoning within the precinct. The proposed zoning (refer to Figure 33) includes:

1. B4 Mixed Use Zone - In close proximity to Warwick Farm Station and the future town centre.
2. R4 High Density Residential Zone - Adjacent to the proposed B4 Mixed Use zone to its east and south.
3. RE1 Public Recreation Zone - Adjacent to Rosedale Oval.

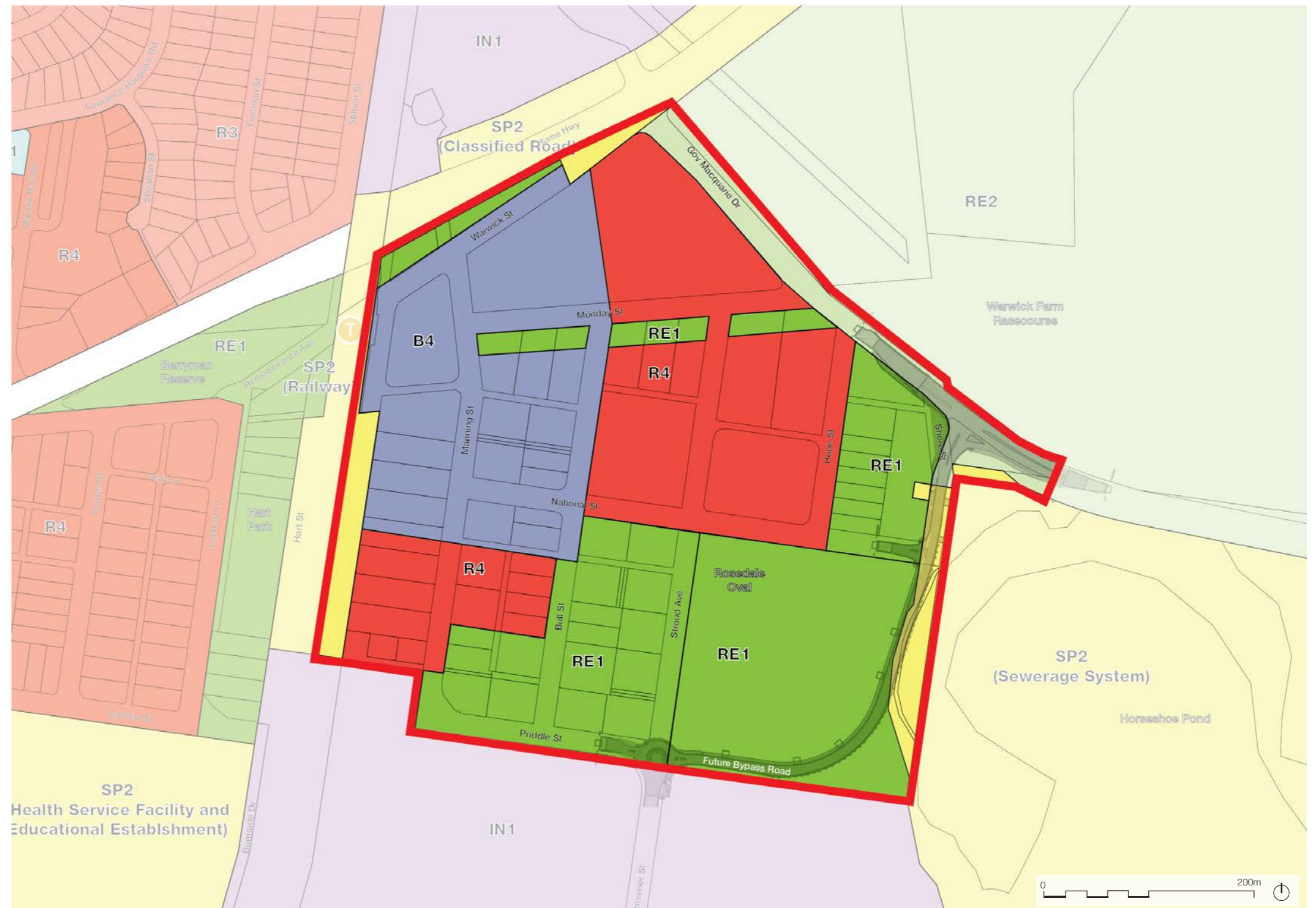


Figure 33: Proposed Zoning Map

## 5.0 Structure Plan

### 5.4 Active Street Frontages

Streets play an important role in shaping the amenity and character of an area. Active street frontages, in the form of retail and commercial uses define the streets, and bring vibrancy to the area, provide passive surveillance and create an attractive town centre. Please refer to Figure 34 for the nominated active street frontages. The key principles are:

1. Active street frontages are required along the local streets within the future town centre (B4 Mixed Use Zone).
2. Active street frontages along laneways and internal roads are desired.
3. Active uses, including retail, commercial shop front, civic uses, display windows and the like should define the active frontages.
4. High quality pedestrian environment along active street frontages should be provided through improving footpath condition, tree planting and awnings all support this street activity.
5. Reduce long sections (i.e. greater than 40m) of blank walls, building services (i.e. substation) and minimise vehicular access points and width along active frontages to improve pedestrian safety and footpath continuity.

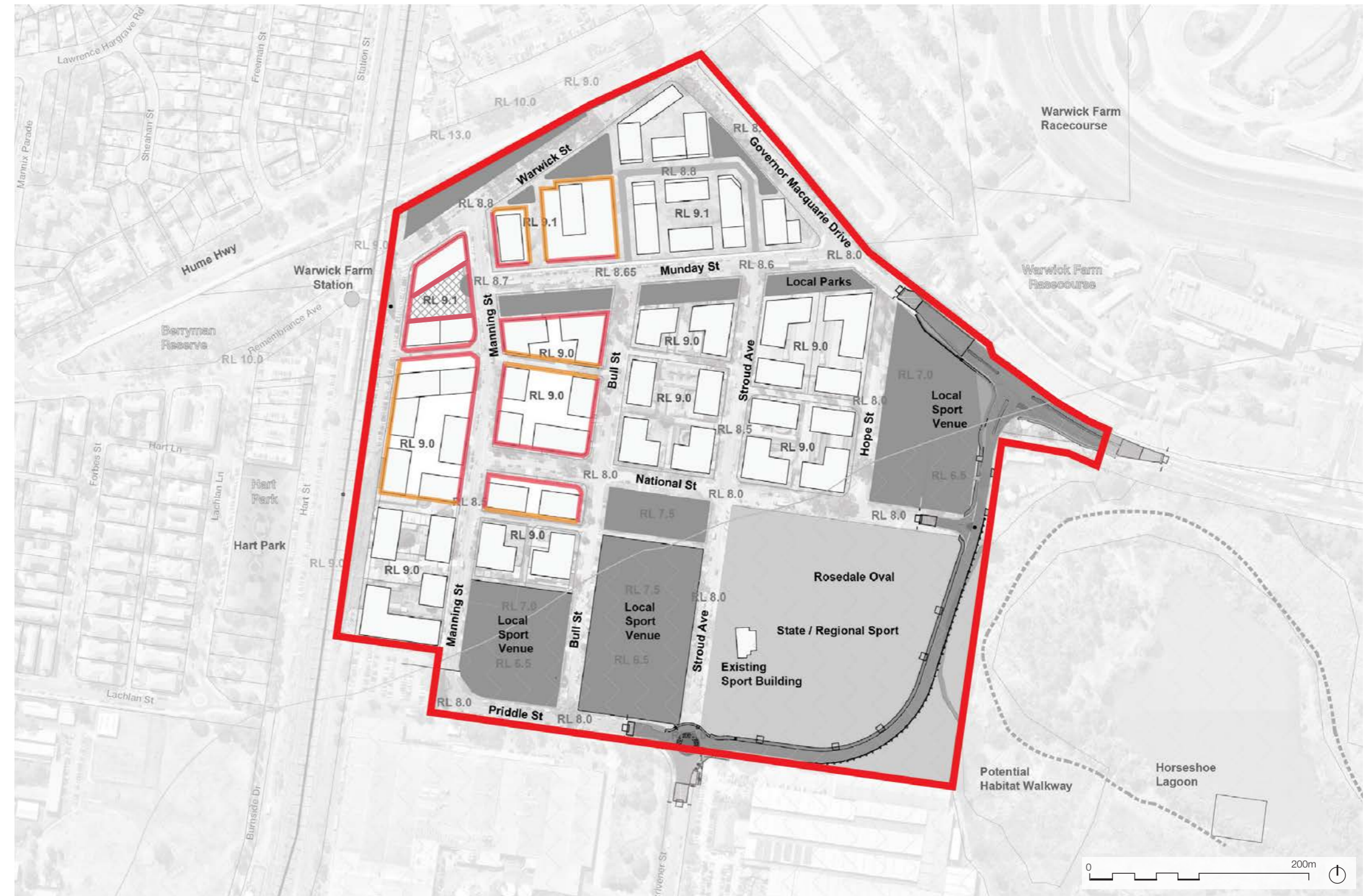


Figure 34: Active Street Frontages Plan

## 5.0 Structure Plan

### 5.5 Proposed Building Height Map

An increase in building height is proposed in the precinct. The proposed building height ranges from four storeys up to 15 storeys in the future town centre, close to Warwick Farm Station.

The proposed height transitions down from 15 storeys near the transport node (Warwick Farm Station) to 4 storeys towards the edge of the precinct, which provides a sensitive built form transition towards Rosedale Oval as well as the future open spaces.

The recommended building height is illustrated in Figure 35. The maximum height will need to be reduced, where the maximum height may result in impacts on either the public domain or adjacent properties, due to overshadowing, privacy or other loss of urban amenity.



Figure 35: Proposed Building Height Map

## 5.0 Structure Plan

### 5.6 Street Wall Height

Street wall height defines the character of an urban space. It forms and shapes the urban experience from the street level. A proper street wall height will assist creating a human-scale streetscape and provide a consistent urban setting. Figure 36 illustrates the desired street wall height. The key principles are:

1. Provide one to two storey street wall height within B4 Mixed Use Zone.
2. Promote human scale through a well proportioned, consistent street wall height.
3. Make the upper levels distinct from the street wall height.
4. Include active and employment generating uses within the building podium level(s) to activate the street and to provide local employment.

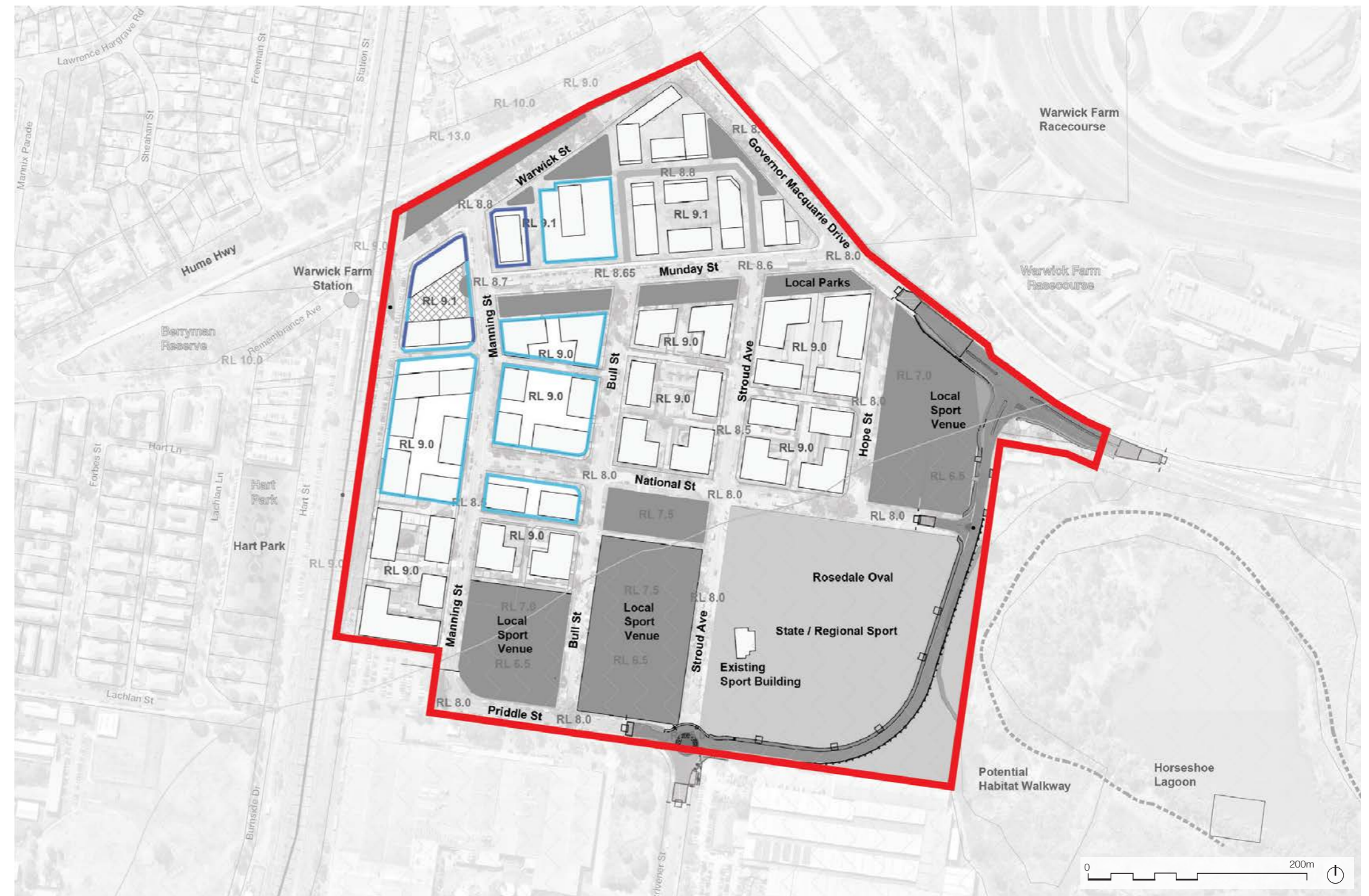


Figure 36: Street Wall Height Map

## 5.0 Structure Plan

### 5.7 Open Space Network

The open space network provides a structure for the future public domain improvements. It also adjoins the adjacent existing / proposed open spaces and forms a part of Liverpool's green network.

Future residential development will benefit from the proposed large and small size local open spaces within walking distance from the door step, providing amenities and views.

Green links along Munday Street, National Street and laneways will improve the precinct's permeability. They will provide east-west spines linking the community to the west of the railway corridor to the future habitat walkway in Horseshoe Pond (subject to the collaboration with Sydney Water) through the heart of the precinct.

Tree-lined streets within the precinct will provide shades to pedestrian and cyclists and improve the overall streetscape.

The future open spaces will provide multi purpose sport facilities, playground, natural based discovery facilities, BBQ and picnic areas.



Figure 37: Open Space Network Map

#### LEGEND

- Study Area
- ↔ Proposed Main Green Corridor
- - - Potential to Extend the Green corridor to the Surrounding Open Space
- - - Potential Habitat Walkway
- Proposed Open Space
- Existing Open Space

## 5.0 Structure Plan

### 5.8 Active Transport

Active transport, which priorities walking and cycling, will improve the quality of the public domain as well as the wellbeing of the future residents.

The precinct currently has a shared path (pedestrian and cyclists) along Warwick Street, Manning Street, Munday Street and Governor Macquarie Drive, linking Warwick Farm Station to the Hume Highway (refer to Figure 38). The walking and cycling environment will be further strengthened via improved existing footpaths / through site laneways and new footpath / shared way.

The over railway corridor connection will be improved via additional pedestrian / cyclists over bridge and updated station concourse. The proposed active transport network in the precinct will also link to the Chipping Norton Cycleway, which provides access to the Georges River foreshore. The potential link to Horseshoe Pond will provide a habitat walkway through the scenic area and create another access to the Georges River foreshore.

#### LEGEND

- Study Area
- Existing Shared Path (Pedestrian / Cycle)
- Chipping Norton Cycleway (Liverpool Bike Plan 2018-2023)
- - - Local Road - One Side of Pedestrian Footpaths + One Side of Shared Path
- - - Local Road - Pedestrian Footpaths on both sides
- - - Improved Through Site Laneway - Shared Zone
- <- - - -> Potential Pedestrian Bridge Over Rail Corridor
- <- - - -> Potential Pedestrian Link to Open Water Treatment Plant Open Space
- - - Potential Habitat Walkway
- B Bus Stop



Figure 38: Active Transport Map

## 5.0 Structure Plan

### 5.9 Evacuation Route

The precinct is subject to flooding issues. A key issue with the proposed development is the evacuation of residents during a flood. Shelter in place is not appropriate and therefore there must be appropriate access from every building in events larger than a 1% Annual Exceedance Probability (AEP). The key features of the evacuation approach are:

1. All floors to be at or above 9m AHD (1% AEP + 0.5m).
2. All floors must be at least 0.3m above the surrounding ground / road to allow for local drainage.
3. All internal roads to be at or above 8.5m AHD (1 % AEP).
4. All roads or pedestrian access used for evacuation must rise to the Probable Maximum Flood (PMF).
5. There must be either pedestrian or vehicle access from all floors that is always at or above 8.5m AHD (1 % AEP) to above to the PMF.

The proposed evacuation route fulfils the abovementioned requirements by providing a continuously rising route from 8.5m AHD to 10.8m AHD (PMF) and above along the Hume Highway. The proposed evacuation route should be detailed later in the Development Application (DA) stage. Please refer to Warwick Farm Structure and Planning Proposal Flooding Assessment report by WMA Water.



Figure 39: Evacuation Route Plan

#### LEGEND

- Study Area
- Evacuation Route



## 5.0 Structure Plan



Figure 40: Aerial View

# **APPENDIX 1 DESIGN OPTIONS**

## Appendix 1 Design Options

### Design Approach



- Pros
- Developable area is maximised.
  - Mixed-use zone along Munday and Manning Street is maximised.
- Cons
- Long escape paths are proposed.
  - Floodplain displacement cannot be achieved
  - Open space benchmarks cannot be achieved.



- Pros
- Additional open spaces are provided.
  - Additional communal open spaces are provided.
- Cons
- Mixed-use zone is reduced.
  - Long escape paths are proposed.
  - Open space benchmarks cannot be achieved.
  - Inactive frontage along Stroud Avenue.



- Pros
- Open space benchmarks are met.
  - The escape paths are shorten.
  - Floodplain displacement can be achieved.
- Cons
- Mixed-use zone is reduced.
  - Smaller open spaces are missing.
  - No visual connections between the station and the future open spaces.
  - Less development yield.



- Pros
- Open space benchmarks are met.
  - Small to large scale open spaces are introduced.
  - The escape paths are shorten.
  - Floodplain displacement can be achieved.
  - Mixed-use zone along Munday and Manning Street is maximised.
  - Visual connections between the station and the future open spaces are provided
- Cons
- Less development yield.

## Appendix 1 Design Options

### Options Snapshot

#### Option 1



Development Parameters		Open Space Calculation	
Residential GFA (m <sup>2</sup> )	149,930	<b>Total Open Space Area</b>	<b>114,647 m<sup>2</sup></b>
Commercial GFA (m <sup>2</sup> )	39,857		
<b>Total GFA</b>	<b>190,122</b>		
<b>Overall FSR</b>	<b>0.7:1</b>	<b>Floodplain Displacement Calculation</b>	
<b>No. of Dwellings</b>	<b>1,744</b>	<b>FILL</b>	22,574 m <sup>3</sup>
		<b>CUT (in OS3 only)</b>	22,504 m <sup>3</sup>

Recreation and Open Space Benchmarking	
Scenario 1 - 1,000 Dwellings - Demand (precinct site only - 1,000 dwellings, 2,349 people)	6.6
Scenario 2 - 1,500 Dwellings - Demand (precinct site only - 1,500 dwellings, 3,523 people)	10.0
Scenario 3 - 2,000 Dwellings - Demand (precinct site only - 2,000 dwellings, 4,697 people)	13.3

#### Option 2A



Development Parameters		Open Space Calculation	
Residential GFA (m <sup>2</sup> )	171,897	<b>Total Open Space Area</b>	<b>137,429 m<sup>2</sup></b>
Commercial GFA (m <sup>2</sup> )	39,857		
<b>Total GFA</b>	<b>211,755</b>		
<b>Overall FSR</b>	<b>0.7:1</b>	<b>Floodplain Displacement Calculation</b>	
<b>No. of Dwellings</b>	<b>2,006</b>	<b>FILL</b>	27,357 m <sup>3</sup>
		<b>CUT (in OS3 only)</b>	30,186 m <sup>3</sup>

Recreation and Open Space Benchmarking	
Scenario 1 - 1,000 Dwellings - Demand (precinct site only - 1,000 dwellings, 2,349 people)	6.6
Scenario 2 - 1,500 Dwellings - Demand (precinct site only - 1,500 dwellings, 3,523 people)	10.0
Scenario 3 - 2,000 Dwellings - Demand (precinct site only - 2,000 dwellings, 4,697 people)	13.3

#### Option 2B



Development Parameters		Open Space Calculation	
Residential GFA (m <sup>2</sup> )	169,850	<b>Total Open Space Area</b>	<b>98,491 m<sup>2</sup></b>
Commercial GFA (m <sup>2</sup> )	40,383		
<b>Total GFA</b>	<b>210,233</b>		
<b>Overall FSR</b>	<b>0.7:1</b>	<b>Floodplain Displacement Calculation</b>	
<b>No. of Dwellings</b>	<b>1,982</b>	<b>FILL</b>	50,391 m <sup>3</sup>
		<b>CUT (in OS3 only)</b>	49,099 m <sup>3</sup>

Recreation and Open Space Benchmarking	
Scenario 1 - 1,000 Dwellings - Demand (precinct site only - 1,000 dwellings, 2,349 people)	6.6
Scenario 2 - 1,500 Dwellings - Demand (precinct site only - 1,500 dwellings, 3,523 people)	10.0
Scenario 3 - 2,000 Dwellings - Demand (precinct site only - 2,000 dwellings, 4,697 people)	13.3

## Appendix 1 Design Options

Option 1 - Plan

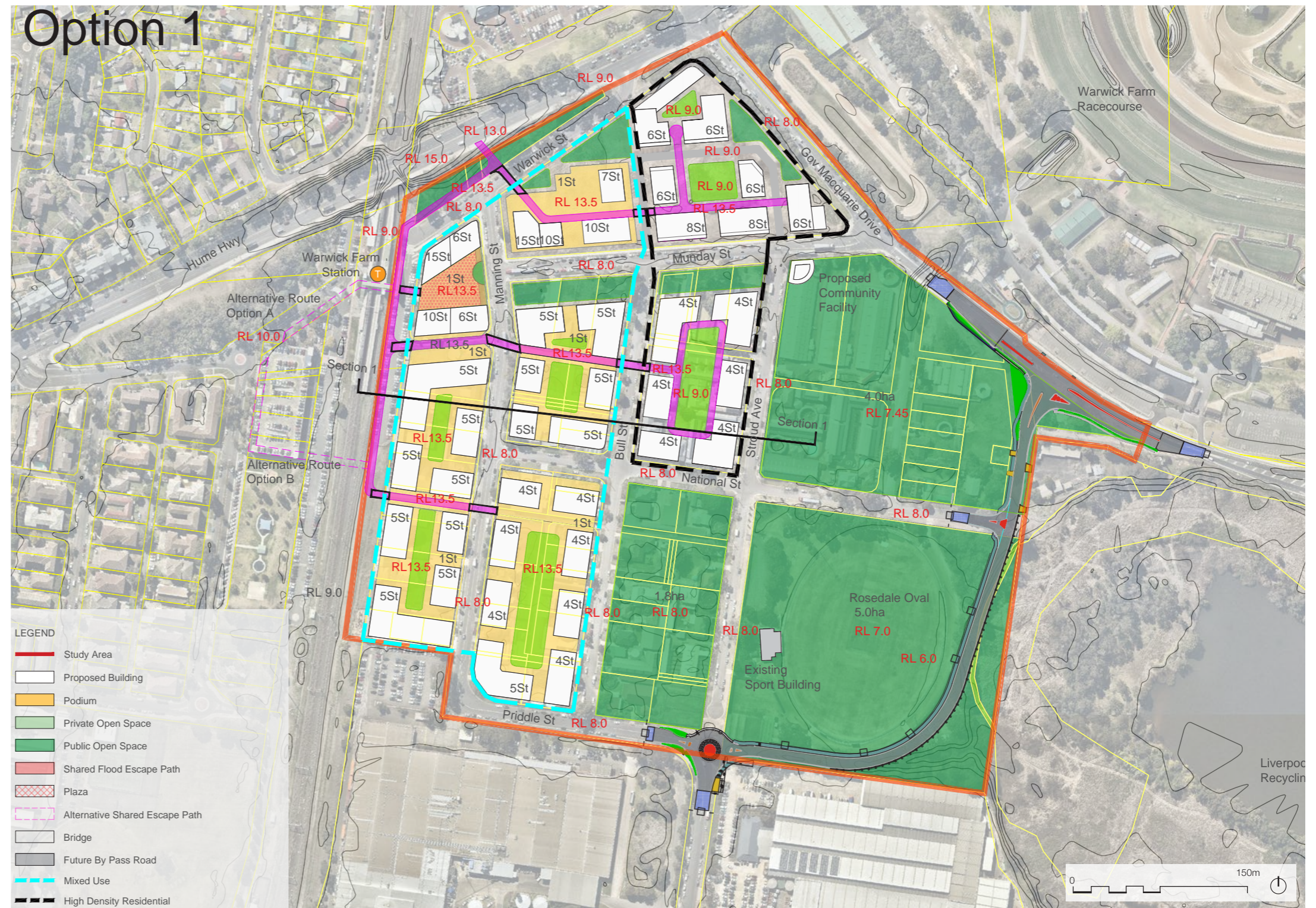


Figure 41: Option 1 - Plan

## Appendix 1 Design Options

Option 1 - Cross Section

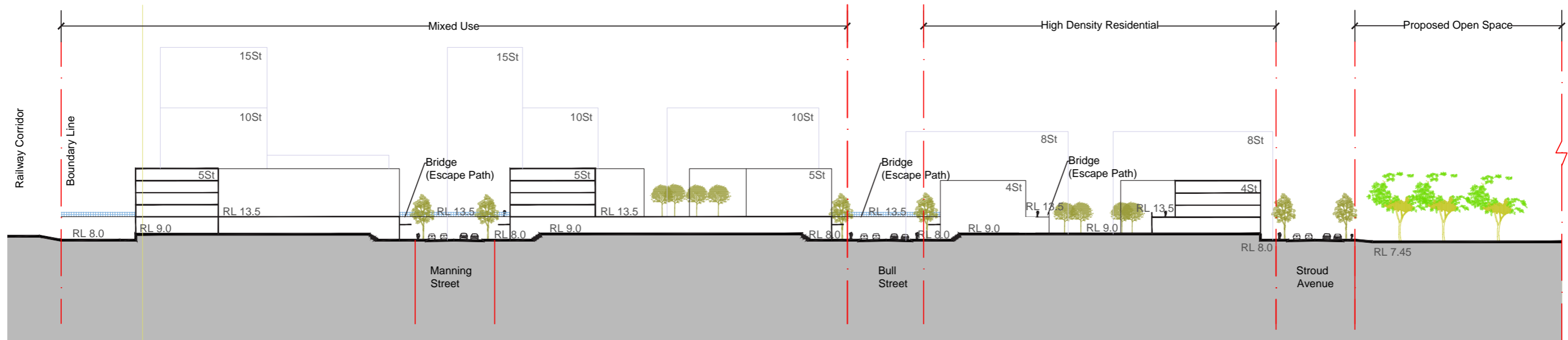
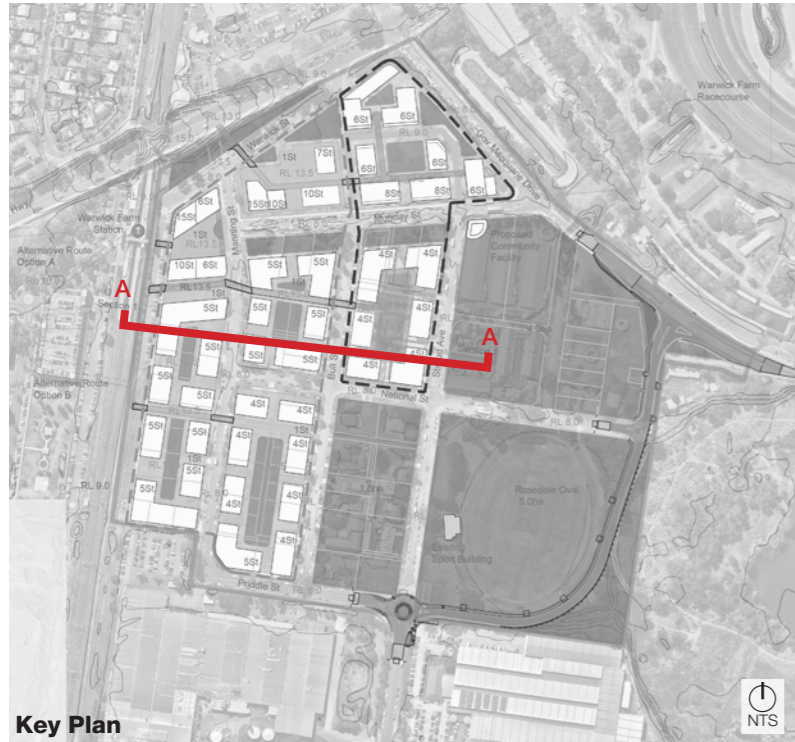


Figure 42: Option 1 - Section A

## Appendix 1 Design Options

### Option 1 - Yield Calculation

240 Governor Macquarie Drive	
	Total GFA
Residential	54,263 m <sup>2</sup>
Commercial	4,616 m <sup>2</sup>
Total GFA*	58,879 m <sup>2</sup>
Site Area	29,307 m <sup>2</sup>
FSR	2.0:1

\* Efficiency rates are used to calculate the GFA. No detailed floor plans are developed at this stage.

Development Parameters					
	Total GBA (m <sup>2</sup> )	Efficiency	Total GFA (m <sup>2</sup> )	Dwelling Size (m <sup>2</sup> )	No. of Dwellings
Residential	199,907	75%	149,930	85	<b>1,744</b>
Commercial	56,661	70%	39,857	N/A	
<b>Total GFA</b>			<b>190,122</b>		
<b>Site Area</b>			<b>284,042</b>		
<b>Overall FSR</b>			<b>0.7:1</b>		

Open Space Calculation	
Open Space 1 (OS1)	2,490 m <sup>2</sup>
Open Space 2 (OS2)	2,993 m <sup>2</sup>
Open Space 3 (OS3)	40,916 m <sup>2</sup>
Open Space 4 (OS4)	18,321 m <sup>2</sup>
<b>Total Proposed Open Space</b>	<b>64,720 m<sup>2</sup></b>
Rosedale Oval	49,927 m <sup>2</sup>
<b>Total Open Space Area</b>	<b>114,647 m<sup>2</sup></b>

Floodplain Displacement Calculation	
Existing Building Footprint (EBF)	49,977 m <sup>2</sup>
Proposed Developed area (PDA)	95,125 m <sup>2</sup>
<b>FILL**</b>	<b>22,574 m<sup>3</sup></b>
<b>CUT (in OS3 only)***</b>	<b>22,504 m<sup>3</sup></b>

\*\* The volume of fill = (PDA-EBF) X (1% flood level)

\*\*\*The volume of cut = OS3 area X (1% flood level)

1% flood level is 0.5m (based on MIKE - 11 model)

### Key Plan



Figure 43: Option 1 - Yield calculation

## Appendix 1 Design Options



Figure 44: Option 1 - Aerial View



## Appendix 1 Design Options

Option 2A - Plan

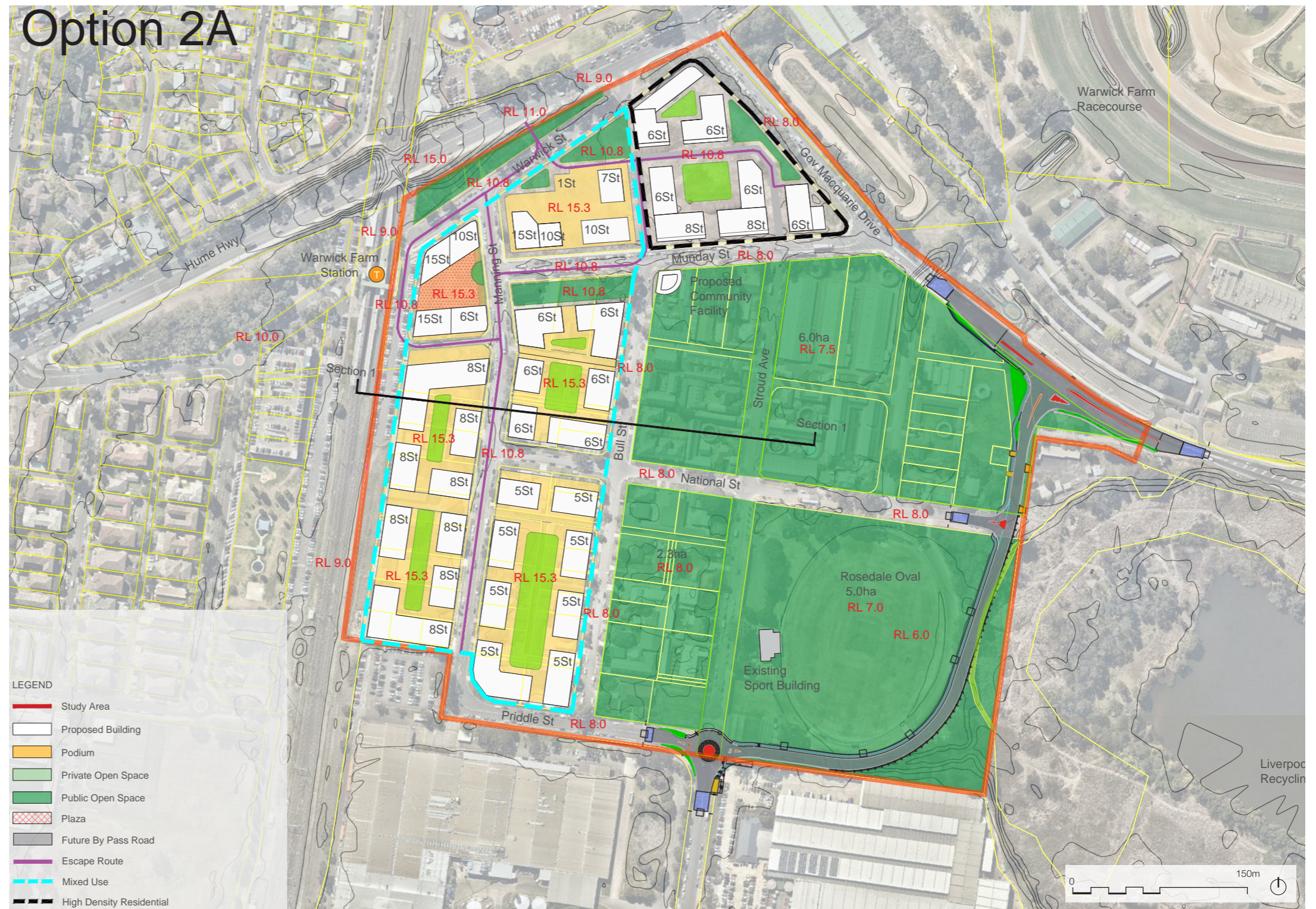


Figure 45: Option 2A - Plan

## Appendix 1 Design Options

Option 2A - Cross Section

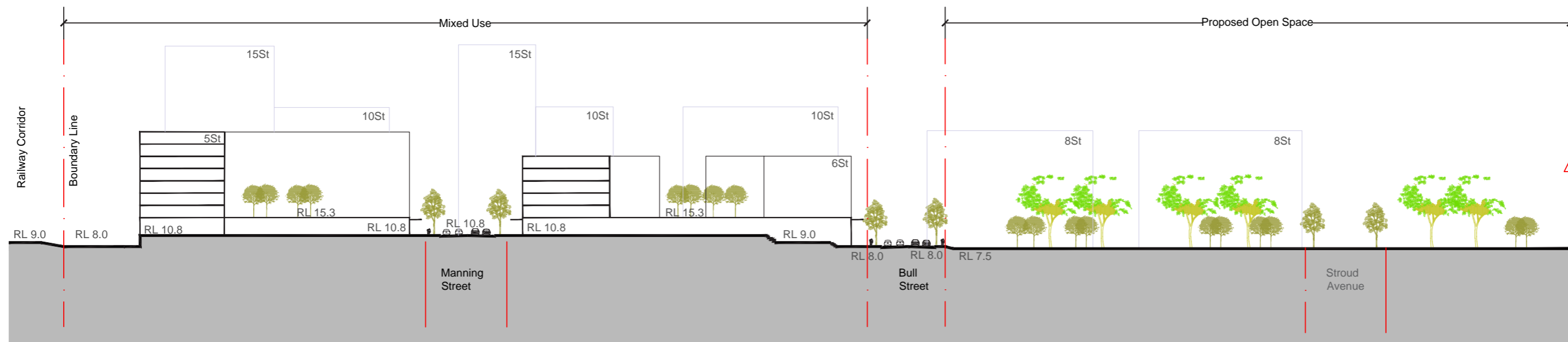
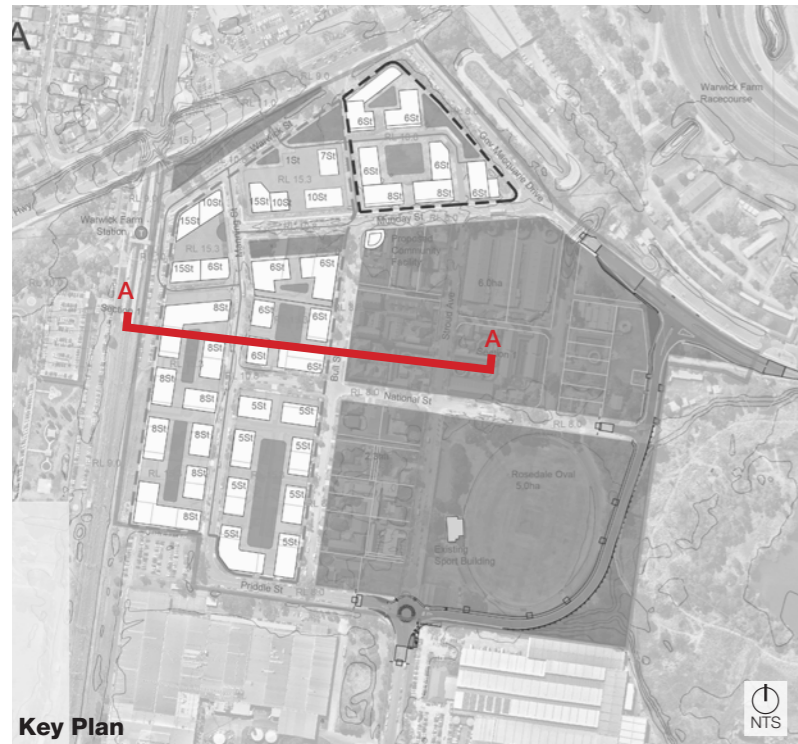


Figure 46: Option 2A - Section A

## Appendix 1 Design Options

### Option 2A - Yield Calculation

240 Governor Macquarie Drive	
	Total GFA
Residential	54,263 m <sup>2</sup>
Commercial	4,616 m <sup>2</sup>
Total GFA*	58,879 m <sup>2</sup>
Site Area	29,307 m <sup>2</sup>
FSR	2.0:1

\* Efficiency rates are used to calculate the GFA. No detailed floor plans are developed at this stage.

Development Parameters					
	Total GBA (m <sup>2</sup> )	Efficiency	Total GFA (m <sup>2</sup> )	Dwelling Size (m <sup>2</sup> )	No. of Dwellings
Residential	229,197	75%	171,897	85	<b>2,006</b>
Commercial	56,661	70%	39,857	N/A	
<b>Total GFA</b>			<b>211,755</b>		
<b>Site Area</b>			<b>284,042</b>		
<b>Overall FSR</b>			<b>0.7:1</b>		

Open Space Calculation	
Open Space 1 (OS1)	2,490 m <sup>2</sup>
Open Space 2 (OS2)	1,800 m <sup>2</sup>
Open Space 3 (OS3)	60,372 m <sup>2</sup>
Open Space 4 (OS4)	22,840 m <sup>2</sup>
<b>Total Proposed Open Space</b>	<b>87,502 m<sup>2</sup></b>
Rosedale Oval	49,927 m <sup>2</sup>
<b>Total Open Space Area</b>	<b>137,429 m<sup>2</sup></b>

Floodplain Displacement Calculation	
Existing Building Footprint (EBF)	49,977 m <sup>2</sup>
Proposed Developed area (PDA)	104,684 m <sup>2</sup>
<b>FILL**</b>	<b>27,354 m<sup>3</sup></b>
<b>CUT (in OS3 only)***</b>	<b>30,186 m<sup>3</sup></b>

\*\* The volume of fill = (PDA-EBF) X (1% flood level)

\*\*\*The volume of cut = OS3 area X (1% flood level)

1% flood level is 0.5m (based on MIKE - 11 model)

### Key Plan



Figure 47: Option 2A - Yield Calculation

## Appendix 1 Design Options



Figure 48: Option 2A - Aerial View

## Appendix 1 Design Options

Option 2B - Plan

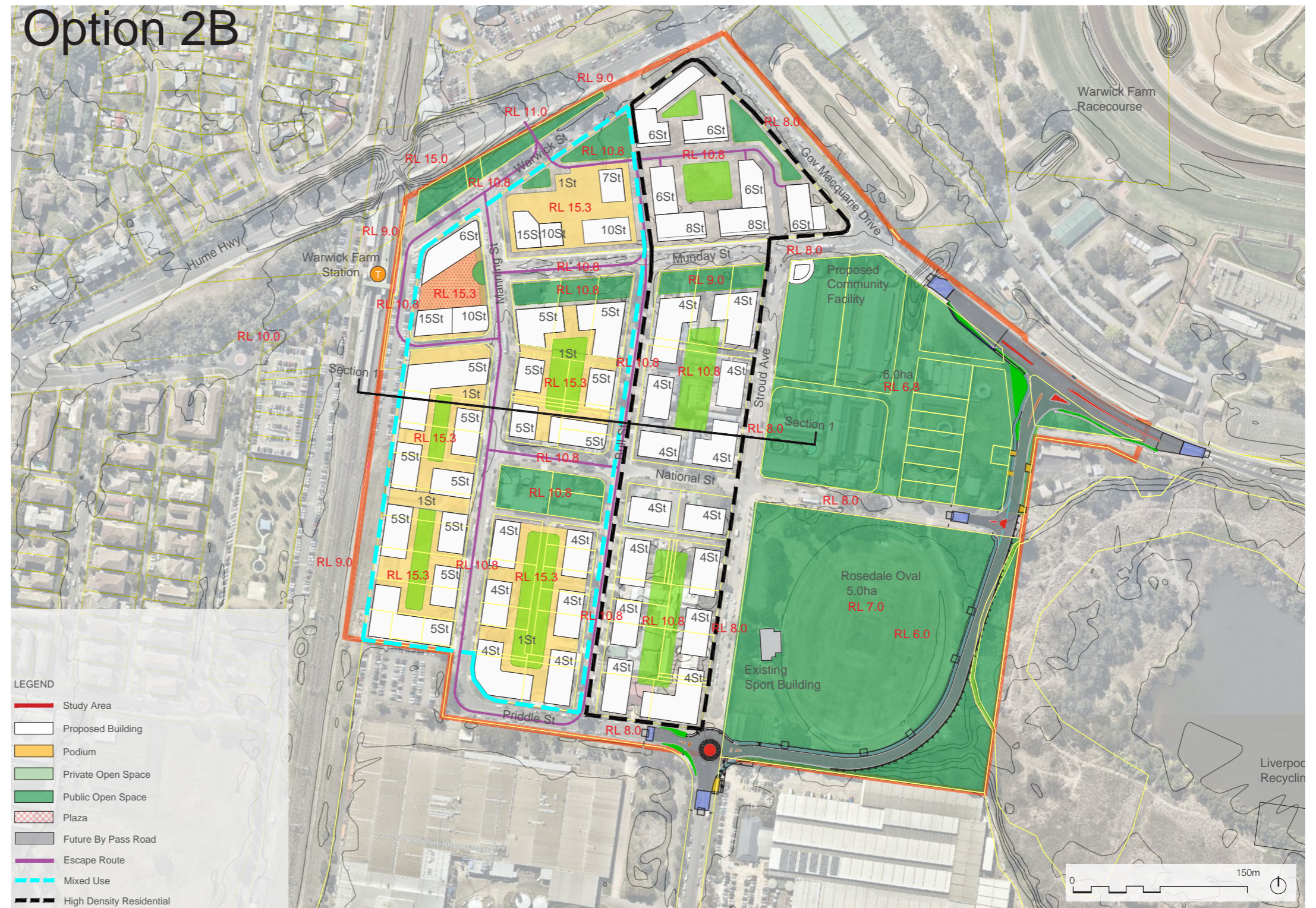


Figure 49: Option 2B - Plan

## Appendix 1 Design Options

Option 2B - Cross Section

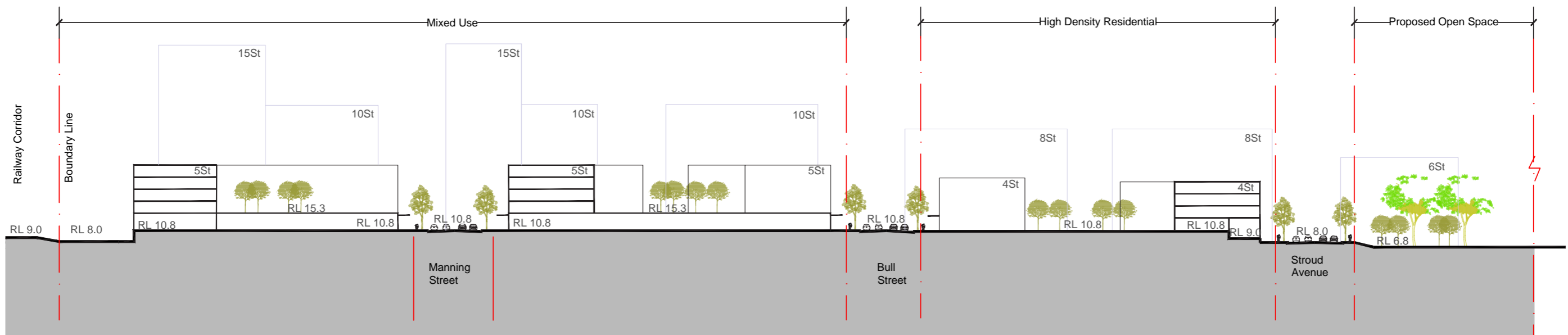


Figure 50: Option 2B - Section A

## Appendix 1 Design Options

### Option 2B - Yield Calculation

240 Governor Macquarie Drive	
	Total GFA
Residential	54,263 m <sup>2</sup>
Commercial	4,616 m <sup>2</sup>
Total GFA*	58,879 m <sup>2</sup>
Site Area	29,307 m <sup>2</sup>
FSR	2.0:1

\* Efficiency rates are used to calculate the GFA. No detailed floor plans are developed at this stage.

Development Parameters					
	Total GBA (m <sup>2</sup> )	Efficiency	Total GFA (m <sup>2</sup> )	Dwelling Size (m <sup>2</sup> )	No. of Dwellings
Residential	226,467	75%	169,850	85	<b>1,982</b>
Commercial	57,279	70%	40,383	N/A	
<b>Total GFA</b>			<b>210,233</b>		
<b>Site Area</b>			<b>284,042</b>		
<b>Overall FSR</b>			<b>0.7:1</b>		

Open Space Calculation	
Open Space 1 (OS1)	2,490 m <sup>2</sup>
Open Space 2 (OS2)	1,800 m <sup>2</sup>
Open Space 3 (OS3)	40,916 m <sup>2</sup>
Open Space 4 (OS4)	3,358 m <sup>2</sup>
<b>Total Proposed Open Space</b>	<b>48,564 m<sup>2</sup></b>
Rosedale Oval	49,927 m <sup>2</sup>
<b>Total Open Space Area</b>	<b>98,491 m<sup>2</sup> (34.6% of the site area)</b>

Floodplain Displacement Calculation	
Existing Building Footprint (EBF)	49,977 m <sup>2</sup>
Proposed Developed area (PDA)	150,759 m <sup>2</sup>
<b>FILL**</b>	<b>50,391 m<sup>3</sup></b>
<b>CUT (in OS3 only)***</b>	<b>49,099 m<sup>3</sup></b>

\*\* The volume of fill = (PDA-EBF) X (1% flood level)

\*\*\*The volume of cut = OS3 area X (1% flood level)

1% flood level is 0.5m (based on MIKE - 11 model)

### Key Plan



Figure 51: Option 2B - Yield Calculation

## Appendix 1 Design Options



Figure 52: Option 2B - Aerial View