Attachment 5 to Item 3.1.1.

Traffic Impact Assessment

Date of meeting: 21 November 2024
Location: Audio-visual link
Time: 10am

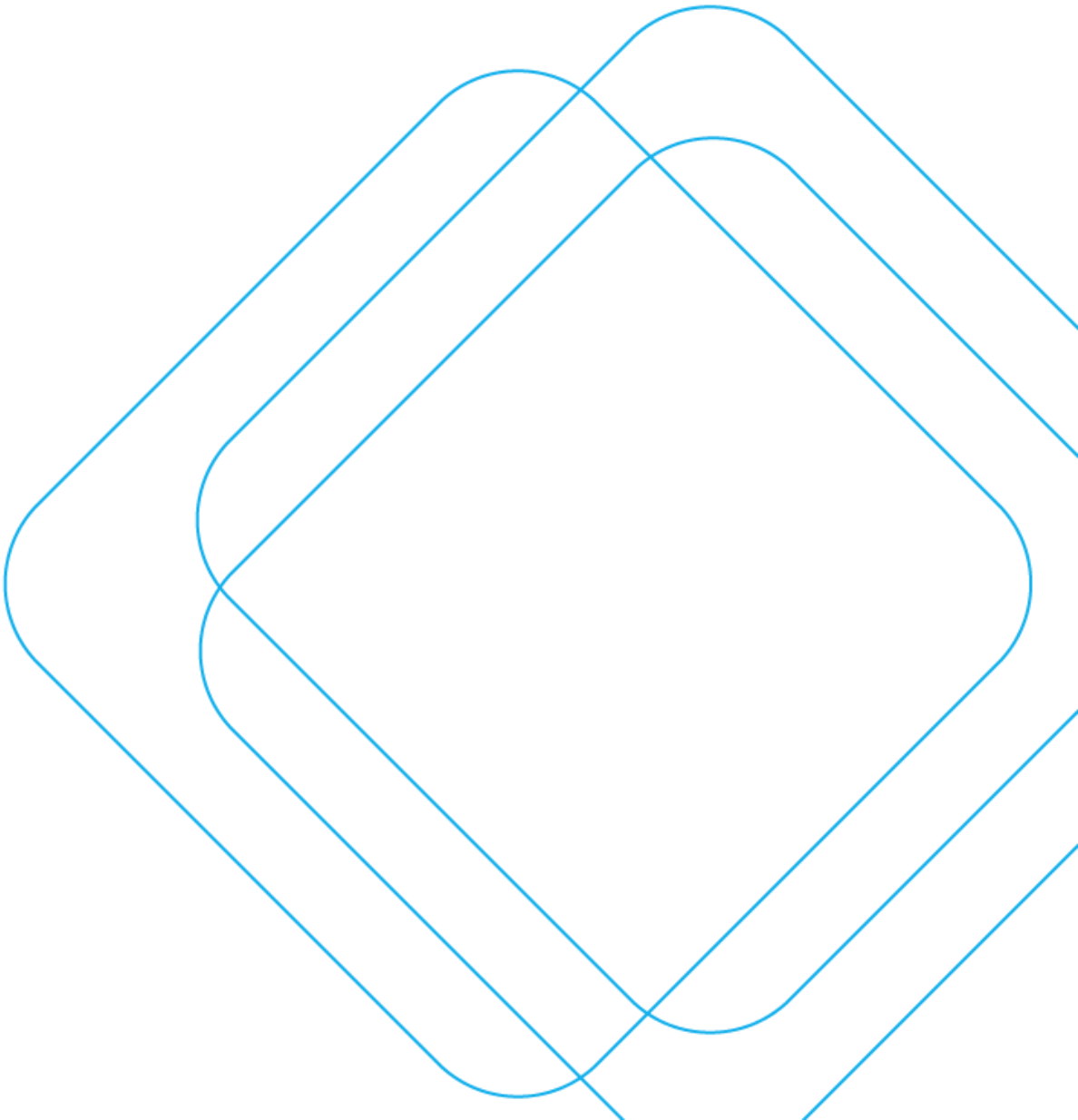
SCT Consulting

REDBANK EXPANSION AREA (KEMSLEY PARK) PLANNING PROPOSAL

Scoping traffic study

15 JULY 2024

SCT Consulting acknowledges the traditional owners of the lands on which we work.
We pay our respects to Elders past, present and emerging.



Quality Assurance

Project:	Redbank Expansion Area (Kemsley Park) Planning Proposal		
Project Number:	SCT_00579		
Client:	Redbank Communities	**ABN:**	15 327 282 455
Proponent:	Redbank Communities		
Prepared by:	SCT Consulting PTY. LTD. (SCT Consulting)	**ABN:**	53 612 624 058

Information	Name	Position	Signature
Author:	Shawn Cen	Principal Consultant	[redacted]
Reviewer:	Andy Yung	Director	[redacted]
Authoriser:	Andy Yung	Director	[redacted]

Version	Date	Details
1.0	10 May 2024	Draft report
2.0	3 July 2024	Final draft report
3.0	4 July 2024	Final report
4.0	15 July 2024	Updated final report

© SCT Consulting PTY LTD (SCT Consulting)

SCT Consulting's work is intended solely for the use of the Client and the scope of work and associated responsibilities outlined in this document. SCT Consulting assumes no liability with respect to any reliance that the client places upon this document. Use of this document by a third party to inform decisions is the sole responsibility of that third party. Any decisions made or actions taken as a result of SCT Consulting's work shall be the responsibility of the parties directly involved in the decisions or actions. SCT Consulting may have been provided information by the client and other third parties to prepare this document which has not been verified. This document may be transmitted, reproduced or disseminated only in its entirety and in accordance with the above.

Contents

Executive Summary

The proposal

SCT Consulting has been engaged by Redbank Communities to provide traffic and transport consultancy services to support the planning proposal for Redbank Expansion Area (Kemsley Park). Redbank Expansion Area is surrounded by the approved Redbank development to the east, north and south. The western frontage is Gross Vale Road.

The study area is currently zoned as RU4 – Primary Production Small Lots and occupies an area of approximately 35.3 hectares. About 300-350 dwellings are anticipated to be accommodated for this subdivision (as an extension of the Redbank development) and a total of three internal accesses are proposed to connect the site with the surrounding local road network within the Redbank development.

Strategic context

Redbank is an urban residential development in North Richmond that will provide up to 1,399 new dwellings and will help to address the Hawkesbury Local Government Area (LGA)'s housing supply targets. The Redbank *Transport Management and Accessibility Plan* (TMAP) conducted by AECOM in 2013 confirmed that upgrades are required to support the development including the construction of a new alternative bridge crossing at Yarramundi (Grose River Bridge) and intersections at Grose Vale Road and Springwood Road.

SCT Consulting then prepared a Traffic Impact Assessment to support a Review of Environmental Factors (REF) for the Grose River Bridge proposal, which assists Hawkesbury City Council in addressing the requirements of Section 5.5 of the EP&A Act. The intersection performance has been assessed for Grose River Road / Grose Vale Road and Grose River Bridge / Springwood Road (the two critical intersection on both sides of the new Grose River Bridge) based on the approved 1,399 dwellings in Redbank, where both intersections are forecast to operate at a good LoS A, with significant spare capacity.

The Australian Government and NSW Government have recently committed $500 million for traffic improvements including a new bridge over the Hawkesbury River between Richmond and North Richmond. The Australian Government funding of $400 million is being provided via the Infrastructure Investment Program. The duplication of Richmond Bridge is featured by capacity improvements to the intersection of Bells Line of Road / Grose Vale Road, a

new two-lane bridge with 1 in 20-year flood resilience, a bypass of the Richmond town centre and new signal and roundabouts.

Existing conditions

According to the Census 2016, private vehicles had the highest mode share at 79 per cent in the study area, followed by did not go to work / not mentioned at 13 per cent and work from home at four per cent. Active transport use was low given the limited walking network and the employment opportunities close by. Compared with Hawkesbury LGA, a higher proportion of car use and a lower proportion of working from home was recorded for the local area.

Bells Line of Road, Springwood Road and Castlereagh Road form the arterial road network whereas the sub-arterial roads include Grose Vale Road and Grose River Road. The local road network has partially delivered as part of the Redbank development to the east of the site. Two roundabouts have been delivered as part of the Redbank development at the intersections of Grose Vale Road / Grose River Road and Grose Vale Road / Yobarnie Avenue.

Cycling facilities are generally limited within North Richmond, with no dedicated cycle links from the site or surrounding residential areas to the North Richmond town centre. Footpaths are provided on all street networks and a shared path is also provided along the collector road and entry road within the Redbank development. Bus Route 680 (loop service between Bowen Mountain and Richmond) provides ten services per day at the bus stop about 250m to the south of the site on Grose Vale Road.

Transport appraisal

This road network impact associated with the Redbank Expansion Area (Kemsley Park) Planning Proposal can be mitigated due to the existing and planned infrastructure projects. No additional infrastructure is needed as a result of the proposal:

– The approved capacity for the entire Redbank development was 1,399 dwellings which was also assessed in AECOM's TMAP. However, the actual delivery of Redbank development will be 1,354 dwellings when complete. This reduced 44 dwellings leaves capacity on the surrounding road network and will offset the impact of the Planning Proposal by about 15 per cent.

– The surveyed traffic volumes at three locations along Gross River Road in 2018 and 2021 are generally lower than the forecasted demand by TMAP (AECOM, 2013). There is also a trend of traffic decrease on Gross Vale Road in the vicinity of the site, reflecting lower background traffic demand on the network in the future and potentially even more remaining capacity than the outcomes from the traffic modelling.

– The delivery of the Grose River Bridge will provide an alternative for North Richmond and Redbank residents to connect with the wider road network across the Hawkesbury River, relieving the pressure of traffic on the traffic signals at Grose Vale Road / Bells Line of Road. For the intersections at Grose River Road / Grose Vale Road and Grose River Bridge / Springwood Road, the traffic modelling undertaken for the Grose River Bridge REF shows that the degree of saturation would be a maximum of 46 per cent by 2031 and a fairly good level of service. The traffic volumes in the modelling were conservative based on historical survey data. Hence, if the actual traffic volumes are lower than predicted, the actual remaining capacity could be more than 54 per cent to accommodate the proposed development, which is sufficient given the relatively small increase of the traffic in this direction.

– The duplication of the existing Richmond Bridge would significantly increase the river-crossing capacity to the east of the site and facilitate access to Richmond and further to Blacktown. It is expected that the existing Richmond Bridge would function as two-lane westbound whereas the new bridge will be two-lane eastbound, increasing the capacity of the major crossing of the Hawkesbury River at this location by 100 per cent. The additional southbound lane on Bells Line of Road at the approach and departure lane of Grose Vale Road intersection would also increase the capacity at the intersection of Grose Vale Road / Bells Line of Road as a major access point of the North Richmond, Redbank and future Redbank Expansion Area (Kemsley Park) communities. This would release more green time for the movement on Grose Vale Road, especially the west approach and reduce the delay at the intersection.

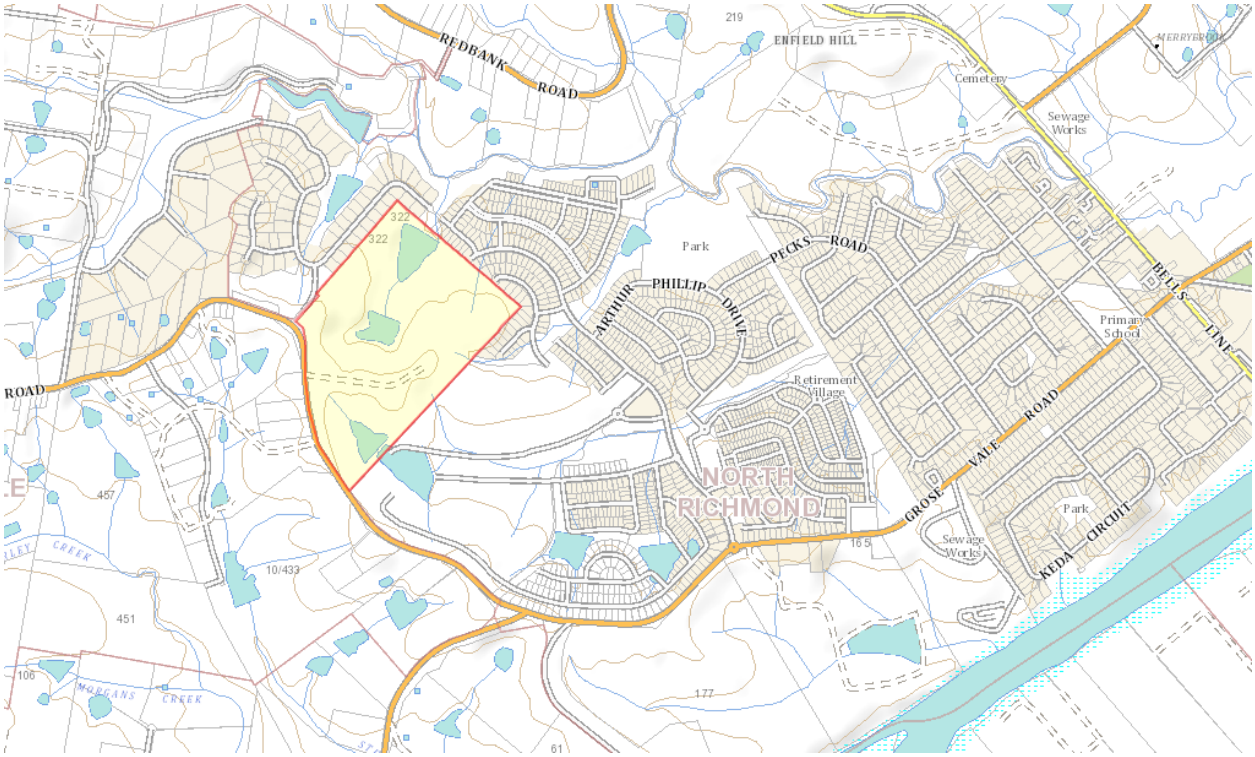
1.0 Introduction

1.1 Background

SCT Consulting has been engaged by Redbank Communities to provide traffic and transport consultancy services to support the planning proposal for the Redbank Expansion Area (Kemsley Park) in North Richmond within the Hawkesbury Local Government Area (LGA).

The study area is part of a proposed development shown in **Figure 1-1**, which is zoned as RU4 – Primary Production Small Lots and occupies an area of approximately 35.3 hectares. The Redbank Expansion Area is surrounded by the approved Redbank development to the east, north and south. The western frontage is Gross Vale Road. About 300-350 dwellings are anticipated to be accommodated for this subdivision (as an extension of the Redbank development) and a total of three internal accesses are proposed to connect the site with the surrounding local road network within the Redbank development.

Figure 1-1 Current lot boundaries and limit of works for proposed sub-division



Source: SIX Maps, 2024

1.2 Purpose of this report

SCT Consulting has conducted a transport appraisal to support the planning proposal as part of the scoping process. The report includes the following:

- A review of strategic context
- A review of the Hawkesbury Development Control Plan (DCP) and transport planning requirements
- A summary of existing traffic conditions
- Future vehicle trip generation from the proposed development and distribute the trips to the surrounding road network based on preferred access strategies and travel patterns
- Appraisal of impacts on the road, active transport, public transport network, and evacuation routes
- Summary of relevant traffic, transport and access justifications that Redbank Expansion Area can be rezoned for residential development as an extension to the current Redbank development without major transport infrastructure investments.

1.3 Report structure

The report comprises the following sections:

– **Section 2** summarises the strategic context of the region and describes how the development could support the future intents of the region.

– **Section 3** describes the existing transport conditions for all modes of transport.

– **Section 4** describes the proposed development, including its access strategy and proposed road network.

– **Section 5** assesses the estimated trips generated, their distribution based on the preferred access strategy, and the appraisal of potential traffic impacts associated with the additional trips.

– **Section 6** summarises the report and presents the conclusion.

2.0 Strategic context

2.1 Hawkesbury Local Strategic Planning Statement 2040

The purpose of the *Hawkesbury Local Strategic Planning Statement* (LSPS) is to:

– Provide a 20-year land use vision for the Hawkesbury LGA

– Outline the characteristics that make Hawkesbury unique

– Identify Hawkesbury's shared values to be enhanced or maintained

– Direct how future growth and change will be managed

– Updates to guide the Hawkesbury Local Environmental Plan (LEP) and Development Control Plan (DCP)

– Identify further detailed strategic planning for future needs.

The increase in population expected in Hawkesbury will place significant pressure on existing infrastructure such as the need for additional open space embellishments, community facilities, public transportation, an improved road network, and health, and educational facilities. This existing infrastructure is currently already at capacity or nearing capacity.

The strategic planning statement identified the following areas to be considered:

– Improving public transport links to other parts of the Sydney Region, and to Penrith and Western Sydney Airport has been consistently raised as a high priority through Council's community engagement processes.

– Greater certainty is required in terms of corridor planning including the Outer Sydney Orbital corridor and the role of Bells Line of Road.

– Existing crossings of the Hawkesbury River provide limited evacuation capacity in the event of a moderate to major flood. The Council supports an additional crossing of the Hawkesbury River to help manage congestion and to support safe flood evacuation. The council will work with TfNSW to discuss options for an additional river crossing and potential locations.

2.2 Hawkesbury Council Residential Land Strategy

The population of the Hawkesbury area is projected to increase to 69,898 people by 2031. This will inevitably put pressure on the current infrastructure. Based on the current rate of housing supply of new housing, the Hawkesbury residential market is not keeping up with housing demands. The provision of well-positioned, diverse housing is considered a key outcome of the strategy to meet community needs. The Strategy outlines that this is to be achieved through setting a strategic direction for housing policy to better inform land use zoning and other planning controls. Council adopted, on 10 May 2011, the Hawkesbury Residential Land Strategy. The key aims of the Strategy are to accommodate 5,000 to 6,000 additional dwellings by 2031, primarily within existing urban areas as prescribed in the DPIE's Northwest Subregional Strategy.

The Redbank Expansion Area, however, is within a moderately constrained area (Figure 2-1). Increased density and investigation areas in North Richmond are subject to:

– Resolution of road access, traffic, and transport issues

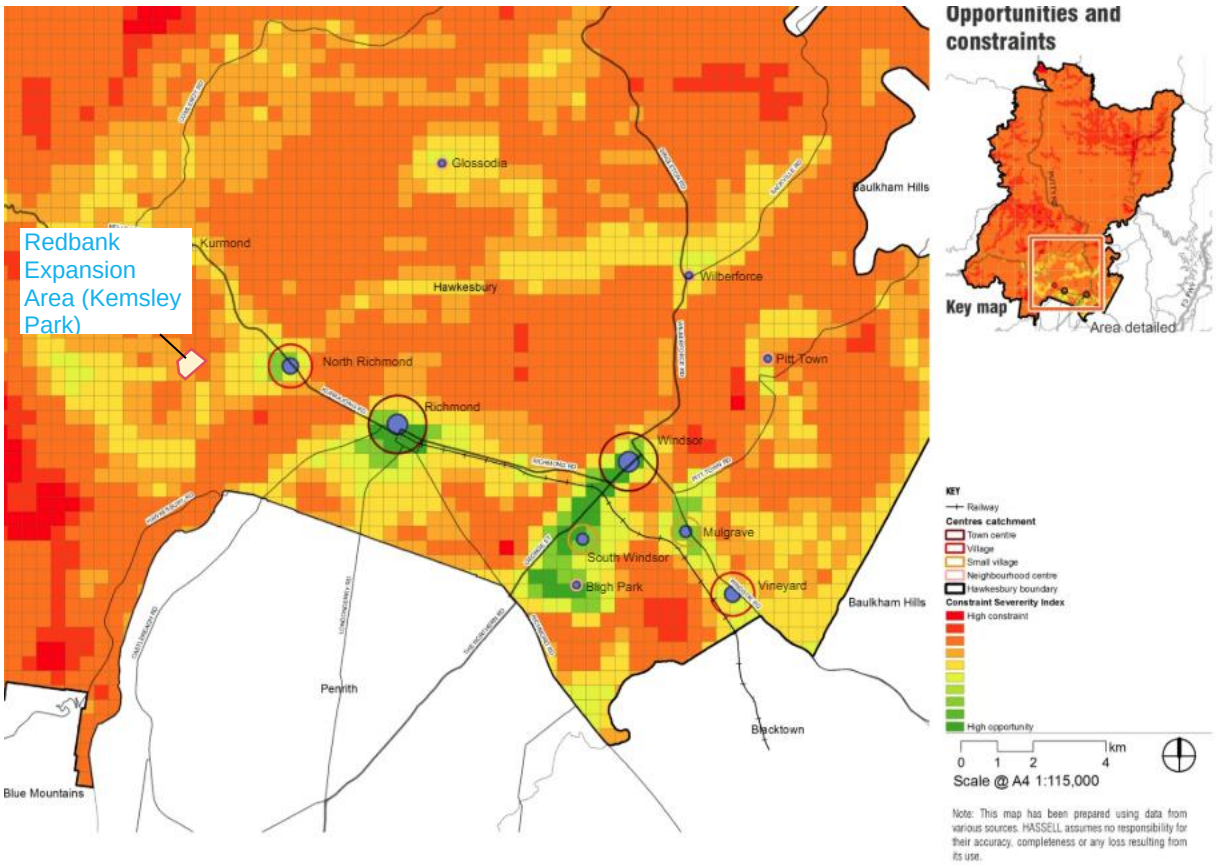
– Investigation into bushfire-prone areas

– Detailed structure planning of the village and investigation areas

– Provision of an increased range of services and facilities.

Due to the limited connectivity of public transport services, there is significant reliance on the private motor car for transport. Key roads providing access to Hawkesbury LGA include Windsor Road, Richmond Road and Bells Line of Road. However, the LGA is located on the Richmond Railway Line and is within easy commuter distance to employment nodes. Regular and reliable bus services should also be in place to key destinations and further transport links.

Figure 2-1 Opportunity and constraints analysis



Source: Hawkesbury Council Residential Lands Strategy, 2011

2.3 Hawkesbury Local Housing Strategy

The *Hawkesbury Local Housing Strategy* is intended to set a clear plan to deliver the housing vision in the LGA over the next 20 years. The objectives of the strategy are:

– To identify housing needed to accommodate the future population to 2036

– To formulate a plan for housing delivery that is based on a considered analysis of a comprehensive evidence base on housing needs, infrastructure availability, physical constraints and present opportunities

– To align housing delivery with the NSW Government's strategic plans

The housing strategy is to deliver on the Greater Sydney Commission's requirements including:

– Creating capacity for more housing in the right locations

– Supporting planning and delivery of growth areas and planned precincts as relevant to each local government area

– Supporting investigation of opportunities for alignment with investment in regional and district infrastructure

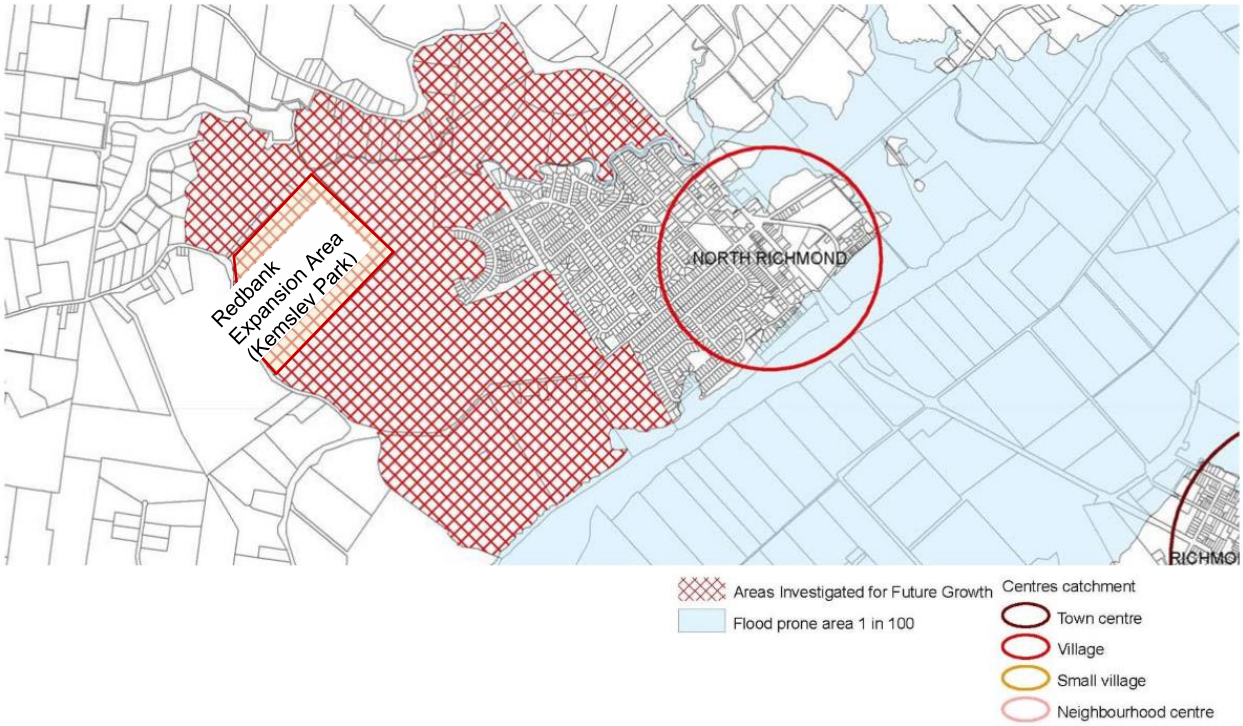
– Supporting the role of centres

– Supporting the delivery of a diversity of housing

– Ensuring that housing range and supply are better suited/matched to the population over time

Parts of the investigation area have been rezoned and developed and some sites still have potential for further investigation (**Figure 2-2**).

Figure 2-2 North Richmond future investigation areas (2011)



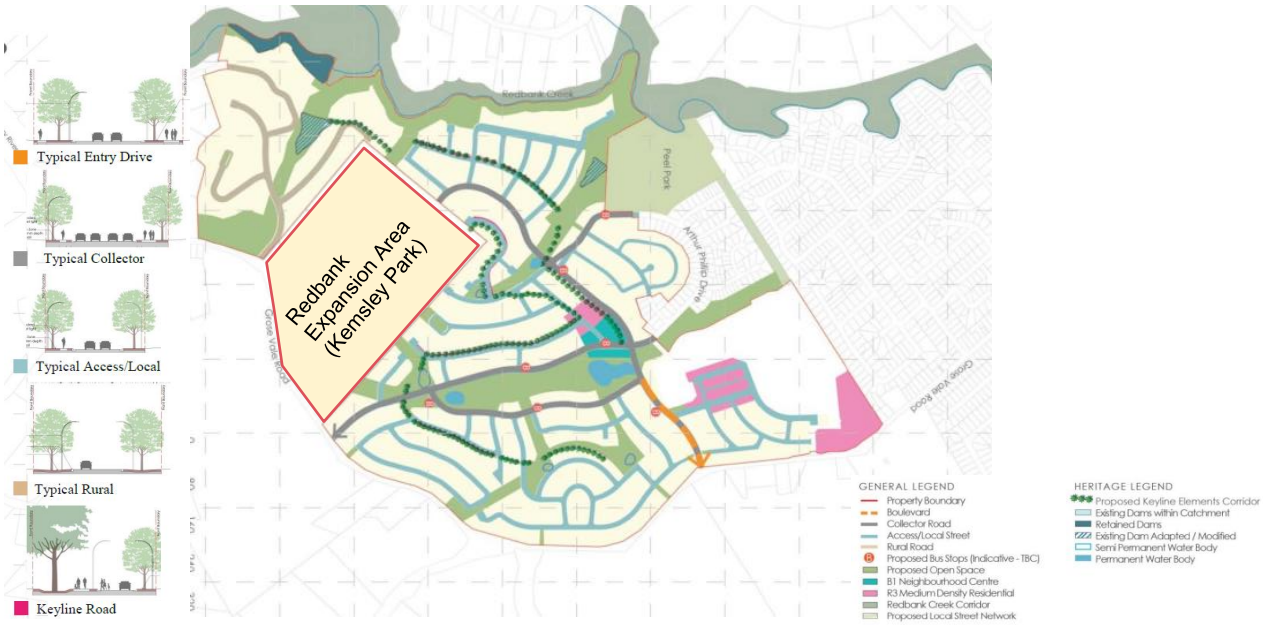
Source: Draft Hawkesbury Local Housing Strategy, 2020

2.4 Hawkesbury Development Control Plan 2002 – Part E Chapter 8 Redbank at North Richmond

The road network layout of Redbank Expansion Area should consider integration with the Redbank development based on Hawkesbury DCP. The site has the opportunity to connect with the collector and local street network in Redbank which further connects with Grose Vale Road via the existing Yobarnie Avenue (**Figure 2-3**).

It is expected that collector roads will be bus-capable such that the delivery of Redbank Expansion Area could enable a larger part of Redbank and Redbank Expansion Area to be serviced by future bus routes.

Figure 2-3 Redbank network layout

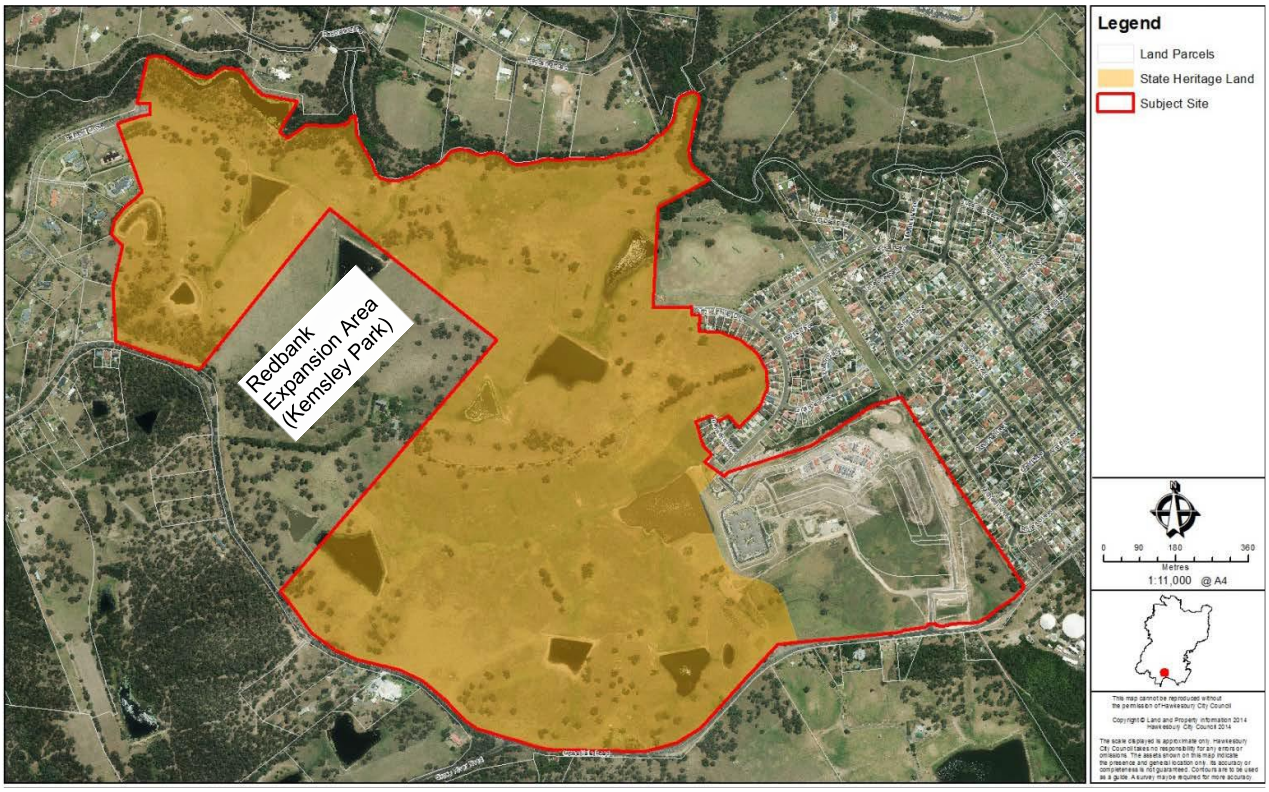


Source: Hawkesbury Development Control Plan 2002 – Part E Chapter 8 Redbank at North Richmond, 2002

2.5 Redbank Transport Management and Accessibility Plan (TMAP, AECOM 2013)

Redbank is an urban residential development that will provide up to 1,399 new dwellings and will help to address the Hawkesbury Local Government Area's housing supply targets. A masterplan, DCP and VPA were developed and approved which enables the development proposal for this land and provides for future residential development and a local neighbourhood centre. The Seniors Living Development forms part of the overall Redbank development, in addition to the proposed approximate 1,399 new dwellings (**Figure 2-4**).

Figure 2-4 Redbank site



Source: Hawkesbury Development Control Plan 2002 – Part E Chapter 8 Redbank at North Richmond, 2002

The project would require the delivery of many road network and intersection improvements to cater for the traffic generated by the Redbank development. New intersections are expected to be constructed along Grose Vale Road and Arthur Phillip Drive to provide vehicular traffic access to different parts of the residential development and the local neighbourhood centre. These infrastructure upgrades will also facilitate safe and efficient pedestrian, cyclist and bus movements between the development and regional centres as well as other transport hubs.

The Redbank TMAP confirmed that upgrades are required to support the development (1,399 residential dwellings):

– Option 1: intersection upgrades + contribution to the upgrade of Richmond Bridge.

– Option 2: construction of a new alternative bridge crossing at Yarramundi + intersections at Grose Vale Road and Springwood Road.

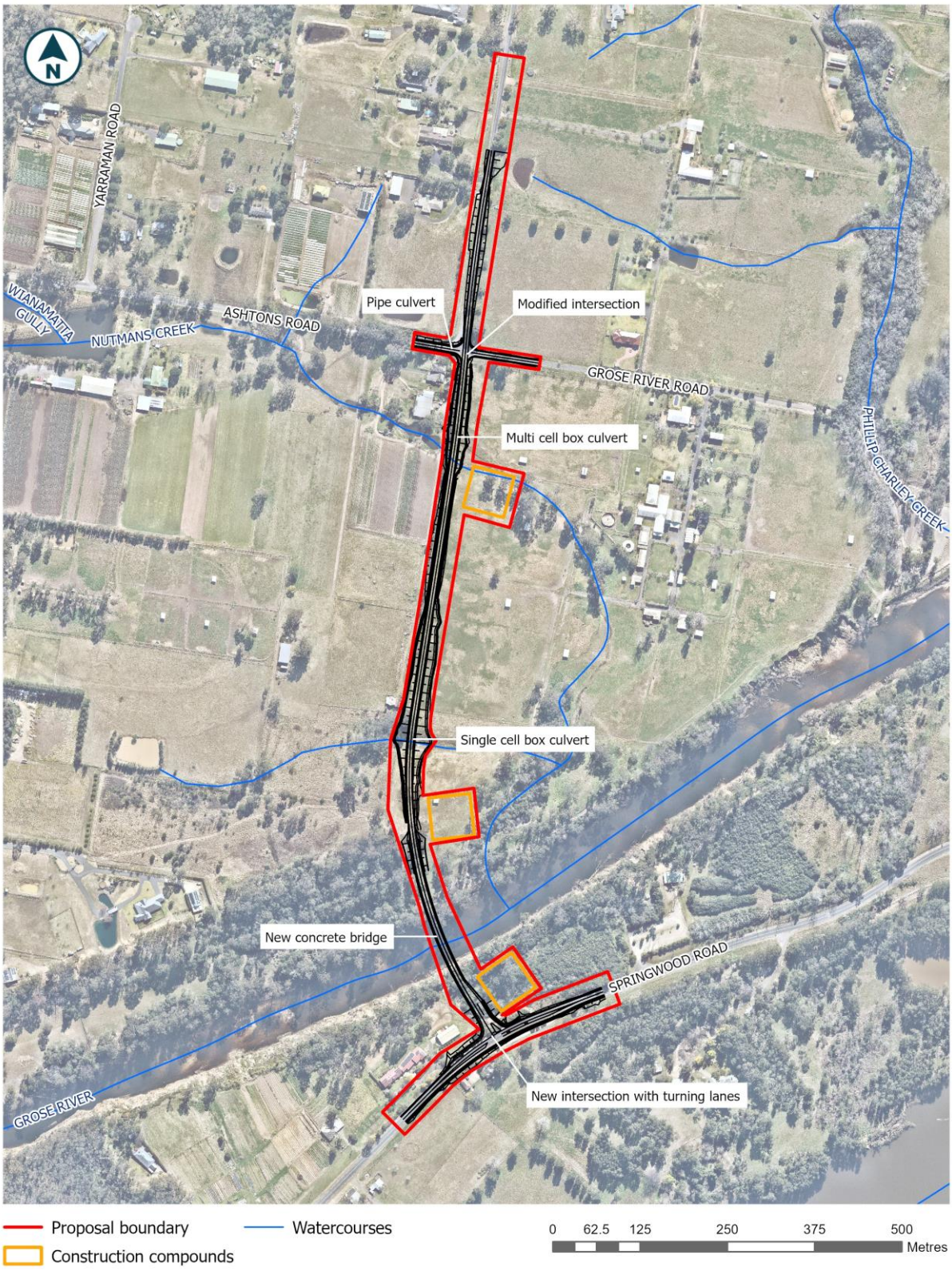
The preferred infrastructure contribution and funding package is Option 2. The TMAP confirmed that the delivery of infrastructure package Option 2 will cater for the proposed Redbank development and the surrounding network and intersections are expected to operate at an acceptable level of service.

Since the approval of the TMAP and VPA, significant upgrades and contributions by Redbank and the State Government have occurred at the intersections along the Bells Line of Road corridor between Grose Vale Road and Richmond, to improve the capacity of the network.

2.6 Grose River Bridge

Redbank Communities, Roads and Maritime Services (now TfNSW) and Hawkesbury City Council have been working together to prioritise plans and the approvals required to develop a new bridge crossing over the Grose River, connecting Grose River Road with Springwood Road at Yarramundi (**Figure 2-5**).

Figure 2-5 Grose River Bridge proposed alignment

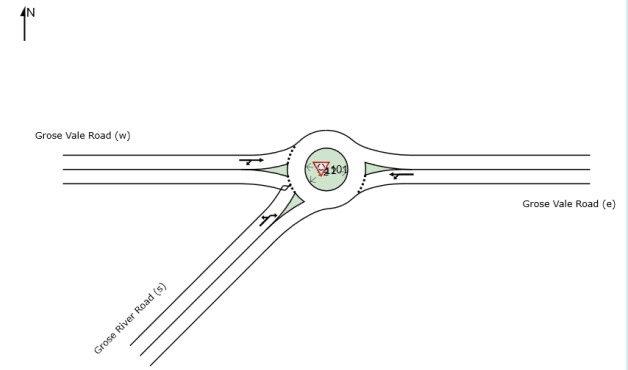
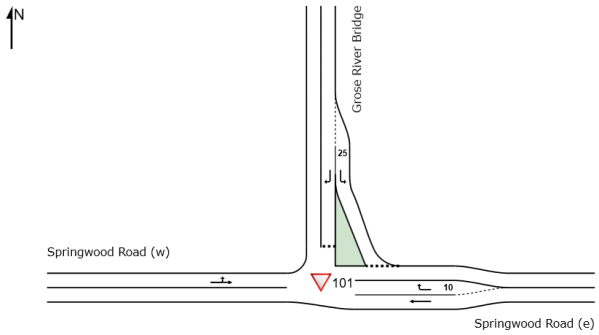


Source: Redbank Communities, 2024

SCT Consulting prepared a Traffic Impact Assessment to support a Review of Environmental Factors (REF) for the bridge proposal, which assists Hawkesbury City Council in addressing the requirements of Section 5.5 of the EP&A Act, including examining and taking into account to the fullest extent possible all matters affecting or likely to affect the environment because of the activity.

The intersections of Grose River Road / Grose Vale Road and Grose River Bridge / Springwood Road were modelled in SIDRA to test the operational performance with the permitted development in the area in 2031 (**Table 2-1**).

Table 2-1 Intersection geometry

Grose River Road / Grose Vale Road	Grose River Bridge / Springwood Road
	

The intersection performance results for the two intersections are shown in **Table 2-2**. The SIDRA results show that both intersections are forecast to operate at a good LoS A, with significant spare capacity.

Table 2-2 Intersection performance (2031)

Intersection	Peak hour	With the proposed Redbank Development (1,399 dwellings)			
		Volume (veh/hr)	Delay (sec)	LoS	DoS
Grose River Road / Grose Vale Road	AM	1,099	9.0	A	0.463
	PM	980	7.3	A	0.462
	Sat	855	7.7	A	0.296
Grose River Bridge / Springwood Road	AM	1,358	8.1	A	0.461
	PM	1,258	11.3	A	0.229
	Sat	1,022	8.6	A	0.179

Delay = worst movement for priority intersections and DoS = degree of saturation of worst movement

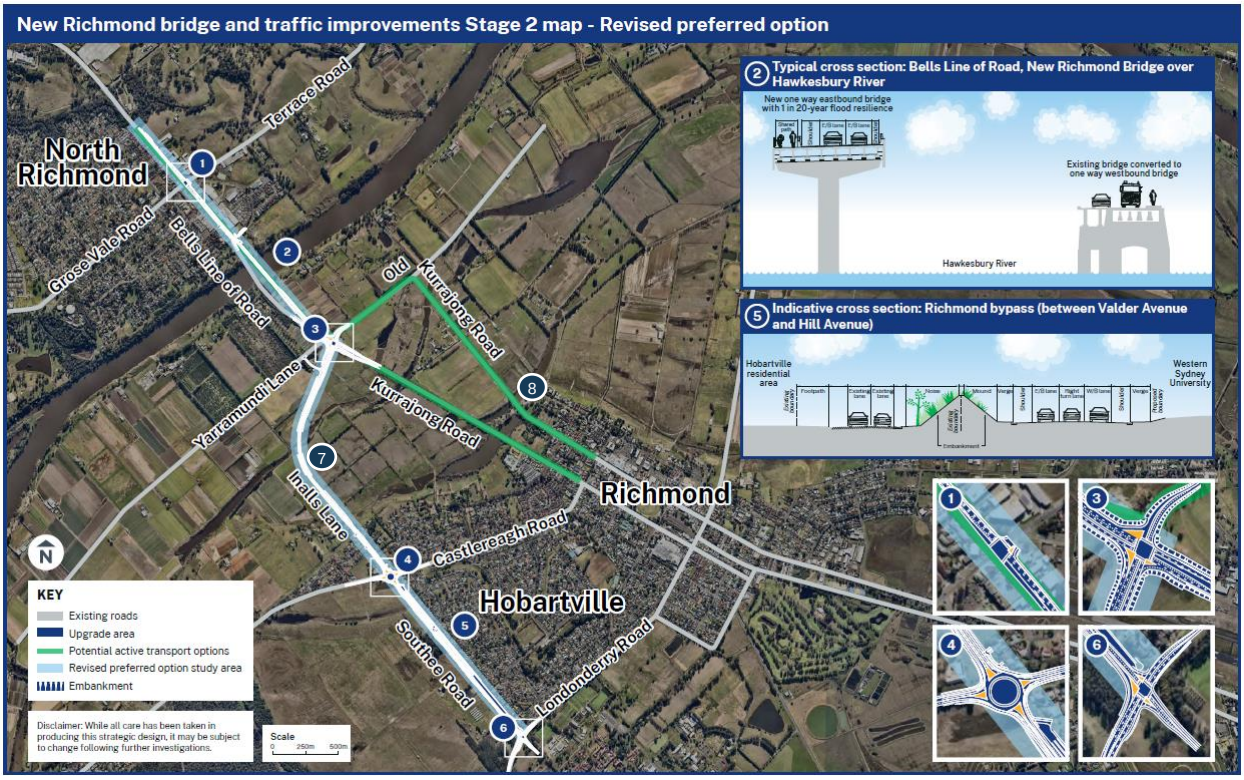
2.7 Richmond Bridge duplication and traffic improvements

The bridge between Richmond and North Richmond provides a vital crossing of the Hawkesbury River and carries an average of 31,000 vehicles per day with a single lane in each direction. Due to a growing, vibrant community, it is estimated that without improvements to the road network, the peak hour journey between North Richmond and Richmond would increase by up to ten minutes by 2026 compared with travel times in 2019. The key objective of this project is to reduce congestion between Richmond and North Richmond. Key features of the revised preferred option include (Error! Not a valid bookmark self-reference.):

1. Capacity improvements to the intersection of Bells Line of Road/Grose Vale Road/Terrace Road (Three southbound lanes in the north approach and south departure)
2. New two-lane bridge with 1 in 20-year flood resilience, 30–70 metres downstream of the existing bridge
3. A new signalised intersection at the intersection of Kurrajong Road/Old Kurrajong Road
4. A roundabout to replace the priority intersection of Castlereagh Road/Southee Road/Inalls Lane

5. A new road parallel to Southee Road
6. Traffic signals to replace the priority intersections of Londonderry Road with Southee Road and Vines Drive
7. A bypass of the Richmond town centre connecting Kurrajong Road to Inalls Lane with 1 in 20-year flood resilience
8. Further opportunities to explore options for pedestrian connectivity and shared path connection between Richmond and North Richmond town centres

Figure 2-6 Richmond Bridge and traffic improvements – Stage 2



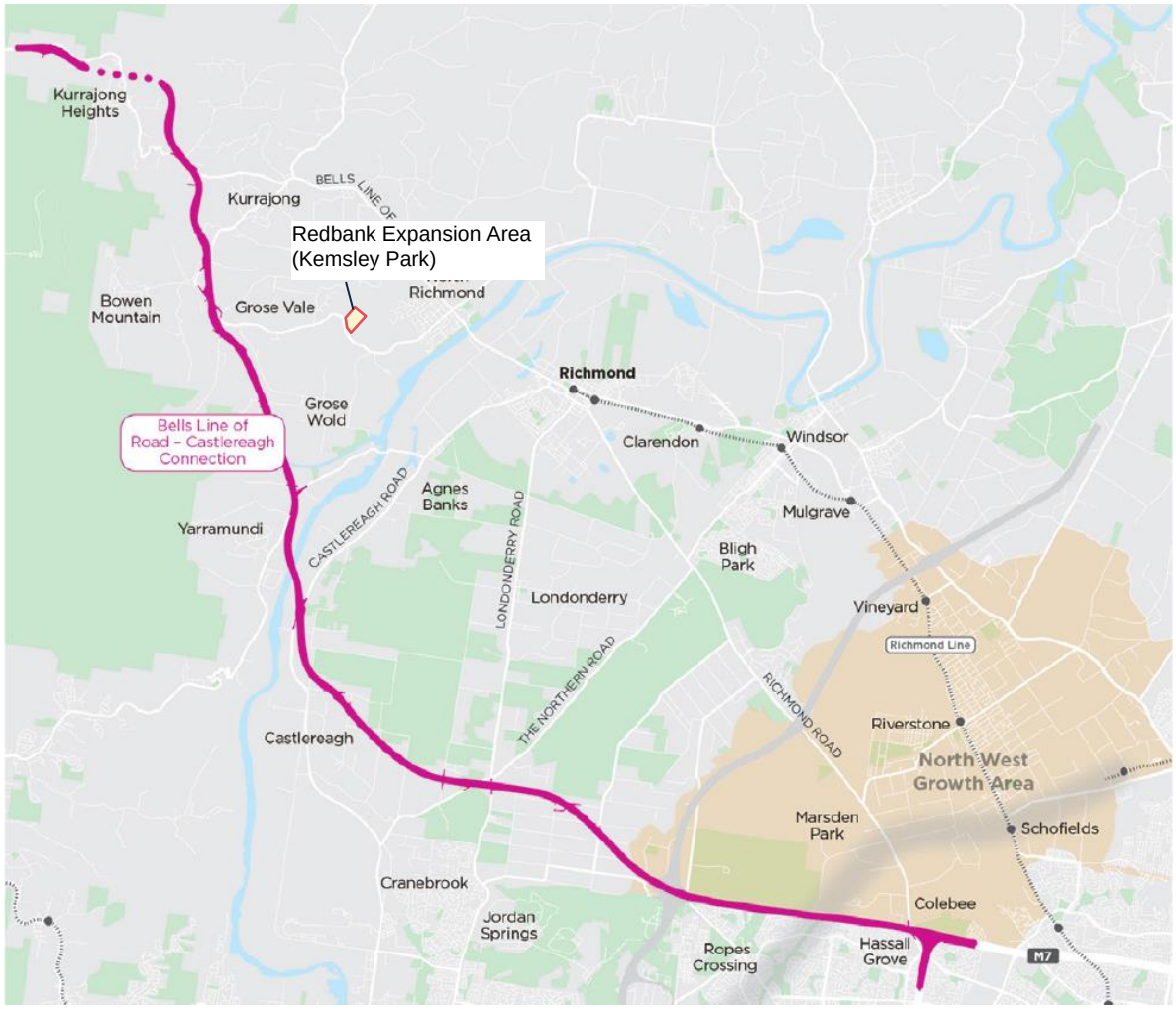
Source: New Richmond Bridge and traffic improvements – Stage 2, 2022

2.8 The Bells Line of Road – Castlereagh Connection

The Bells Line of Road – Castlereagh Connection corridor will provide for an east-west motorway connection between Kurrajong Heights and the junction of Richmond Road with the M7 Motorway at Colebee. On/off ramps for this corridor are anticipated in the vicinity of the site.

This integrated solution will support population, housing, and job growth across Sydney's north-west and provide transport links to regional NSW. It will also ensure appropriate transport solutions are planned for the Western Sydney Airport which will be a catalyst for generating a range of new jobs and will enable people to work closer to home.

Figure 2-7 Bells Line of Road – Castlereagh connect



Source: Bells Line of Road – Castlereagh Connection corridor identification, 2018

3.0 Existing conditions

3.1 The site

The proposed development site is located at Grose Vale Road in North Richmond, surrounded by the approved Redbank development to the east, north and south, covering around 35.3 hectares. The western frontage is Gross Vale Road.

3.2 Travel behaviour

3.2.1 Method of Travel to Work data

Given the 2021 Census was carried out during a state-wide lockdown affected by COVID-19, which could skew the results, the 2016 Census is chosen to be more evident to represent the travel behaviour of the residents.

The 2016 Census method of travel to work data was reviewed to understand the travel behaviour of residents in the vicinity of the site. The subject site is located in the suburb of North Richmond.

At the time of the Journey to Work (JTW) data being collected in 2016, approximately 1,900 trip samples were included in the survey for the area. According to the Australian Bureau of Statistics, a person in employment is those of working age who, during a short reference period, were engaged in any activity to produce goods or provide services for pay or profit.

For analysis, it has been assumed that JTW data provides a suitable reflection of the travel characteristics during AM and PM peak hour periods on an average weekday, due to the high proportion of trips during this timeframe associated with the journey to work trips. **Table 3-1** summarises the JTW travel modes based on the suburb.

Table 3-1 2016 Method of travel to work

Travel Mode	Study area	Hawkesbury
Public Transport	4%	5%
Vehicle (car, as driver, car, as passenger, truck, motorbike)	79%	76%
Bicycle	0%	0%
Walk	0%	0%
Worked at home	4%	5%
Not mentioned/did not go to work	13%	14%
Total	**100%**	**100%**

Source: ABS, 2016

Private vehicles had the highest mode share at 79 per cent, followed by did not go to work / not mentioned at 13 per cent and work from home at four per cent. Active transport use was low given the limited walking network and the employment opportunities close by. Compared with Hawkesbury (LGA), a higher proportion of car use and a lower proportion of working from home was recorded.

3.2.2 Employment locations of residents

The job location of the residents indicated that nearly 52 per cent of them work in Hawkesbury Local Government Area, followed by Penrith (14%), Blacktown (12%) and The Hills Shire (6%).

3.3 Road network

The site is situated west approximately 2km from the North Richmond Town Centre as shown in **Figure 3-1.** The following are key roads within the vicinity of the site:

– **Bells Line of Road** is an arterial road that connects the Blue Mountains, North Richmond with Richmond, Windsor and further with Sydney Greater Metropolitan Area. It intersects with Grose Vale Road and crosses the

Hawkesbury River in the vicinity of the site. In the North Richmond area, it has a posted speed of 60km/h and is a two-way with two lanes in each direction of travel.

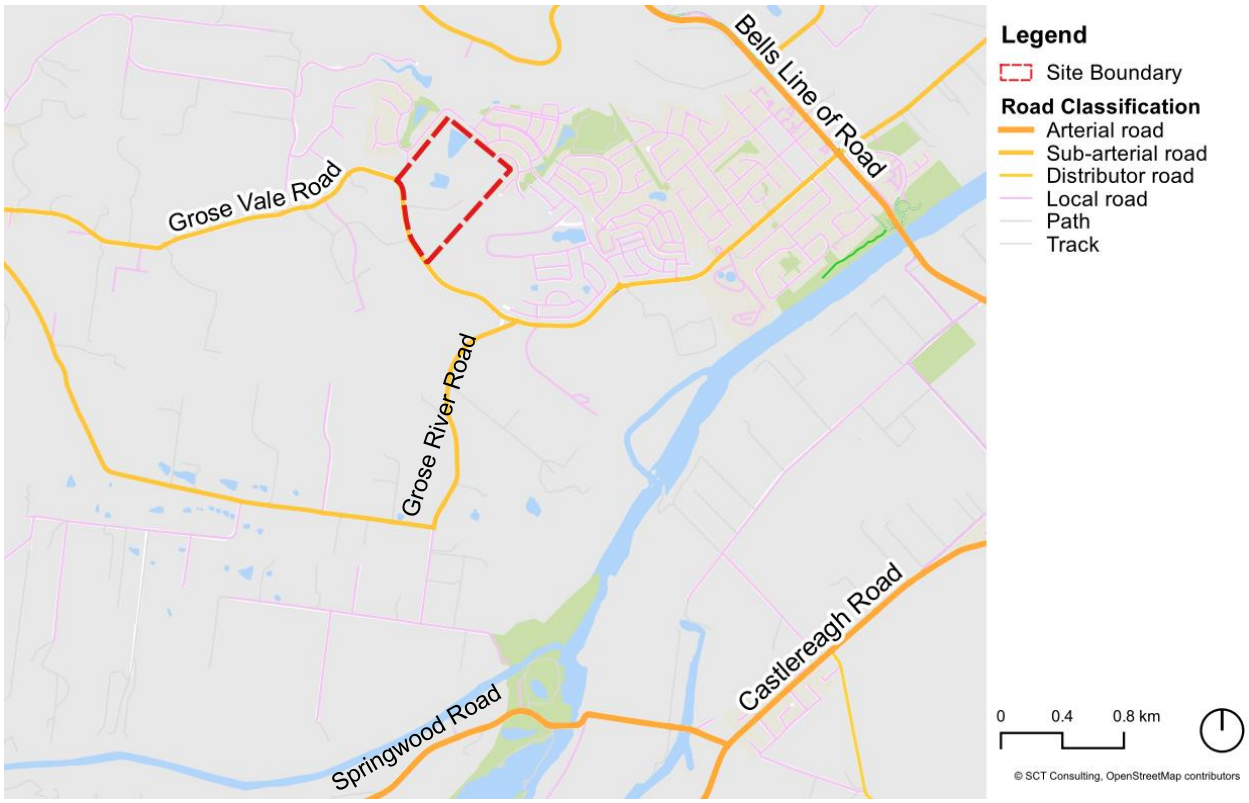
– **Richmond Bridge** has a two-lane cross-section and is reported as being at capacity during the AM and PM peak periods resulting in congestion and increased travel times[1]. Transport for NSW is currently planning to build an additional bridge over the Hawkesbury Rover in the vicinity of the existing bridge. Funding has been secured and a preferred option identified. A concept design and environmental assessment are the next steps in the process. The additional crossing will add road capacity to the surrounding network potentially reducing future traffic flows on the Grose River Bridge.

– **Grose Vale Road** is a sub-arterial road that runs along the west side of the site. It is a road that extends from Bells of Line Road in the east and eventually becomes Old Bells of Line Road in the northwest, providing connections to the Bells Line of Road. The two-lane, undivided road has a sign posted speed limit ranging from 60km/h to 70km/h, with a school zone of 40km/h outside Richmond North Public School. Grose Vale Road provides access to the local primary school and shopping village in North Richmond. It also provides local access to the rural and residential properties at Kurrajong, Grose Vale and North Richmond.

– **Grose River Road** is a local road that intersects with Grose Vale Road in the south of the site. It has a posted speed of 60km/h and is a two-way with one lane in each direction of travel. It will become an important bridge crossing corridor in the future to connect with Springwood Road. Grose River Road / Grose Vale Road roundabout has been in operation since mid-2023.

– **Springwood Road** is a classified State Road that intersects with Castlereagh Road at Agnes Banks to the east and travels south-west to become Hawkesbury Road eventually intersecting with the Great Western Highway at Springwood in the Blue Mountains. Castlereagh Road provides a connection between Penrith and Richmond. Springwood Road is a two-lane, undivided road with a speed limit ranging from 60 to 100km/h and crosses the Nepean River at Yarramundi.

Figure 3-1 Road hierarchy and key roads in the vicinity of the site



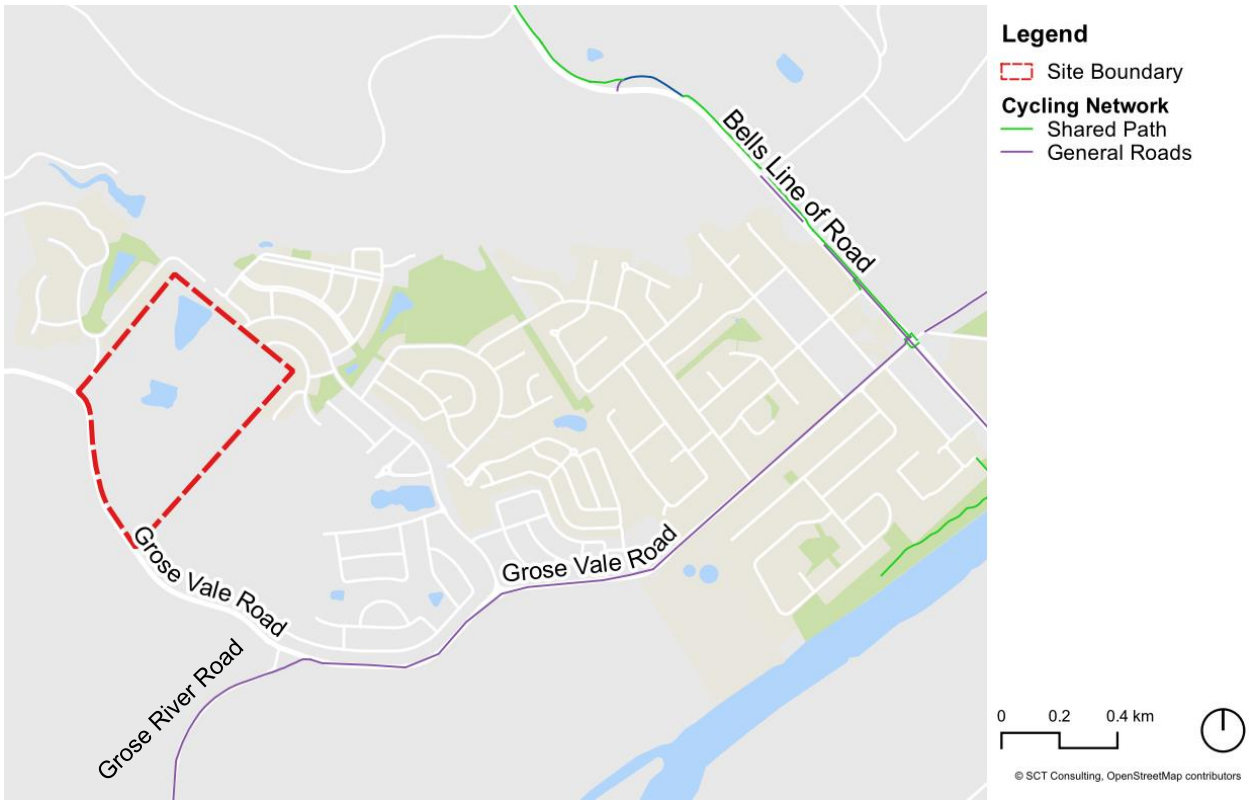
Source: Transport for New South Wales, 2023

[1] Richmond Bridge duplication and traffic improvements: Preferred option report, TfNSW, May 2021

3.4 Active transport infrastructure

The cycling infrastructure around the site is shown in **Figure 3-2**. Cycling facilities are generally limited within North Richmond, with no dedicated cycle links from the site or surrounding residential areas to the North Richmond town centre. In the vicinity of the site, cycling is on quieter local roads, the shared path on the Bells Line of Road to the east and Grose Vale Road which is considered a bike-friendly road until it intersects with Grose River Road where the bike-friendly road continues.

Figure 3-2 Cycling Infrastructure in the vicinity of the site



Source: SCT Consulting and Transport for New South Wales, 2023

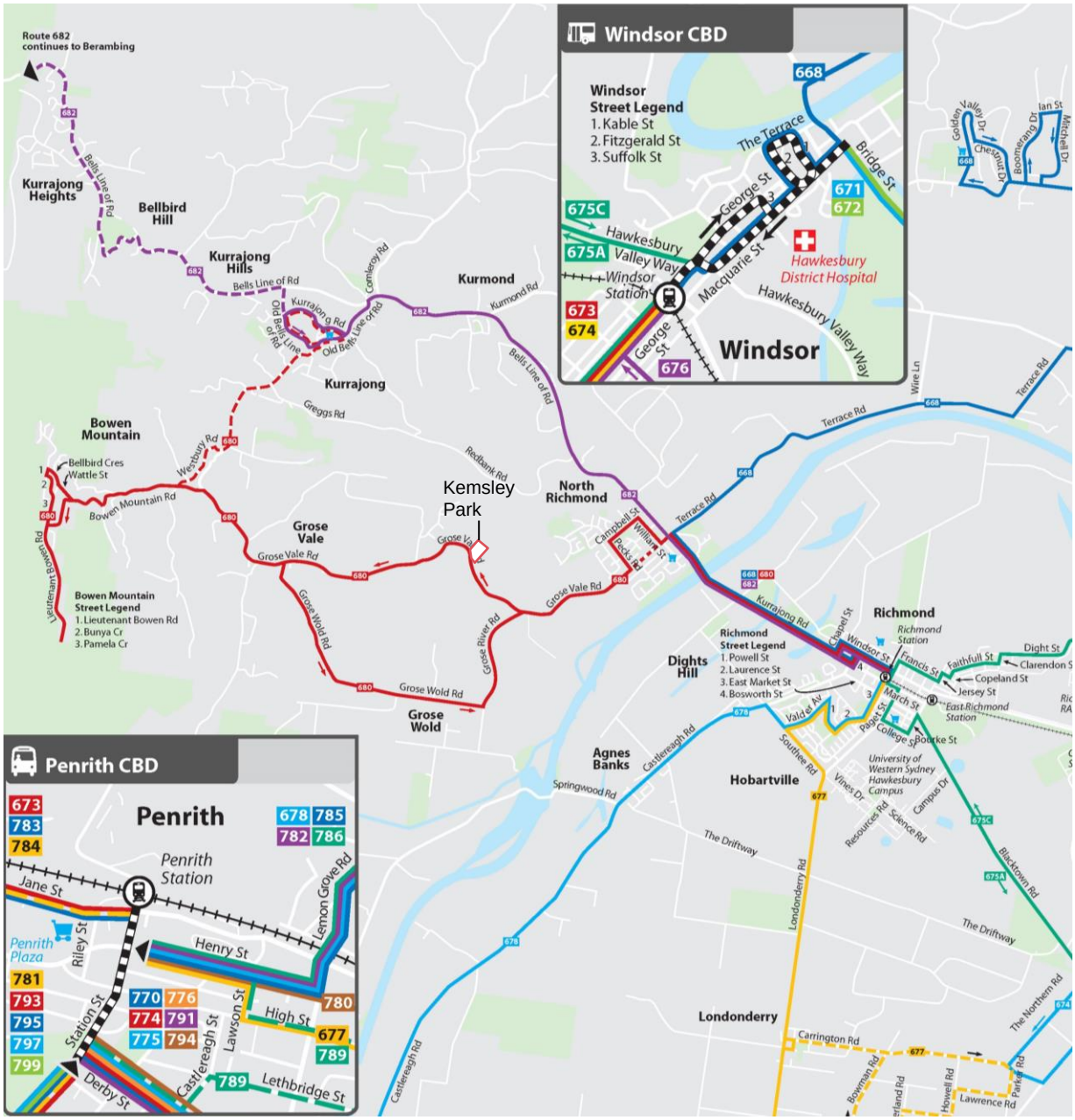
Footpaths are provided on all street networks and a shared path is also provided along the collector road and entry road within the Redbank development.

3.5 Public Transport

Bus route 680 and its proximity to the site are shown in **Figure 3-3.** Route 680 (loop service between Bowen Mountain and Richmond) provides ten services per day at the bus stop about 250m to the south of the site.

Richmond Station is over 5 km from the site, where T1 and T5 lines provide service to connect the city's train network. The frequency of the train service is two citybound services during AM peak hours.

Figure 3-3 Public transport stations within the vicinity of the site



Source: Transport for New South Wales, 2023

3.6 Road crash data

The crash data map is presented in **Figure 3-4**. The data includes any vehicular and pedestrian crashes and is categorised by severity. The composition of the crashes is shown below and the description of the fatal injury on Grose Vale Road was head-on:

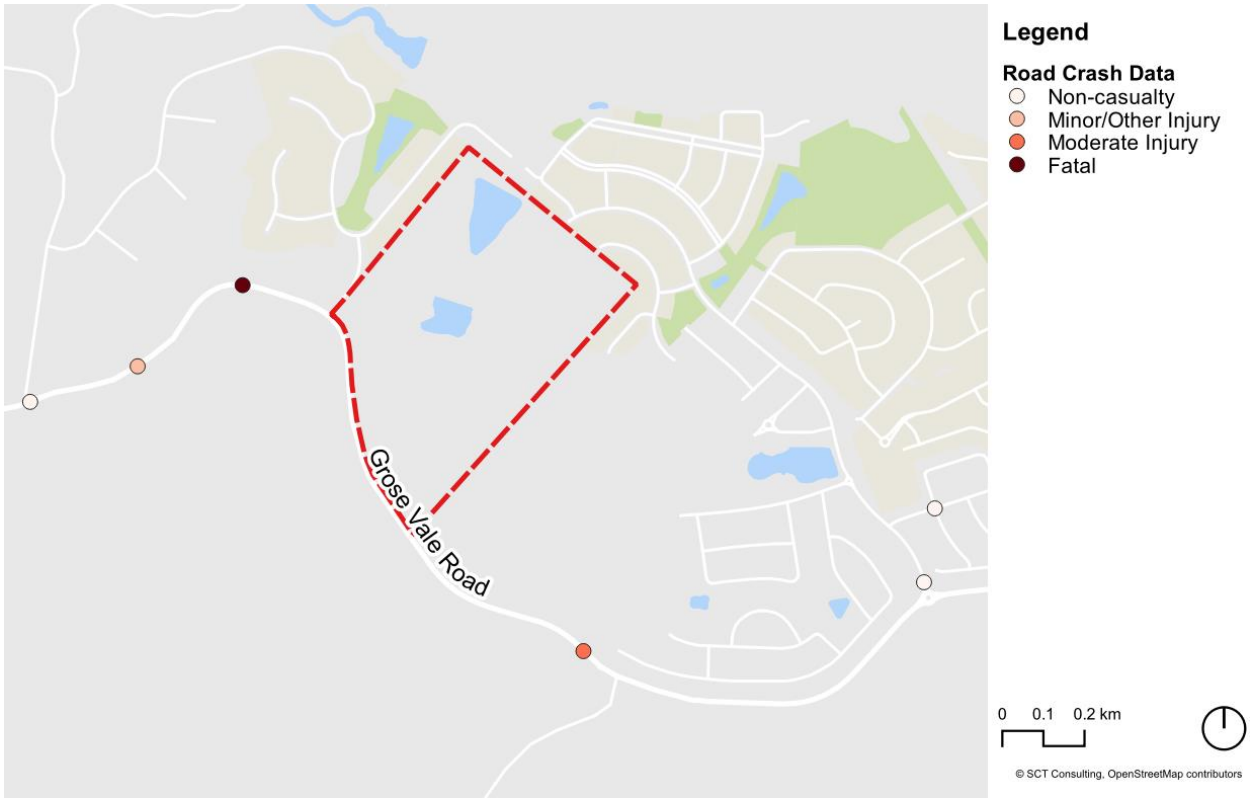
– 3 Non-casualty incidents

– 1 Minor/Other injury incident

– 1 Moderate injury incidents

– 1 Fatal injury incident

Figure 3-4 Crash data map



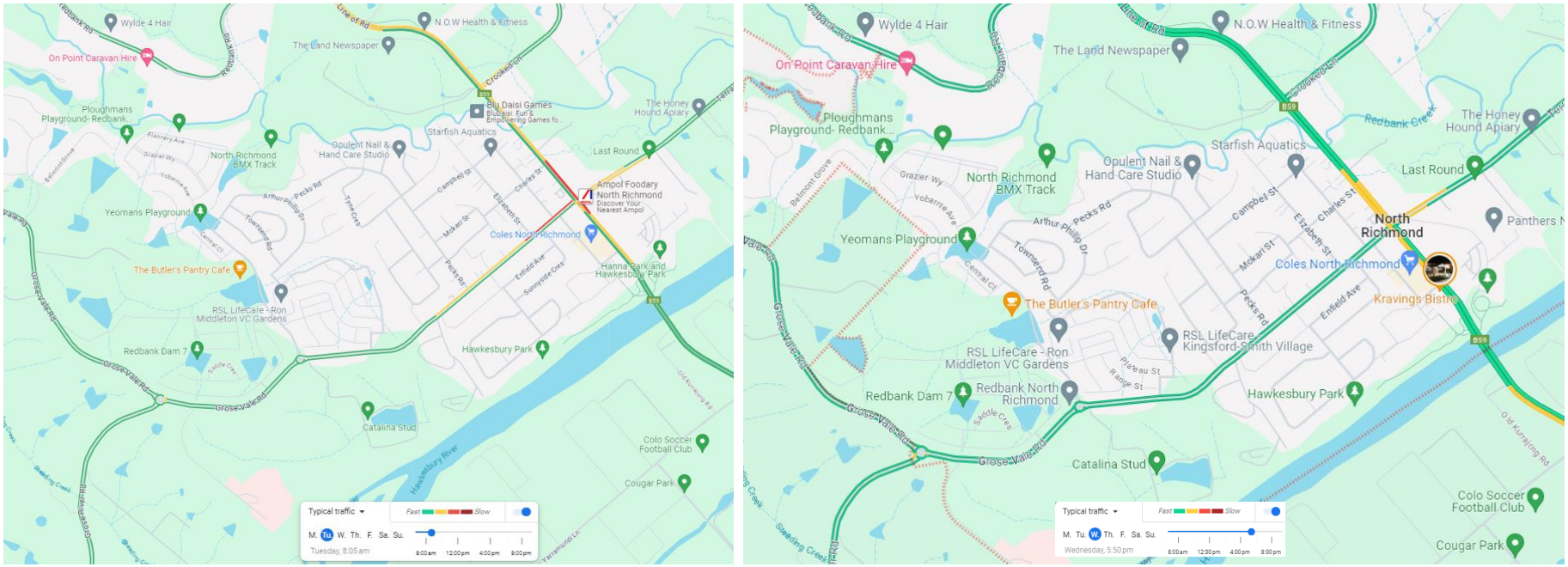
Source: Transport for New South Wales, 2023

3.7 Traffic data

3.7.1 Travel speed

As shown in **Figure 3-5**, Google's speed map indicates that there is slow speed and congestion at the intersection of Bells line of Road and Grose Vale Road during the peak hours. Slow speed occurs on Bells line of Road southbound and on Grose Vale Road eastbound in the morning peak, indicating the road network is approaching capacity. The intersection performance is better in the PM peak hour where major delay is observed on Grose Vale Road.

Figure 3-5 Road network condition (AM and PM peak hours)



Source: Google speed map, 2024

3.7.2 Traffic volume

Traffic volumes were collected in March of 2018, 2021 and 2024, which were collected at the following three locations (**Table 3-2**):

– Grose Vale Road, just west of Williams

– Grose Vale Road, just east of Grose River Road

– Grose Vale Road, just to the west of the Grose River Road roundabout.

Table 3-2 Grose Vale Road traffic volume comparison (two-way)

Time period	2018/2019		2021		2024	
	AM	PM	AM	PM	AM	PM
Survey data						
Grose Vale Road just west of William Street	730	1,009	881	1,185	-	-
Grose Vale Road just east of Grose River Road	415	450	497	566	467	519
Grose Vale Road just west of Grose River Road	313	347	356	415	338	393
Forecasted traffic volumes by TMAP						
Grose Vale Road just west of William Street	1,187	1,240	1,390	1,481	-	-
Grose Vale Road just east of Grose River Road	431	515	492	647	-	-
Grose Vale Road just west of Grose River Road	302	320	362	389	-	-

It is found that:

– The traffic volumes on Gross Vale Road indicate an annual increase of up to two per cent between 2018 and 2024 but the actual traffic volumes decrease between 2021 and 2024.

– The forecasted traffic volumes (in the TMAP) for both 2018 and 2021 at Grose Vale Road just west of William Street were overpredicted by an average of around 60 per cent, especially during the AM peak.

– The forecasted traffic volumes for both 2018 and 2021 near the roundabout of Grose Vale Road and Grose River Road were overpredicted by an average of five to six per cent, especially during the PM peak.

4.0 Proposed development

4.1 Redbank Expansion Area (Kemsley Park) planning proposal

The site comprises the land under Lot 260 DP1237271, which is currently zoned as RU4 - Primary Production Small Lots and covers a total area of approximately 35.3 hectares. The site is proposed to be rezoned for residential development, with associated roads and services. The Redbank Expansion Area planning proposal is estimated to yield around 300-350 dwellings.

The proposed subdivision layout is shown in **Figure 4-1**.

Figure 4-1 Proposed subdivision layout

4.2 Proposed access

Three internal accesses are proposed to connect with the surrounding road network (**Figure 4-1**):

1. The eastern access road will connect with the existing Yobarnie Avenue (currently a cul-de-sac as part of the Redbank development subdivision) which further connects with Gross Vale Road.
2. The southern access road will connect with the proposed local roads in the Redbank development subdivision and further with Yobarnie Avenue.
3. The northern access road will connect with Promontory Road (the southern leg of this intersection has been retained) which further intersects with Grose Vale Road.

5.0 Transport appraisal

5.1 Road network

5.1.1 Traffic generation

The *Guide to Traffic Generating Developments* (GTGD) was used to inform traffic generation for the proposed development. The rate for low-density 'dwelling houses' was adopted, despite the mix of housing typologies on the site as the low-density traffic generation rates are highest in the residential category.

Table 5-1 Development traffic generation

Yield	Traffic generation rate*		Total traffic	
	Day	Peak hours (both)	Day	Peak hours (both)
+350 dwellings	9.0 veh/ dwg	0.8 veh/dwg	+3,150 veh / day	+280 veh / h

*This is consistent with AECOM's TMAP trip generation assumption

5.1.2 Traffic distribution

The distribution can be referred to AECOM's TMAP, which is shown in **Table 5-2**.

Table 5-2 Development traffic distribution

Directions	Trip distribution				
	SE (Richmond and Blacktown)	SW (Penrith)	NE (Glossodia)	NW (Blue Mountains)	Internal
Inbound	43%	22%	18%	13%	4%
Outbound	35%	10%	25%	24%	6%

Hence, the trips are further assigned to the surrounding road network corridors as shown in **Table 5-3**. The largest traffic increase would take place on Bells Line of Road (over 100 vehicles) and further on Richmond Bridge whereas the increase in the other three directions is in the order from 28 vehicles to 70 vehicles, i.e. at most just over one car per minute.

Table 5-3 Development traffic

Directions	Traffic increase hourly				
	Bells line of Road	Grose River Road	Terrace Road	Grose Vale Road (w)	Internal
Inbound	+120 veh	+62 veh	+50 veh	+36 veh	+12 veh
Outbound	+98 veh	+28 veh	+70 veh	+68 veh	+16 veh

5.1.3 Road network impact appraisal

This road network impact associated with the proposal can be mitigated due to the existing and planned infrastructure projects. No additional infrastructure is needed as a result of the development:

Approved Redbank development

The approved capacity for the entire Redbank development was 1,399 dwellings which was also assessed in AECOM's TMAP. However, the actual delivery of Redbank development will be 1,354 dwellings when complete. This reduced 44 dwellings leaves capacity on the surrounding road network and will offset the impact of the Planning Proposal by about 15 per cent.

Lower traffic than predicted

Based on the discussion from **Section 3.7.2**, it is found that the surveyed traffic volume at three locations along Gross River Road in 2018 and 2021 is generally lower than the forecasted demand by TMAP (AECOM, 2013). There is also a trend of traffic decrease on Gross Vale Road in the vicinity of the site. This reflects lower background traffic demand on the network in the future and potentially even more remaining capacity than the outcomes from the traffic modelling.

Grose River Bridge

The delivery of the Grose River Bridge will provide an alternative for North Richmond and Redbak residents to connect with the wider road network across the Hawkesbury River, relieving the pressure of traffic on the traffic signals at Grose Vale Road / Bells Line of Road. For the intersections at Grose River Road / Grose Vale Road and Grose River Bridge / Springwood Road, the traffic modelling undertaken for the Grose River Bridge REF shows that the degree of saturation would be a maximum of 46 per cent by 2031 and a fairly good level of service. The traffic volumes in the modelling were conservative based on historical survey data. Hence, if the actual traffic volumes are lower than predicted, the actual remaining capacity could be more than 54 per cent to accommodate the proposed development, which is sufficient given the relatively small increase of the traffic in this direction.

Richmond Bridge duplication and intersection upgrade

The duplication of the existing Richmond Bridge would significantly increase the river-crossing capacity to the east of the site and facilitate access to Richmond and further to Blacktown. It is expected that the existing Richmond Bridge would function as two-lane westbound whereas the new bridge will be two-lane eastbound, increasing the capacity of the major crossing of the Hawkesbury River at this location by 100 per cent.

The additional southbound lane on Bells Line of Road at the approach and departure lane of Grose Vale Road intersection would also increase the capacity at the intersection of Grose Vale Road / Bells Line of Road as a major access point of the North Richmond, Redbank and future Redbank Expansion Area communities. This would release more green time for the movement on Grose Vale Road, especially the west approach and reduce the delay at the intersection.

5.2 Walking and cycling

It is expected that the proposed cross-sections of the internal road of the Redbank Expansion Area would be consistent with Redbank development. The footpath network would connect with Redbank to ensure pedestrian comfort and permeability while shortening walking distances overall from surrounding destinations. Cycling will take place on lower-hierarchy and lower-speed roads. It should be noted that given the limited pedestrian and cycling infrastructure outside of the Redbank development and low-density nature, walking and cycling mode share would remain low. Hence, there would be a limited impact on the local walking and cycling network.

5.3 Public transport

The site is within 250m distance to the nearest bus stops on Grose Vale Street for the 680 bus routes, providing access to Bowen Mountain, North Richmond and Richmond town centres and the lake foreshore for future residents.

Given the limited increase in public transport demand associated with the proposed development, the public transport network will be able to cope and there will be no impact on the public transport system.

5.4 Evacuation and flood impact

Molino Stewart Pty Ltd prepared a *North Richmond Release Area Flood and Bushfire Safety Evaluation* in 2009. The preceding analysis shows that riverine flooding does not pose a direct threat to the proposed North Richmond development and local flooding would only directly impact a small number of properties in the most extreme events. The indirect impacts of either type of flooding are unlikely to trigger the mass evacuation of North Richmond.

However, should it be decided, there would remain a safe, flood-free access route by which people could leave at any time. This would mean that there would be no urgency to evacuate and the State Emergency Service (SES) could time the evacuation so that it did not coincide with urgent evacuations from life-threatening floodwaters.

The NSW SES bases its flood evacuation planning on an estimated vehicle evacuation rate of 600 vehicles per hour, per lane of outbound traffic (Opper, 2004). If the whole of the Redbank development were to be developed that would increase to between 2,600 and 3,600 dwellings and a conservatively high figure of two vehicles per household were

assumed then a maximum total of 7,200 vehicles would need to be evacuated. This would take about 12 hours to evacuate. The evacuation of all of North Richmond and its surrounding area could therefore be evacuated in one day.

Redbank Communities prepared a *Submission to the Independent Flood Review* in 2022 which highlighted the flood resilience opportunities with the addition of the Grose River Bridge. The proposed Grose River Bridge was originally intended to reduce traffic congestion on the existing Bells Line of Road at North Richmond, Hawkesbury City Council resolved for it to be relocated to a new planned route so it could be built at the 1:100-year flood level. During times of flood when the current North Richmond bridge is closed people living west of the river who need to get to the east side need to travel west on Bells Line of Road to Bell (over 50km west of North Richmond) and then use the Darling Causeway to Blackheath and then down the Great Western Highway. Once the new Grose River Bridge and connecting roads are complete under the same flooding scenario commuters will be able to use this road and travel up Springwood Road to Springwood and then down the Great Western Highway cutting the journey in more than half. It is recommended that the Grose River Bridge and connecting roads construction be supported by all Government Departments and construction completed as quickly as possible to mitigate the flood impact.

6.0 Conclusion

The Redbank Expansion Area (Kemsley Park) planning proposal is for the extended development within the Redbank development, west of North Richmond town centre. Approximately 300-350 dwellings is expected to be accommodated as part of the planning proposal being cosnsidered. This transport appraisal confirms that the Redbank Expansion Area can be rezoned for residential development as an extension to the current Redbank development with the existing and planned infrastructure projects. No additional infrastructure is needed as a result of the proposal.

Thoughtful Transport Solutions

Suite 4.03, Level 4, 157 Walker Street, North Sydney NSW 2060
sctconsulting.com.au