

Report
Prepared for
Villawood Properties

14 August 2017

**Traffic Engineering Evidence
Statement**

Proposed Residential Subdivisions
250 Sunbury Road, and 3-5
Macedon Street, Sunbury

**Amendments 207 and 208 Hume
Planning Scheme**

**Sunbury South Precinct Structure
Plan**

**Lancefield Road Precinct
Structure Plan**

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Prepared for:

Villawood Properties
Our reference 14203TRep001

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1 Statement of Witness:

Reference

- 1.1.1 Amendment C207 and C208 Hume Planning Scheme
- 1.1.2 Planning Applications P18858 and P18854
- 1.1.3 675 Sunbury Road and 3-5 Macedon Street, Sunbury

Name

- 1.1.4 Stephen John Hunt

Position

- 1.1.5 Principal – Traffic, Ratio Consultants

Address

- 1.1.6 9 Clifton Street, Richmond, VIC 3121

Qualifications

- Bachelor of Engineering (Civil), 1975, Swinburne University of Technology.
- Graduate Diploma of Highway and Traffic Engineering, 1981, Chisholm Institute of Technology.

Experience

- 2017 – Present: Principal – Traffic, Ratio Consultants.
- 2010 – 2016 : Group Manager – Cardno Victoria
- 2007 – 2010: Consultant, Cardno Grogan Richards.
- 1988 – 2006: Director, Grogan Richards.
- 1975 – 1988: Traffic Engineer with Cities of Doncaster and Templestowe, Caulfield and Prahran.

Professional Expertise

- 1.1.7 I have worked in the area of Traffic and Transportation Engineering throughout my career. My area of expertise includes traffic advice and assessment of a wide range of land use and development proposals for planning authorities, government agencies, corporations and developers.
- 1.1.8 My training, qualifications and experience including involvement with a wide variety of developments over a number of years, qualifies me to comment on the traffic implications of this proposal.

Instructions which define the scope of this report

- 1.1.9 I have been requested by Norton Rose Fulbright on behalf of the Villawood Properties to review:
 - Amendments C 207 and C208 to the Hume Planning Scheme, which seek to introduce the Sunbury South Precinct Structure Plan and Lancefield Road Precinct Structure Plan into the Scheme;
 - Planning Application P18858 for a multi-lot residential subdivision at 675 Sunbury Road, Sunbury (known as Redstone Hill); and
 - Planning Application P18854 for a multi lot residential at 3-5 Macedon Street, Sunbury (known as Sherwood Heights).
- 1.1.10 My instructions are to prepare a traffic expert evidence statement detailing my opinions on the Precinct Structure Plans as exhibited and the Section 96A applications for multi lot residential subdivision described

above, to assist the Planning Panel convened to consider the Amendments.

Facts, Matters and Assumptions Relied Upon

1.1.11 In the course of preparing this report, the facts, matters and assumptions I have relied upon are as follows:

- Site visit on Wednesday 26 July 2017.
- Hume Planning Scheme Amendment C207 and C208 exhibited documents.
- *Sunbury South Precinct Structure Plan (November 2016)* (Exhibited Version)
- *Lancefield Road Precinct Structure Plan (November 2016)* (Exhibited Version)
- *Traffic and Transport Assessment – Redstone Hill Residential Subdivision – Precinct 1 (December 2015)* - prepared by Cardno for Viewgrange Pastoral Pty Ltd,
- *Traffic and Transport Assessment – Sherwood Heights Subdivision – Racecourse Road Sunbury (November 2015)* - prepared by Cardno for Racecourse Road Holdings Pty Ltd,
- *Sunbury South and Lancefield Road Precinct Structure Plan – Background Report (November 2016) – Victorian Planning Authority.*
- *Strategic Modelling of the Sunbury and Diggers Rest Growth Corridor (October 2015)* – prepared by GTA Consultants for the Metropolitan Planning Authority
- *Sunbury Growth Corridor DCP Modelling Supplementary Report (February 2017)* prepared by GTA Consulting for Villawood / Capitol Property Group.
- *Sunbury Integrated Transport Assessment (February 2011)* prepared by Aecom for the East Sunbury Developer Group.
- *Sunbury Infrastructure Co-Ordination and Delivery Strategy (Draft) (November 2016) – Victorian Planning Authority.*
- Panel Report – Amendment C190 to Hume Planning Scheme (May 2015).

Identity of Persons Undertaking the Work

1.1.12 Stephen Hunt of Ratio Consultants, assisted by Hilary Marshall and Melissa Merrick also of Ratio Consultants.

Declaration

1.1.13 I confirm that I have read and that I understand the Planning Panels Victoria's 'Guide to Expert Evidence' and that I comply with the provisions of that guide.

1.1.14 I have no relationship with the client other than a business engagement to comment on this matter.

1.1.15 My involvement in this project commenced in January 2017 and I was not involved directly in the preceding Planning Application process.

- 1.1.16 I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.



Stephen Hunt
Principal - Traffic
Ratio Consultants

2.1 Instructions

- 2.1.1 I have been requested by Norton Rose Fulbright Lawyers on behalf of Villawood Properties, to undertake a review of the traffic engineering implications of the proposed residential subdivisions at 675 Sunbury Road, and 3-5 Macedon Street, Sunbury and prepare an expert evidence statement for submission and consideration by Planning Panels Victoria, in association with Amendment C207 and C208 to the Hume Planning Scheme.
- 2.1.2 In particular, I have been requested to review and comment on the following:
1. The road and transport network proposed to be developed in association with the Sunbury South Precinct Structure Plan and the Lancefield Road Precinct Structure Plan which is being considered concurrently through Amendment C207 and C208 of the Hume Planning Scheme.
 2. The regional traffic implications of the progressive development of both PSPs
 3. The adequacy of the proposed initial access arrangements to the subdivisions from Sunbury Road and Racecourse Road and the planned roll out of access works as the subdivision and adjacent land is progressively developed.
 4. The proposed cross-section of Sunbury Road adjacent to the site and the proposed staged upgrade of the Lancefield Road / Sunbury Road intersection.
 5. Issues raised in submissions related to the subject proposals.
- 2.1.3 This report has been prepared in accordance with the Planning Panels Victoria's 'Guide to Expert Evidence'. In the course of preparing this assessment, I have inspected the subject sites and surrounding road network, reviewed the subdivision plans and referred to the background documentation including two traffic engineering assessments prepared by Cardno, which accompanied the Section 96A applications for the Redstone Hill and the Sherwood Heights residential subdivisions in December and November 2015, respectively.
- 2.1.4 My firm has also prepared functional plans showing the recommended progressive upgrading and duplication of Sunbury Road and the Lancefield Road intersection which have been the basis of discussions with VicRoads and adjacent property developers.
- 2.1.5 I have had no involvement in the preparation of either the Sunbury South or Lancefield Road PSPs.
- 2.1.6 While I was employed at Cardno in November and December 2015, I was not directly involved in the preparation of the reports referenced above. Hilary Marshall, who was the author of those reports, is now also employed at Ratio and has assisted me in the preparation of this evidence.
- 2.1.7 My opinions with respect to the traffic engineering issues related to the proposed residential subdivisions are set out in the following report.

2.2 Amendments C207 and C208 to the Hume Planning Scheme

- 2.2.1 The Victorian Planning Authority (VPA), in consultation with Hume City Council have prepared the Sunbury South and Lancefield Road PSPs which are proposed to be introduced into the Planning Scheme through Amendments C207 and C208.
- 2.2.2 Following the release of draft PSPs in January 2015 by the VPA, Villawood submitted two applications for residential subdivision under Section 96A of the Planning and Environment Act to be considered in association with the amendments, including Redstone Hill and Sherwood Heights.
- 2.2.3 In December 2015, prior to the exhibition of the Amendments, revised applications for the Part 1 Residential Subdivision at Redstone Hill and Sherwood Heights were lodged by Mesh Planning on behalf of Villawood.
- 2.2.4 Amendment C207 proposes to:
 - Incorporate the Sunbury South PSP into the Scheme,
 - Rezone the land to the Urban Growth Zone,
 - Make a number of related changes to the Scheme.
- 2.2.5 Amendment C208 proposes to:
 - Incorporate the Lancefield Road PSP into the Scheme,
 - Rezone the land to the Urban Growth Zone,
 - Make a number of related changes to the Scheme.

3.1 Sunbury South PSP

- 3.1.1 The Sunbury South Precinct Structure Plan as exhibited provides for the provision of appropriate transport infrastructure to support the urban development of the area.
- 3.1.2 The rezoning of this land for urban development and the consequent requirement to construct new roads and connections to support development, provides the only realistic opportunity to facilitate and fund key “missing” transport links which constrain movement across and around Sunbury currently.
- 3.1.3 The PSP includes a number of transport projects which not only benefit the proposed community of Sunbury South, but the wider Sunbury area including:
 - The construction of a new road between Sunbury Road and Vineyard Road providing a “southern link” crossing of Jacksons Creek and ultimately a grade separated crossing of the rail line to Vineyard Road.
 - Construction of improved connections to the south to Bulla Diggers Rest Road providing alternate access to the Calder Freeway from Jacksons Hill and existing areas in the Goonawarra area.
 - The opportunity to develop a new railway station in Sunbury South linking to central Melbourne to take advantage of additional capacity within the rail network resulting from the Melbourne Metro Rail Project.
- 3.1.4 Sufficient funding is likely to be available through a Sunbury South ICP to largely fund these projects as well as significant regional intersection upgrades such as the ultimate development of the Sunbury Road / Lancefield Road intersection
- 3.1.5 The opportunity also exists through GAIC funding to facilitate regional improvements such as the duplication of Sunbury Road and possibly the Bulla Bypass.
- 3.1.6 Development of new Activity Centres within the Sunbury South PSP, including the Redstone Hill Major Activity Centre will provide convenient facilities for not only the proposed growth area but also to existing residents of East Sunbury. reducing the intensity of traffic movements to and through the existing Sunbury Town Centre.
- 3.1.7 As evidenced by the traffic modelling undertaken, the development of these transport improvements, particularly the initial construction of the southern Jackson Creek crossing, will provide a net community benefit, offsetting additional traffic generated by the urban development within the Sunbury South PSP.

3.2 Lancefield Road PSP

- 3.2.1 The Lancefield Road Precinct Structure Plan as exhibited provides for the provision of appropriate transport infrastructure to support the urban development of the area.
- 3.2.2 As with the Sunbury South PSP, the rezoning of this land for urban development and the consequent requirement to construct new roads and connections to support development, provides the only realistic

opportunity to facilitate and fund key “missing” transport links which constrain movement across and around northern Sunbury.

3.2.3 Within the Lancefield Road PSP, the following projects will not only benefit the proposed community, but the wider Sunbury area:

- The construction of a new road between Racecourse Road and Lancefield Road providing a northern crossing of Jacksons Creek and two grade separated crossings of the Bendigo Rail line to rail line to Lancefield Road.
- The opportunity to develop a new railway station in Sunbury North linking to central Melbourne to take advantage of additional capacity within the rail network resulting from the Melbourne Metro Rail Project.

3.2.4 In conjunction with the Sunbury South PSP, the Lancefield Road PSP provides the opportunity through GAIC funding to facilitate regional improvements such as the duplication of Sunbury Road and possibly the Bulla Bypass.

3.2.5 Development of new Activity Centres within the Lancefield Road PSP, will provide convenient facilities for not only the proposed growth areas but also to existing residents of Goonawarra and Rolling Hills and reduce the intensity of traffic movements to and through the existing Sunbury Town Centre.

3.2.6 As evidenced by the traffic modelling undertaken, the development of these transport improvements will provide a net community benefit, offsetting additional traffic generated by the urban development within the Lancefield Road PSP

3.3 Sunbury Infrastructure Co-ordination and Delivery Strategy

3.3.1 The Sunbury Infrastructure Co-ordination and Delivery Strategy 2016 (SICADS) prepared by the VPA provides a sound basis for staging of transport infrastructure in association with the continued growth and development of the Sunbury Diggers Rest Corridor.

3.3.2 The identification of project priorities and nominated lead agencies and “development partners” for key projects provides a mechanism for channeling ICP (and potentially GAIC) funding towards the delivery of key projects in the short term which would provide the platform for resolving existing connectivity issues in the Sunbury Growth Corridor as soon as possible, as well as mitigating traffic impacts of additional development.

3.3.3 The adoption of an Infrastructure Delivery Strategy, in my view generally in accordance with SICADS, provides the opportunity to ensure that important regional infrastructure such as the “southern link” is delivered as soon as possible to mitigate existing traffic issues and facilitate new development in both the Sunbury South and Lancefield Road PSP areas.

3.4 Redstone Hill Subdivision Application

3.4.1 Access to Redstone Hill Precinct 1 will initially be directed to Sunbury Road as development within Sunbury South proceeds, the southern crossing of Jacksons Creek developed and alternate access to the south west made available, initially through connections to Watson Road and Bulla Diggers Rest Road and ultimately to Vineyard Road through construction of a grade separated crossing of the Sunbury Rail line.

- 3.4.2 Modelling undertaken shows that, with these connections in place, a more permeable transport network will be established resulting in not only traffic generated by the development of Sunbury South being accommodated, but a net overall improvement to regional traffic conditions.
- 3.4.3 Analysis undertaken shows that traffic generated by Redstone Hill can be accommodated by progressive provision of intersections to Sunbury Road.
- 3.4.4 Sunbury Road to the south east has limited capacity to absorb additional traffic at peak times with traffic generated by initial development of Sunbury South absorbed through spreading of peaks and redistribution of existing trips as available capacity is absorbed by additional development.
- 3.4.5 This will be relieved by construction of the southern creek crossing and connections to the south and south west, with peak hour capacity issues to the south east addressed over time by the construction of the Bulla bypass and duplication of Sunbury Road.
- 3.4.6 While congested traffic conditions will continue in the short term, traffic generated by development in Sunbury South can be absorbed until such time as the southern creek crossing can be developed.
- 3.4.7 Initial investigations indicate that a fourth leg to the roundabout would support the development of Precinct 1 of Redstone Hill Road as well as the Capitol property should development of both estates be configured to connect to a southern leg of the intersection.

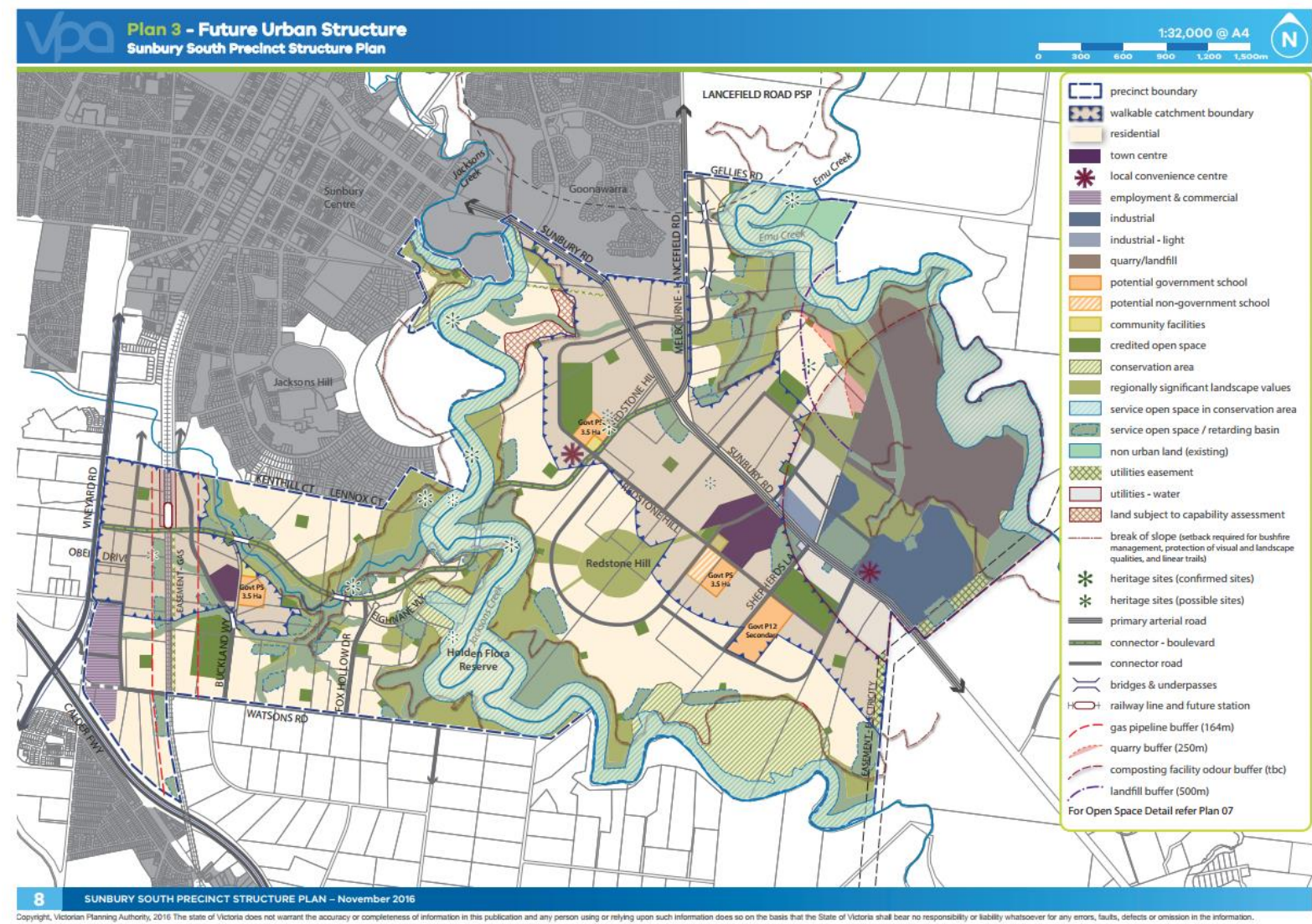
3.5 Sherwood Heights Subdivision Application

- 3.5.1 The proposed development of the Sherwood Heights Estate containing 407 residential lots is expected to generate approximately 3,500 vehicle movements per day which will initially distribute to the existing road network via Racecourse Road and Elizabeth Drive.
- 3.5.2 Ultimately, when the northern crossing of Jacksons Creek is constructed in association with the Lancefield Road PSP, alternate access will be available to the east and south, via the continuation of Elizabeth Drive.
- 3.5.3 Traffic generated by the development of Sherwood Heights can be absorbed by the existing road network in the first instance, assisted by the recent extension of Elizabeth Drive through the Sunbury Fields Estate to Racecourse Road and the further extension of Elizabeth Drive to the south of Mitchells Lane to Vineyard Road.
- 3.5.4 The upgrade of the Elizabeth Drive / Racecourse Road intersection and the construction of Elizabeth Drive east of Racecourse Road provides an appropriate contribution towards regional transport infrastructure.

4.1 Sunbury South Overview

- 4.1.1 The Sunbury South Precinct Structure Plan area (PSP 1074) is situated to the east and south of the existing Sunbury township, applying to approximately 1759 hectares of land, generally bounded by:
- Vineyard Road to the west,
 - Watsons Road and Jacksons Creek to the south,
 - a high voltage power easement to the east, and
 - Gellies Road and Emu Creek to the north east and north east.
- 4.1.2 The land to the north, on the opposite site of Gellies Road, on the east side of Lancefield Road forms part of the Lancefield Road PSP which is being considered concurrently with the Sunbury South PSP.
- 4.1.3 The exhibited Urban Structure Plan for the Sunbury South PSP is shown in Figure 4.1.
- 4.1.4 The PSP is expected to result in a net developable area of 785 hectares of which 720 hectares will be residential, accommodating up to 11,800 dwellings and 65 hectares industrial development, located on the north side of Sunbury Road east of Shepherds Lane. Employment / commercial uses are also proposed on the east side of Vineyard Road north of the Calder Freeway.
- 4.1.5 The PSP makes provision for a new Major Town Centre at Redstone Hill, to provide higher order retail, commercial and community services for the eastern part of the greater Sunbury Growth Area.
- 4.1.6 A new Local Town Centre is also proposed at Harpers Creek to the east of Vineyard Road, supported by a local convenience centre situated adjacent to the proposed Boulevard Connector Street, running south from Sunbury Road at Redstone Hill Road and on the north side of Sunbury Road within the industrial land.

Figure 4.1 Sunbury South PSP – Future Urban Structure



4.2 Street Network

- 4.2.1 The proposed Sunbury South PSP Street Network Plan is shown in Figure 4.2.
- 4.2.2 It is proposed to develop a connective street network in conjunction with the development of the PSP area, which is designed to reinforce the established arterial network of Sunbury and to provide for improved local and regional connections.
- 4.2.3 This is sought to be achieved principally by the development of a “southern link” crossing of Jacksons Creek, to provide a new connection between Sunbury Road and Vineyard Road south of Sunbury Town Centre, connecting the new and existing residential precincts along Sunbury Road and Lancefield Road to the Calder Freeway via Watsons Road and Vineyard Road and providing access to the proposed Sunbury South Rail Station.
- 4.2.4 The proposed southern link is proposed to form part of an ultimate Sunbury Ring Road, completed by a further northern link crossing of Jacksons Creek within the Lancefield Road PSP, providing a new connection west from Lancefield Road to Racecourse Road at Elizabeth Drive.
- 4.2.5 A connection to the established residential area of Jacksons Hill is also proposed via a northerly extension of Buckland Way from the southern link crossing east of the railway line, providing alternate connection from the Jacksons Hill Precinct to the Sunbury South PSP area and to Vineyard Road.
- 4.2.6 The PSP proposes that Sunbury Road will be developed as a six lane primary arterial road, accommodated within the existing 60 metre reservation, forming a continuous arterial link to the east, ultimately linking to the future Bulla Bypass and the Tullamarine Freeway extension north of Melbourne Airport to the future Outer Metropolitan Ring Road (OMR).
- 4.2.7 Lancefield Road and Vineyard Road are both proposed to be developed as six lane secondary arterial roads, accommodated within proposed 40 to 42 metre reservations.
- 4.2.8 The “southern link” is proposed to be progressively developed as a Connector Boulevard with a 34 metre reservation, providing a divided carriageway accommodating a single traffic lane and a parking lane in each direction separated by a 7 metre landscaped median.
- 4.2.9 Access to Sunbury Road is proposed by a series of new and/or improved intersections, including from northwest to south east:
- A signalised intersection approximately 700 metres northwest of Lancefield Road.
 - Upgrading of the existing intersection of Lancefield Road / Sunbury Road from the existing two lane roundabout to a signalised interaction, with a new southern leg developed by the realignment of Redstone Hill Road, forming the eastern end of the “southern link” crossing of Jacksons Creek.
 - A left in / left out connector road intersection located approximately 500 metres south east of Lancefield Road.

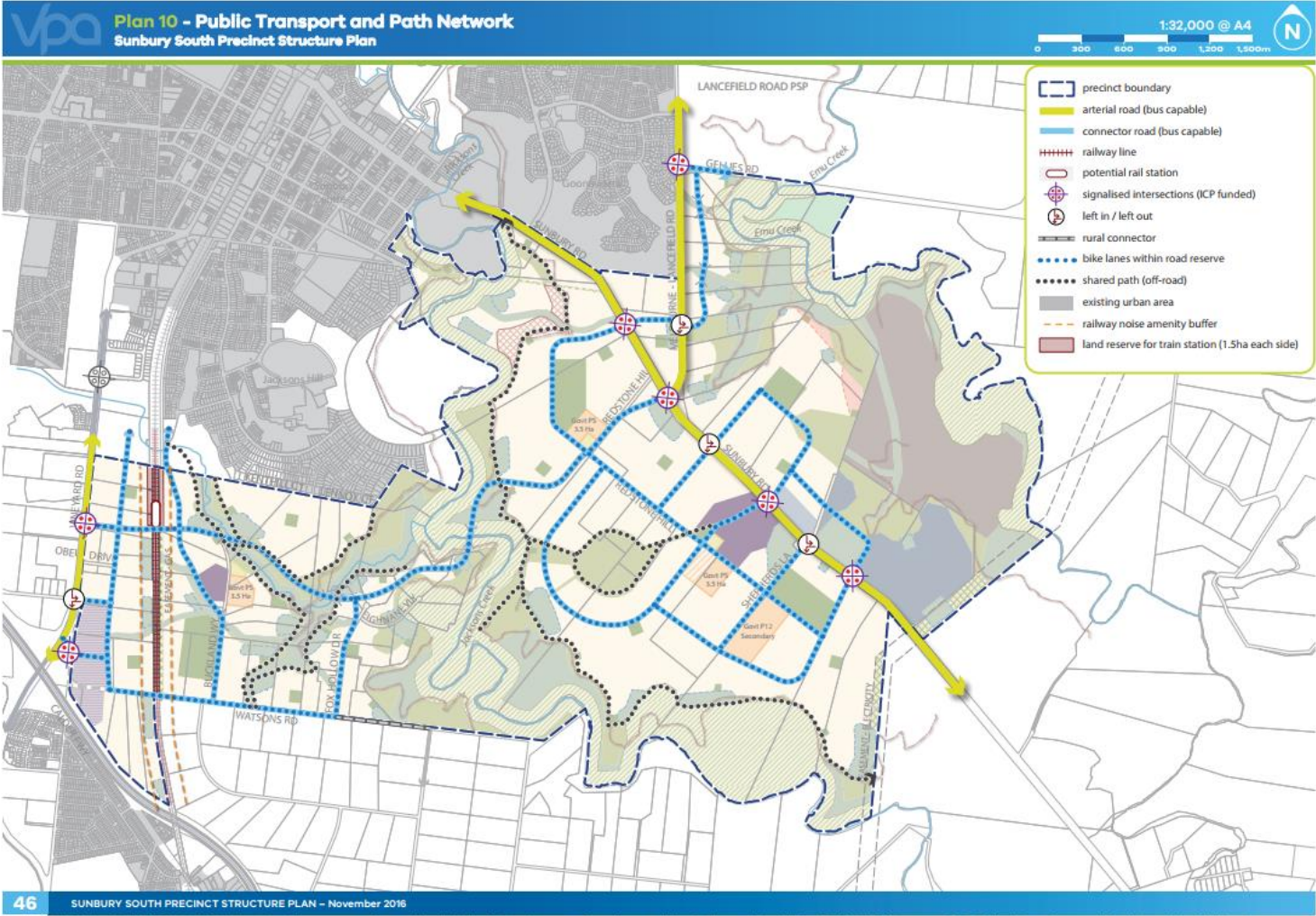
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- A new signalised intersection at the Redstone Hill Major Town Centre, situated approximately 970 metres south east of the Lancefield Road intersection.
 - A connector road intersection at Shepherds Lane located approximately 400 metres south east of the Town Centre signalised intersection. Access will be restricted to left in / left out movements on both the north and south approaches.
 - A new signalised intersection located approximately 800 metres south east of the Town Centre traffic signal.
- 4.2.10 The signalised intersections to Sunbury Road are proposed to be supplemented by left in / left out intersections located between Lancefield Road and the Town Centre and at Shepherds Lane.
- 4.2.11 At Vineyard Road, two signalised access points are proposed providing access to the Sunbury South area, including at the western end of the proposed “southern link” road, supplemented by a left in left out intersection.
- 4.2.12 Two connector links are proposed running south from the “southern link” to Watson Road via Buckland Way and Fox Hollow Drive, designed to provide additional access options to the south and to the Calder Freeway via Crinnion Road and the Bulla – Diggers Rest Road interchange.

4.3 Public Transport Network

- 4.3.1 The proposed Public Transport and Path Network for the Sunbury South is shown in Figure 4.3.
- 4.3.2 The plan features a network of bus capable arterial and connector roads linking to existing bus services, serving Sunbury including to the existing Town Centre and Sunbury Rail Station.
- 4.3.3 The plan also identifies the site for a potential new rail station in South Sunbury located immediately north of the proposed “southern link” crossing point of the Sunbury Rail line.
- 4.3.4 It is noted that the Lancefield Road PSP also identifies a potential new rail station in North Sunbury, such that significantly improved rail access is sought to be facilitated through the combined PSPs.

Figure 4.3 – Sunbury South PSP --Public Transport and Path Network



4.4 Precinct Infrastructure Plan

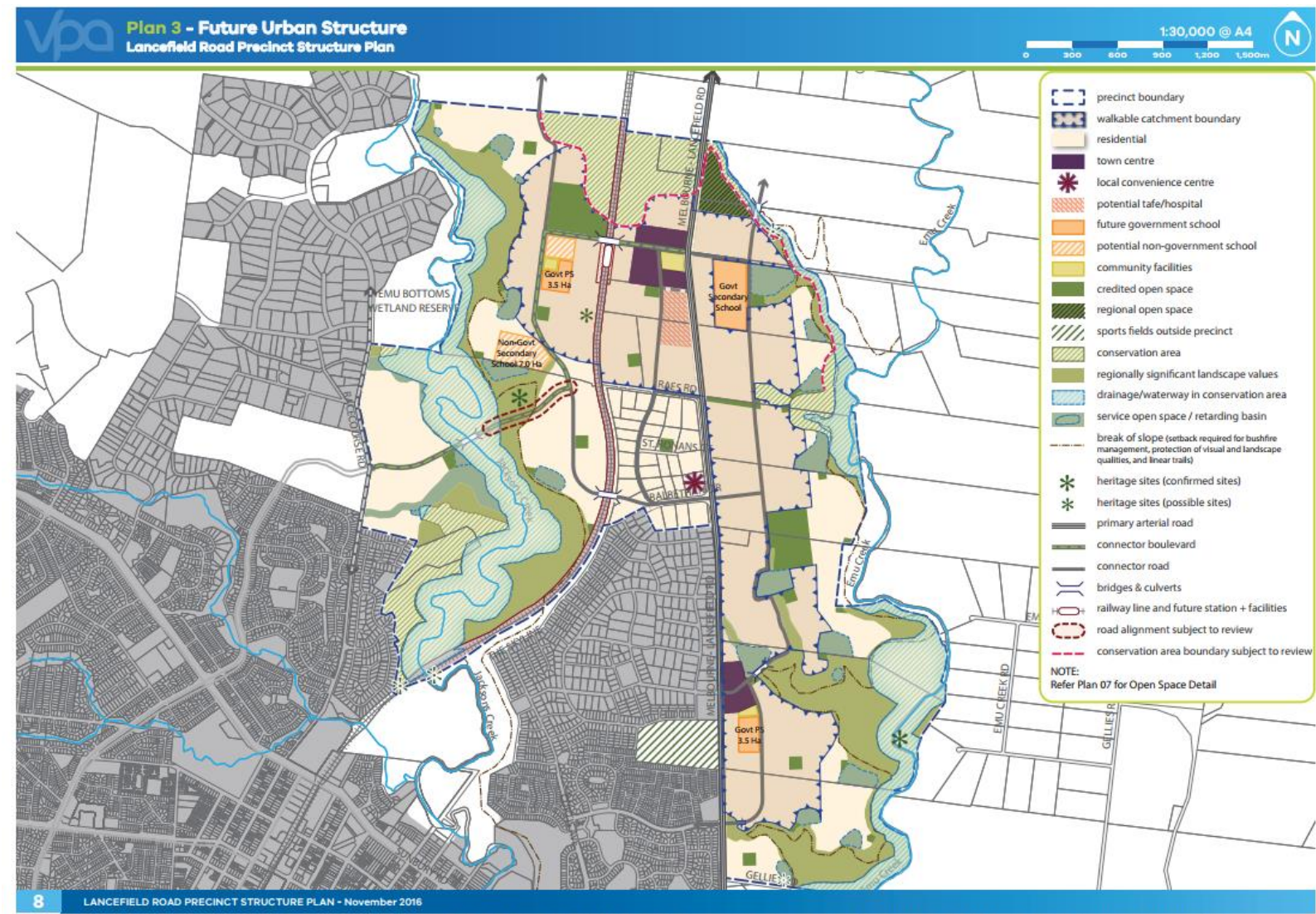
- 4.4.1 The Precinct Infrastructure Plan (PIP) for the Sunbury South PSP sets out the infrastructure items required to meet the needs of the proposed development within the precinct.
- 4.4.2 The proposed PIP is shown in Figure 4.4.
- 4.4.3 The works identified within the PIP are proposed to be funded through a number of mechanisms including the Sunbury South Infrastructure Contributions Plan (ICP).
- 4.4.4 Notable traffic and transport inclusions in the PIP are as follows:
- The duplication of Lancefield Road south of Gellies Road to a 6 lane arterial road to be constructed by VicRoads as a non ICP item. (RD01)
 - The duplication of Sunbury Road between Jacksons Creek and the Urban Growth Boundary as a 6 lane arterial road to be constructed by VicRoads as a non ICP item (RD02)
 - The ultimate upgrade of Vineyard Road to a 6 lane arterial road by VicRoads as a non ICP Item. (RD03)
 - Land and construction of Sunbury Ring Road – Southern Link between Sunbury Road and Vineyard Road as a 2 lane Boulevard Connector as an ICP item (RD04)
 - Construction of Buckland Way, Fox Hollow Road, Watsons Road and Crinion Drive as 2 lane connector roads as ICP items (RD05,06,07 and 08)
 - Signalised intersections along Sunbury Road to be constructed to an interim alignment as an ICP item, with land for the ultimate intersection also an ICP item. (IN01, 02, 03 and 04)
 - Signalised intersections along Sunbury Ring Road – Southern link at Fox Hollow Drive, Buckland Way / Jacksons Hill Link and Vineyard Road as ICP items (INT09,10 and 05)
 - Construction of boulevard connector bridges over Jacksons Creek and Harpers Creek at two locations as ICP items. (BR01,02 and 03)
 - Construction of Sunbury Ring Road - Southern Link underpass of the Sunbury Rail line as an ICP item (BR04)
- 4.4.5 The PSP states that the indicative triggers for delivery of key infrastructure projects included in the Sunbury South precinct are outlined in the Sunbury Infrastructure Coordination and Delivery Strategy, which is discussed in Section 5.

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5.1 Lancefield Road Overview

- 5.1.1 The Lancefield Road Precinct Structure Plan area (PSP 1075) is situated to the north and east of the existing Sunbury township, applying to approximately 1095 hectares of land general bounded by:
- Racecourse Road and Jacksons Creek to the west,
 - The Goonawarra and Rolling Hills communities to the south west,
 - Gellies Road to the south,
 - Emu Creek to the east, and
 - A future conservation zone to the north.
- 5.1.2 As previously discussed, the Lancefield Road PSP is being considered concurrently with the Sunbury South PSP.
- 5.1.3 The exhibited Urban Structure Plan for the Lancefield Road PSP is shown in Figure 5.1.
- 5.1.4 The PSP is expected to result in a net developable area of 514 hectares accommodating up to 8,080 dwellings.
- 5.1.5 Two new Local Town Centres are proposed, one at Emu Creek on the east side of Lancefield Road at Rolling Meadows Drive and a second on the west side at Yellow Gum Boulevard.
- 5.1.6 A local convenience centre is also identified on the west side of Lancefield Road at Balbethan Drive.
- 5.1.7 Residential communities within the western residential precinct between Racecourse Road and Jacksons Creek, are located within the catchment of the proposed Elizabeth Drive Local Town Centre on the west side of Racecourse Road.

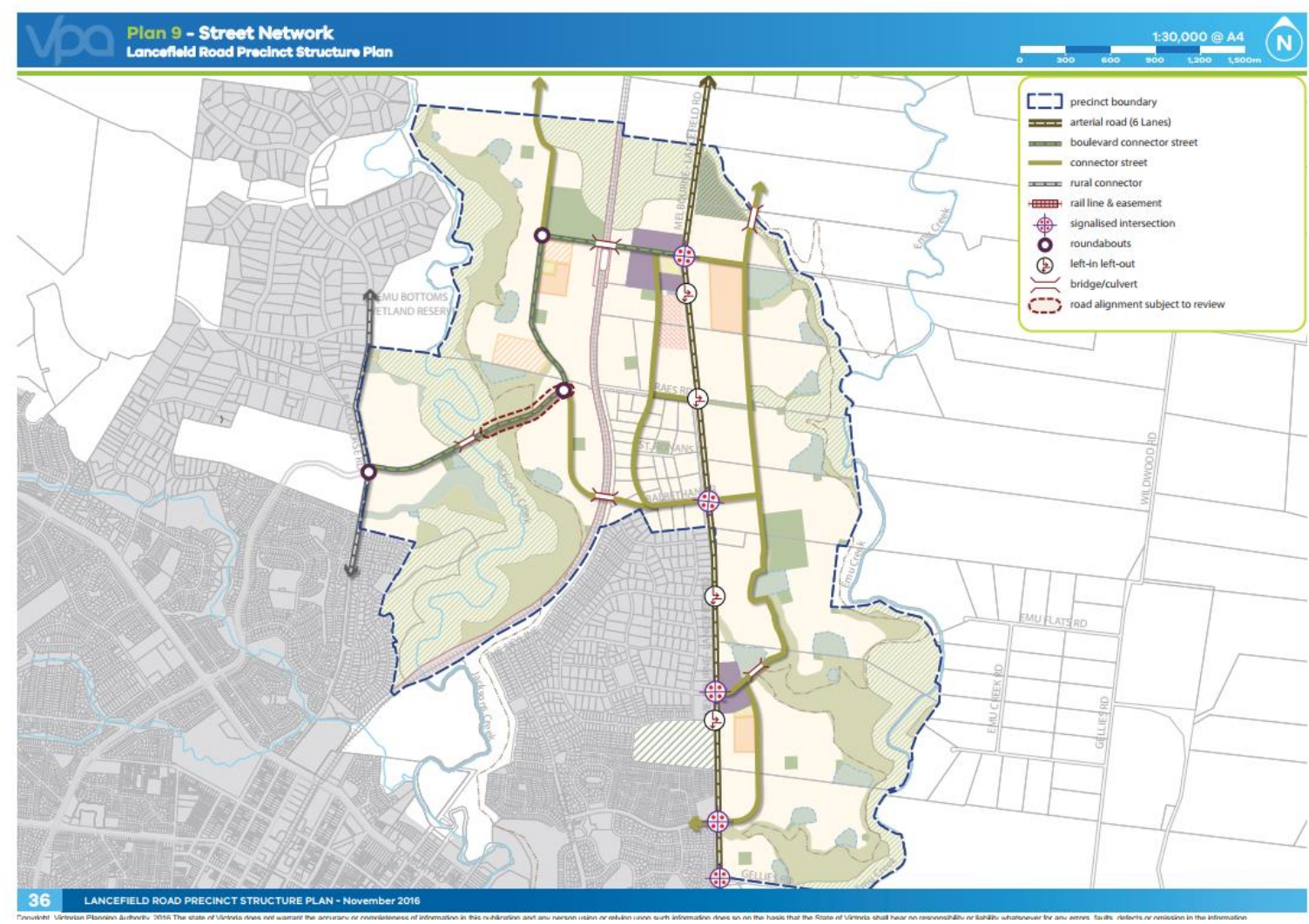
Figure 5.1 Lancefield South PSP – Future Urban Structure



5.2 Street Network

- 5.2.1 The proposed Lancefield Road PSP Street Network Plan is shown in Figure 5.2.
- 5.2.2 It is proposed to develop a connective street network in conjunction with the PSP which is designed to reinforce the established arterial network of Sunbury and to provide for improved local and regional connections.
- 5.2.3 This is sought to be achieved principally by the development of a “northern link” crossing of Jacksons Creek to provide a new connection between Racecourse Road and Lancefield Road as an easterly extension of Elizabeth Drive.
- 5.2.4 The road is depicted as a Boulevard Connector, running east from Racecourse Road across Jackson Creek. The boulevard connector then proceeds to the north for approximately 800 metres, where it swings east to a grade separation of the Bendigo Rail line to a signalised intersection with Lancefield Road.
- 5.2.5 The proposed northern link is designed to connect the new and existing residential precincts along Racecourse Road to Lancefield Road and the proposed railway station and form part of the ultimate Sunbury Ring Road, completed by a further southern link crossing of Jacksons Creek within the Sunbury South PSP and the southerly extension of Elizabeth Drive from Mitchells Lane to Vineyard Road, which is currently under construction.
- 5.2.6 The PSP proposes that Lancefield Road will be developed as a six lane secondary arterial road, accommodated within a 40 metre reservation, forming a continuous arterial link to the east via Sunbury Road, ultimately linking to the future Bulla Bypass and the Tullamarine Freeway extension north of Melbourne Airport to the future OMR.
- 5.2.7 The “northern link” is proposed to be progressively developed as a Connector Boulevard within a 34 metre reservation, providing a divided carriageway accommodating a single traffic lane and a parking lane in each direction separated by a 7 metre landscaped median.
- 5.2.8 Access to Lancefield Road is proposed by a series of four signalised intersections, including:
- A new signalised intersection at the “northern link” Boulevard Connector intersection.
 - A signalised intersection at Balbethan Drive which extends to the west to a southern grade separated crossing of the Bendigo Rail line, linking to the Elizabeth Drive extension.
 - A signalised intersection at Rolling Hills Drive providing access to the Emu Creek Neighbourhood Centre.
 - A signalised intersection at Sunningdale Avenue, with a new connector road forming the eastern approach.

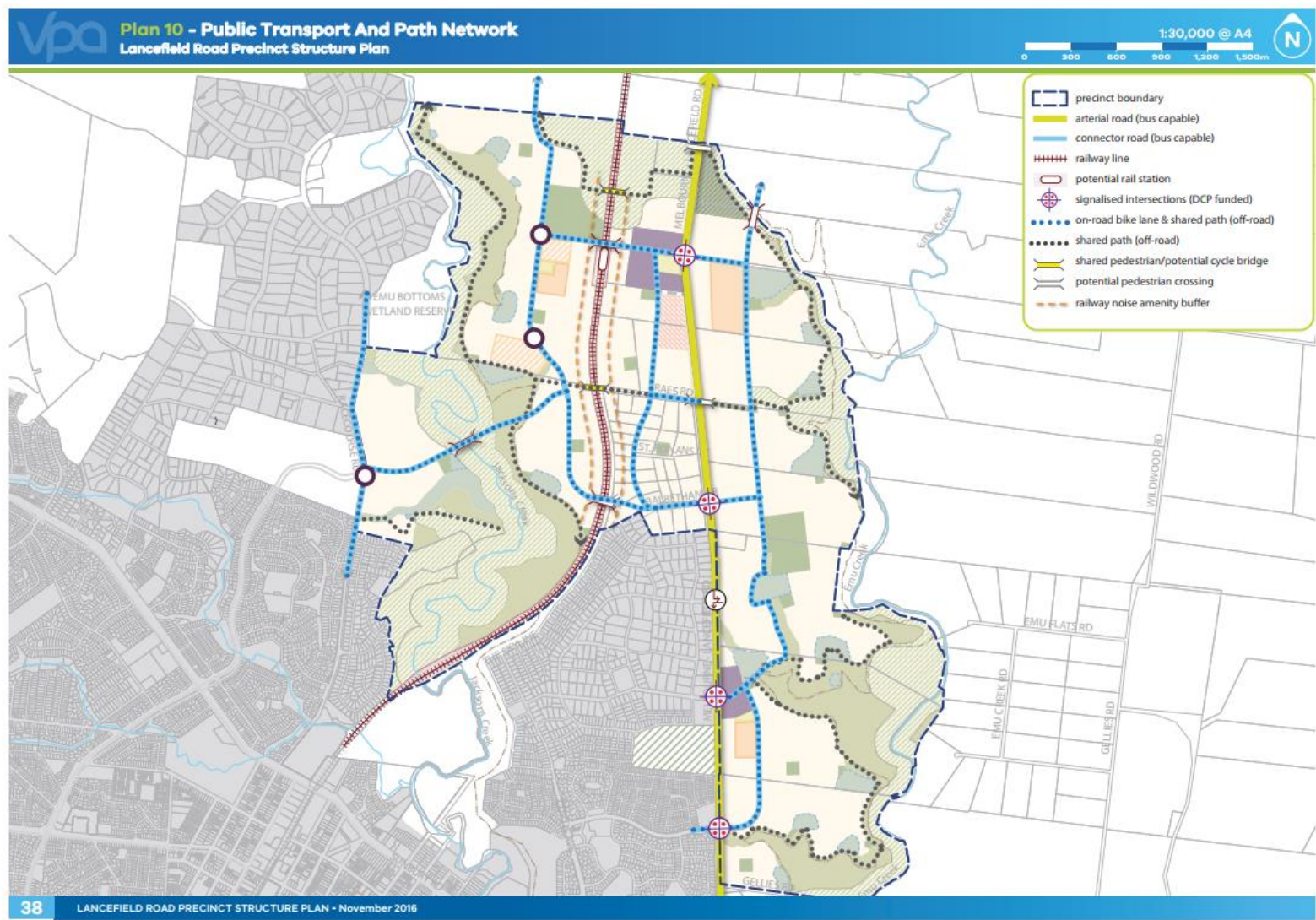
Figure 5.2 – Lancefield Road PSP – Street Network Plan



5.3 Public Transport Network

- 5.3.1 The proposed Public Transport and Path Network for the Lancefield Road PSP is shown in Figure 5.3.
- 5.3.2 The plan features a network of bus capable arterial and connector roads linking to existing bus services serving Sunbury including to the Town Centre and Sunbury Rail Station.
- 5.3.3 The Plan also identifies the site for a potential new rail station in North Sunbury, located immediately south of the proposed “northern link” crossing point of the Bendigo Rail line.
- 5.3.4 It is noted that the Sunbury South PSP also identifies a potential new rail station in South Sunbury, such that significantly improved rail access is sought to be facilitated through the combined PSPs.

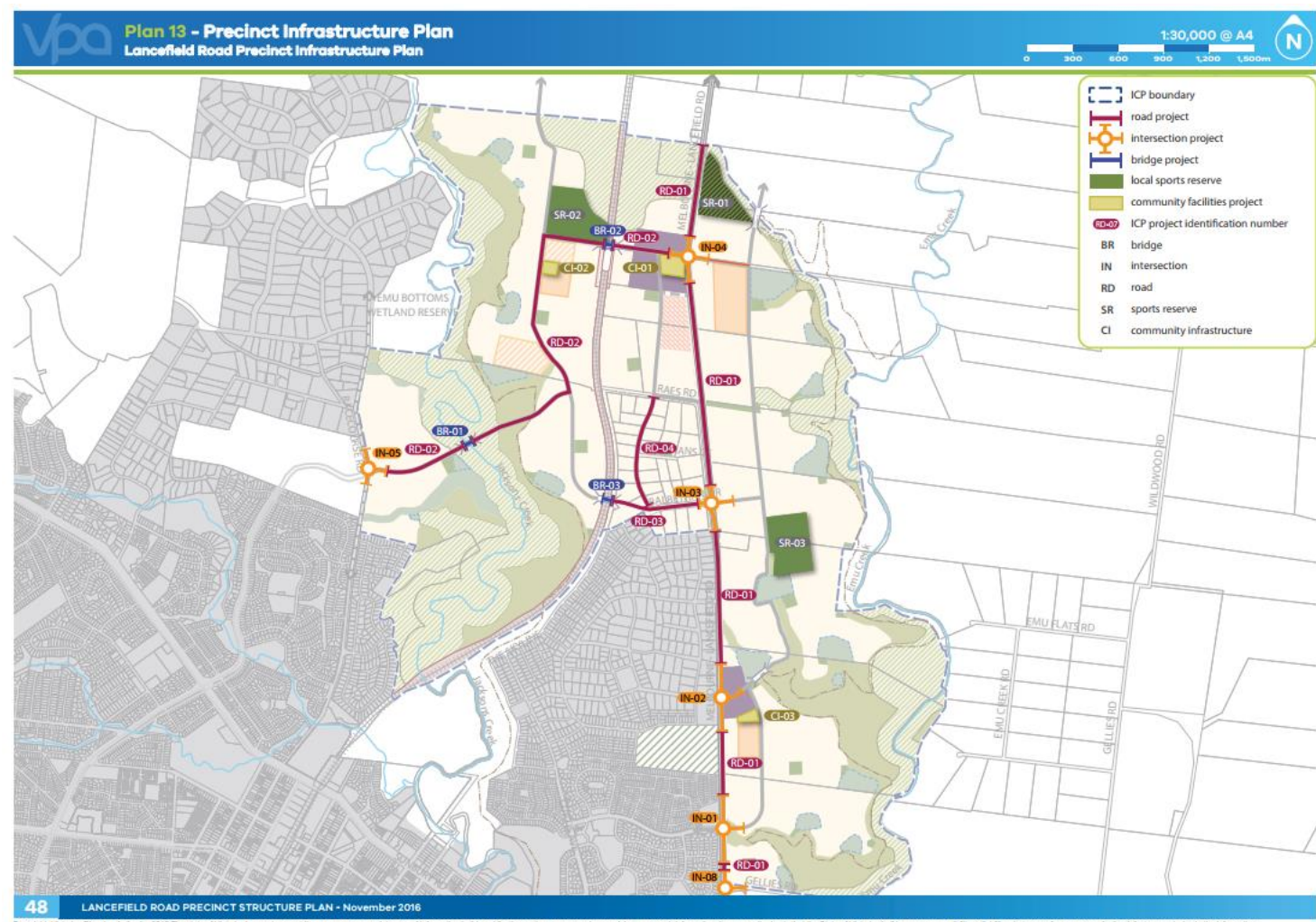
Figure 5.3 – Lancefield Road PSP _ Public Transport and Path Network



5.4 Precinct Infrastructure Plan

- 5.4.1 The Precinct Infrastructure Plan (PIP) for the Lancefield Road PSP sets out the infrastructure items required to meet the needs of the proposed development within the Precinct.
- 5.4.2 The proposed PIP is shown in Figure 5.4.
- 5.4.3 The works specified in the PIP are proposed to be funded through a number of mechanisms including the Lancefield Road Infrastructure Contributions Plan.
- 5.4.4 Notable traffic and transport inclusions in the PIP are as follows:
- The duplication of Lancefield Road to a 6 lane arterial road to be constructed by VicRoads as a non ICP item. (RD-01)
 - Signalised intersections along Lancefield Road to be constructed to an interim alignment as a ICP item, with land for the ultimate intersection also an ICP item. (IN01, 02, 03 and 04)
 - Construction of the fourth leg of the Elizabeth Drive / Racecourse Road intersection as an ICP item (IN-05)
 - Construction of the Sunbury Ring Road (“northern link”) as a boulevard connector as an ICP item. (RD-02)
 - Construction of a boulevard connector bridge over Jacksons Creek as an ICP item. (BR-01)
 - Construction of two bridges over Bendigo Rail line as ICP items, including the southern bridge not on the designated Ring Road. (BR-02 and 03)
 - Upgrading of Belbethan Drive and Stockwell Drive to connector roads as ICP items (RD-03 and 04).
- 5.4.5 It is noted that the all other connector roads, including the connector running between the southern rail bridge and the Elizabeth Drive extension has not been included in the PIP or as an ICP item.
- 5.4.6 The PSP states that the indicative triggers for delivery of key infrastructure projects included in the Lancefield Road precinct are outlined in the Sunbury Infrastructure Coordination and Delivery Strategy which is discussed in Section 5 below.

Figure 5.4 – Lancefield Road PSP – Precinct Infrastructure Plan



6 Sunbury Infrastructure Coordination and Delivery Strategy:

6.1 Overview

- 6.1.1 In November 2016, the VPA prepared a draft “Sunbury Infrastructure Coordination and Delivery Strategy” (SICADS) which was exhibited as supporting documentation to the Sunbury South and Lancefield Road PSPs.
- 6.1.2 It is understood that the document remains in draft form and has not been endorsed by the relevant authorities.
- 6.1.3 The strategies proposed have been derived having consideration of a number of factors including traffic modelling and demand assessments undertaken in background studies prepared for the corridor and the PSP areas.
- 6.1.4 The purpose of SICADS is stated in the document as providing a basis for the growth and development of Sunbury for the next 40 years by identifying required physical infrastructure items to support future growth as identified in the Sunbury Growth Corridor and Sunbury South and Lancefield Road PSPs.
- 6.1.5 The report recognizes that the continued expansion of Sunbury, both within the Growth Areas and existing areas already zoned for urban development, will require a full range of physical infrastructure and public assets to be developed, funded by a number of different funding sources.
- 6.1.6 The infrastructure requirements have been identified based on the need to:
 - Provide local infrastructure to support new development in strategically supported locations; and
 - To deliver regional benefits to the broader Sunbury Township, including major transport network improvements
- 6.1.7 In transport terms, infrastructure items identified include:
 - Road network improvements
 - Intersections
 - Train stations and
 - Bus services.
- 6.1.8 The report provides an overview of likely Infrastructure Staging requirements, identifying items which are expected to be required in the short, medium and long term, as well as for the ultimate build out.

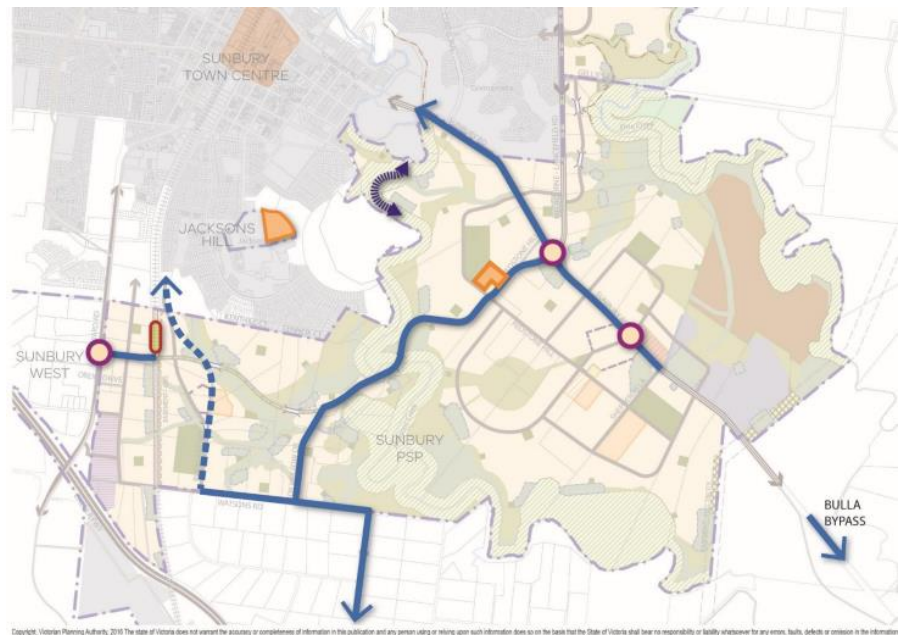
6.2 Sunbury South

Stage 1 (5 to 10 years)

- 6.2.1 SICADS identifies that a key short-term infrastructure priority for Sunbury South is to provide a second crossing of Jacksons Creek through part construction of the Sunbury Ring Road - Southern Link, between Sunbury Road and Fox Hollow Drive, including establishing a new intersection to Sunbury Road at Lancefield Road and upgraded connections to Bulla Diggers Rest Road and the Calder Freeway interchange via Fox Hollow Drive and Watson Road.

- 6.2.2 The report also identifies as short term priority projects:
- duplication of Sunbury Road,
 - establishment of the Town Centre intersection to Sunbury Road
 - early works on the Bulla Bypass and Sunbury South rail station, and
 - interim connection to Jacksons Hill.
- 6.2.3 Plan 2 of the SICADS shows the identified short-term priorities, with those applicable to Sunbury South shown in Figure 6.1.

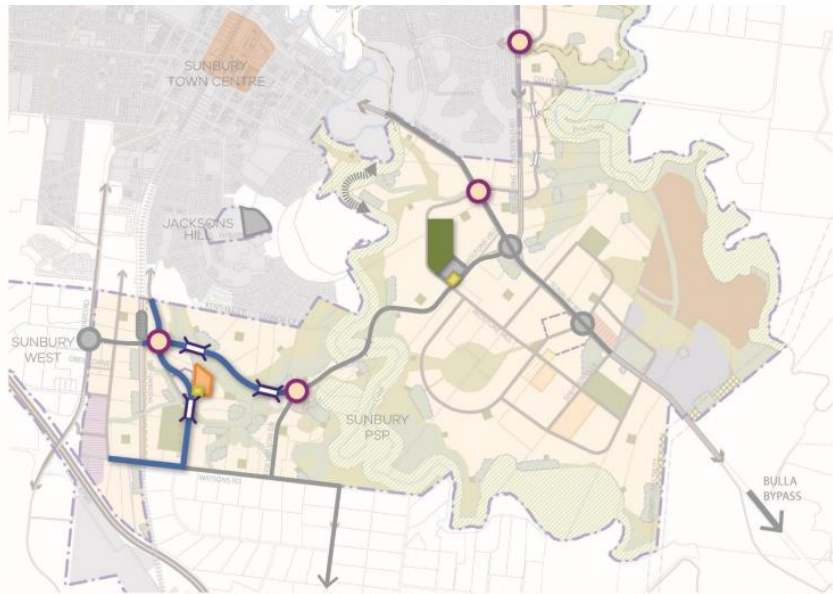
Figure 6.1 - Stage 1 Infrastructure Priorities (Sunbury South)



Stage 2: (10+ years)

- 6.2.4 Stage 2 works identified for Sunbury South include completion of the Sunbury Ring Road “southern link” to Vineyard Road, including grade separation at the Sunbury rail line and construction of the Buckland Way ultimate connection to Jacksons Hill.
- 6.2.5 It also identifies the regional importance of establishment of Sunbury South Station by 2026 to provide additional train services to the area enabled by completion of the Metro Rail Project, and completion of the Bulla Bypass.
- 6.2.6 Plan 3 of the Sunbury Infrastructure Coordination and Delivery Strategy shows the identified medium-term priorities, with those applicable to Sunbury South shown in Figure 6.2.

Figure 6.2 - Stage 2 Infrastructure Priorities (Sunbury South)



Stage 3 and 4: (25+Years)

- 6.2.7 The Stage 3 and 4 Infrastructure Priorities for Sunbury South is oriented towards the continued roll out of infrastructure requirements as development proceeds, including additional signalised intersections to Sunbury Road and Vineyard Road.
- 6.2.8 From a regional perspective, the establishment of a northern link across Jacksons Creek to complete the Sunbury Ring Road and a new Rail station to serve North Sunbury is contemplated in the longer-term scenarios.

6.3 Lancefield Road

Stage 1 : (5 to 10 years)

- 6.3.1 SICADS identifies the key short term infrastructure requirement for Lancefield Road PSP is to provide intersections to facilitate access to expected initial development including;
- Racecourse Road at Elizabeth Drive
 - Lancefield Road at Belbethan Drive, and
 - Lancefield Road at Rolling Hills Drive
- 6.3.2 Plan 2 of SICADS shows the identified short-term priorities, with these applicable to Lancefield Road PSP shown in Figure 6.3Figure 6.3.

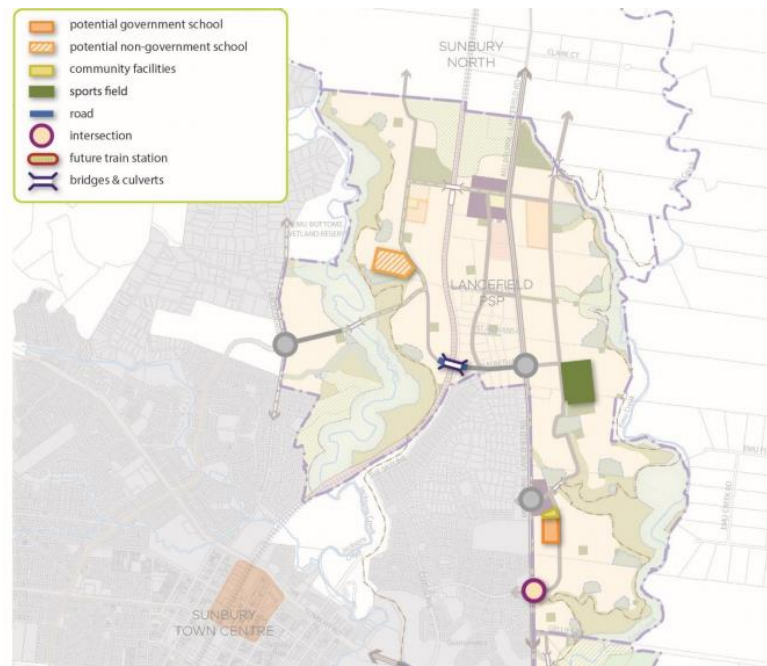
Figure 6.3 - Stage 1 Infrastructure Priorities (Lancefield Road)



Stage 2 (10+ years)

- 6.3.3 Stage 2 works identified in the Lancefield Road PSP are limited to the construction of a third signalised intersection to Lancefield Road at Sunningdale Avenue and the construction of the southern bridge of the Bendigo Rail line to provide initial access to land between the rail line and Jacksons Creek via Belbethan Drive.
- 6.3.4 Plan 3 of SICADS shows the identified medium-term priorities, with those applicable to Lancefield Road shown in Figure 6.4

Figure 6.4 - Stage 2 Infrastructure Priorities (Lancefield Road)



Stage 3 and 4 (25+Years)

- 6.3.5 The Stage 3 and 4 Infrastructure Priorities for Lancefield Road are oriented towards the continued roll out of infrastructure requirements as development proceeds, including construction of the northern signalised intersection to Lancefield Road and the eastern portion of the Northern link, including the northern bridge of the Bendigo Rail Line.
- 6.3.6 From a regional perspective, the establishment of the North Sunbury Station is identified in Stage 3.
- 6.3.7 Notably, the “northern link” crossing of Jacksons Creek to complete the northern portion of the Sunbury Ring Road is contemplated in the longer term (Stage 4) scenarios.

6.4 Selected Infrastructure Improvement 2016 – 2026

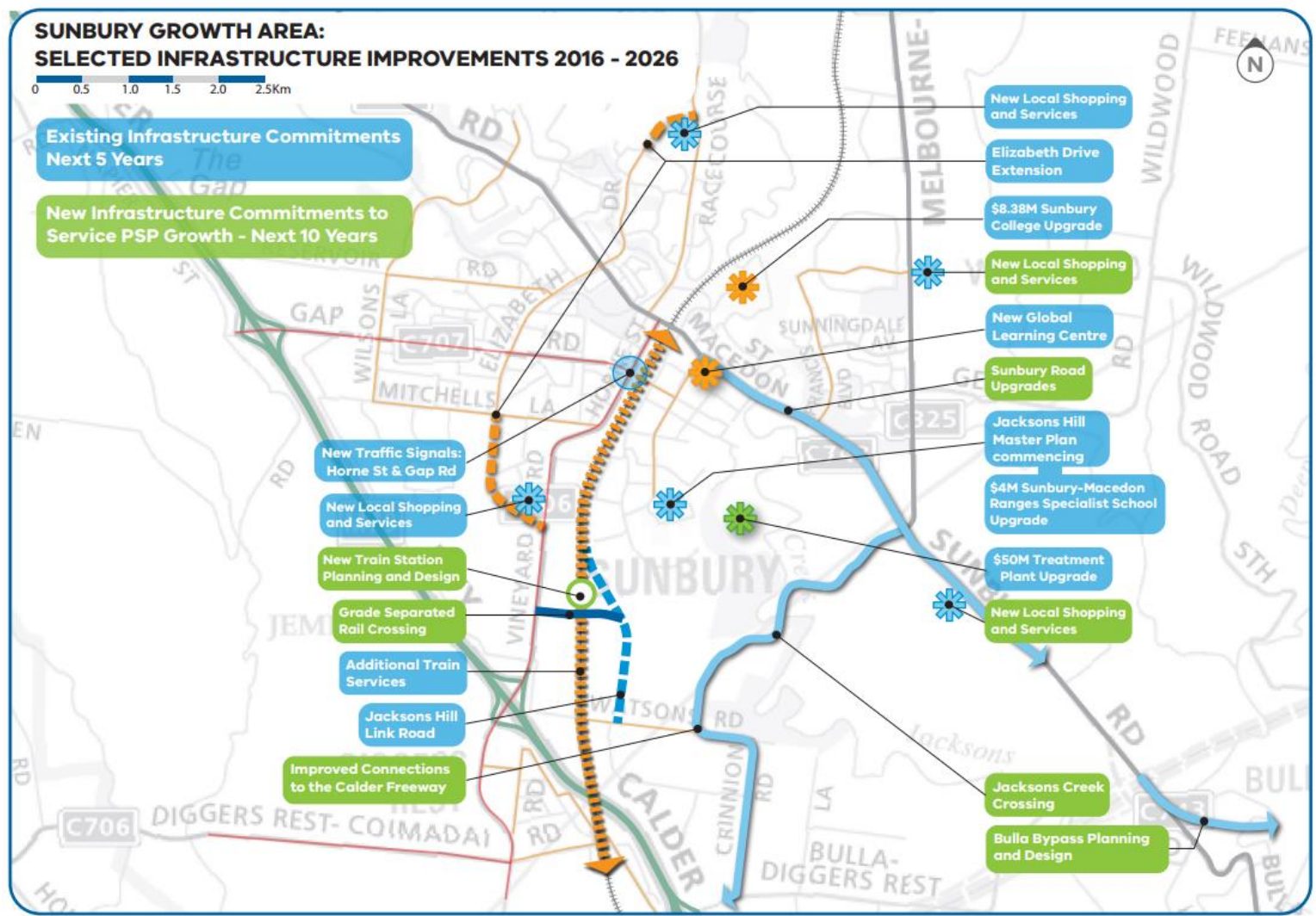
- 6.4.1 In November 2016, the VPA also released a document entitled “Planning for Sunbury’s Future”, which included a plan which identifies “selected infrastructure improvements 2016 – 2026.
- 6.4.2 The plan, which is largely consistent with the items identified as “short term” projects in SICADS is attached in Figure 6.5.

6.5 Review of SICADS

- 6.5.1 I have reviewed the Sunbury Infrastructure Co-ordination and Delivery Strategy 2016 prepared by the VPA and consider that it is an important document which provides a sound basis for staging of transport infrastructure in association with the continued growth and development of the Sunbury Diggers Rest Corridor.
- 6.5.2 I consider the identification of project priorities and nominated lead agencies and “development partners” for key projects to be an important mechanism for channeling ICP (and potentially GAIC) funding towards the delivery of key projects in the short term which will in turn, provide the platform for resolving existing connectivity issues in the Sunbury Growth Corridor as soon as possible, as well as mitigating traffic impacts of additional development.
- 6.5.3 In particular, the identification of the “southern link” crossing of Jacksons Creek and construction of alternate connections to Bulla Diggers Rest Road and the Calder Freeway to the south as priority projects reflects the clear and obvious benefits of delivering the link as soon as possible to relieve traffic pressure on Sunbury Road and Bulla Road to the south east.
- 6.5.4 In my view, the adoption of an infrastructure delivery strategy as contemplated by SICADS is highly desirable, identifying delivery priorities, likely funding sources, lead agencies and, if possible, “delivery partners”.
- 6.5.5 In my experience, the delivery of key items of transport infrastructure has been an issue in several Growth Corridors of Melbourne. Unlike other Growth Areas however, existing transport issues in the Sunbury Growth Corridor can be addressed in conjunction with the urban development of land within the Sunbury South PSP area and to a lesser extent Lancefield Road PSP through the establishment of new routes to resolve existing connectivity issues.
- 6.5.6 The adoption of an Infrastructure Delivery Strategy, in my view generally in accordance with SICADS, provides the opportunity to ensure that

important regional infrastructure such as the “southern link” is delivered as soon as possible to mitigate existing traffic issues and facilitate new development in both the Sunbury South and Lancefield Road PSP areas.

Figure 6.5 Sunbury Growth Area – Selected Infrastructure Projects (Source VPA November 2016)



7.1 Sunbury and Diggers Rest Growth Corridor Modelling 2015

- 7.1.1 GTA Consulting were commissioned by the VPA (formerly MPA) in consultation with VicRoads and Hume Council in 2015 to undertake strategic transport modelling of the Sunbury and Diggers Rest Growth Corridor to determine the transport demands expected to occur in association with the urban development of the Sunbury South and Lancefield Road PSPs.
- 7.1.2 The study focused on the transport network requirements of 75% and 100% of development of the two PSP areas by the year 2046, in association with parallel urban development elsewhere within the corridor. In particular the requirement was tested for additional east west road connections across Jacksons Creek and other transport infrastructure required to support the two PSPs.
- 7.1.3 Modelling was undertaken by adapting and building on the Victorian Integrated Transport Model (VITM) developed for the North Growth Corridor by SKM to reflect the land use and transport link options being considered for the two PSPs.
- 7.1.4 A number of key transport infrastructure items were considered and modelled, including the following:
- The construction of a southern link crossing of Jacksons Creek in PSP 1074 (Sunbury South)
 - Developmental a rail station at Jacksons Hill in PSP 1074.
 - The construction of a northern creek crossing of Jacksons Creek in PSP 1075 (Lancefield Road)
 - Development of a rail station in PSP 1075.
 - The construction of an additional road connection to the Calder Freeway south of PSP 1074.
 - Construction of the OMR by 2046.
- 7.1.5 Nine different combinations for provision of infrastructure were modelled assuming the land uses forecast for ultimate development by 2046 and an interim scenario of 75% of completion.
- 7.1.6 For each option, it was assumed that the Bulla Bypass was constructed to the south east.
- 7.1.7 The nine options tested are summarised in the following Table.

Table 7.1 – GTA Strategic Modelling– Options Tested (2046)

Option	Creek Crossing in PSP 1074	Railway Station in PSP 1074 (Jacksons Hill Station)	Creek Crossing in PSP 1075	Railway Station in PSP 1075 (Roes Road Station)	Additional Connection to Calder Highway south of PSP 1074	Comments
1	✓	✓	✓	✓		
2	✓	✓		✓		
3			✓	✓		
4				✓		
5	✓	✓	✓	✓	✓	
6	✓	✓	✓	✓	✓	No OMR
7	✓	✓		✓	✓	No OMR
8			✓	✓	✓	No OMR
9				✓	✓	No OMR

7.1.8 The modelled 2046 daily volumes for 7 key network links were extracted as Table 7.4, with the Link Volume Key Locations shown in Figure 7.1.

Figure 7.1 –GTA October 2015, Link Volume Key Locations

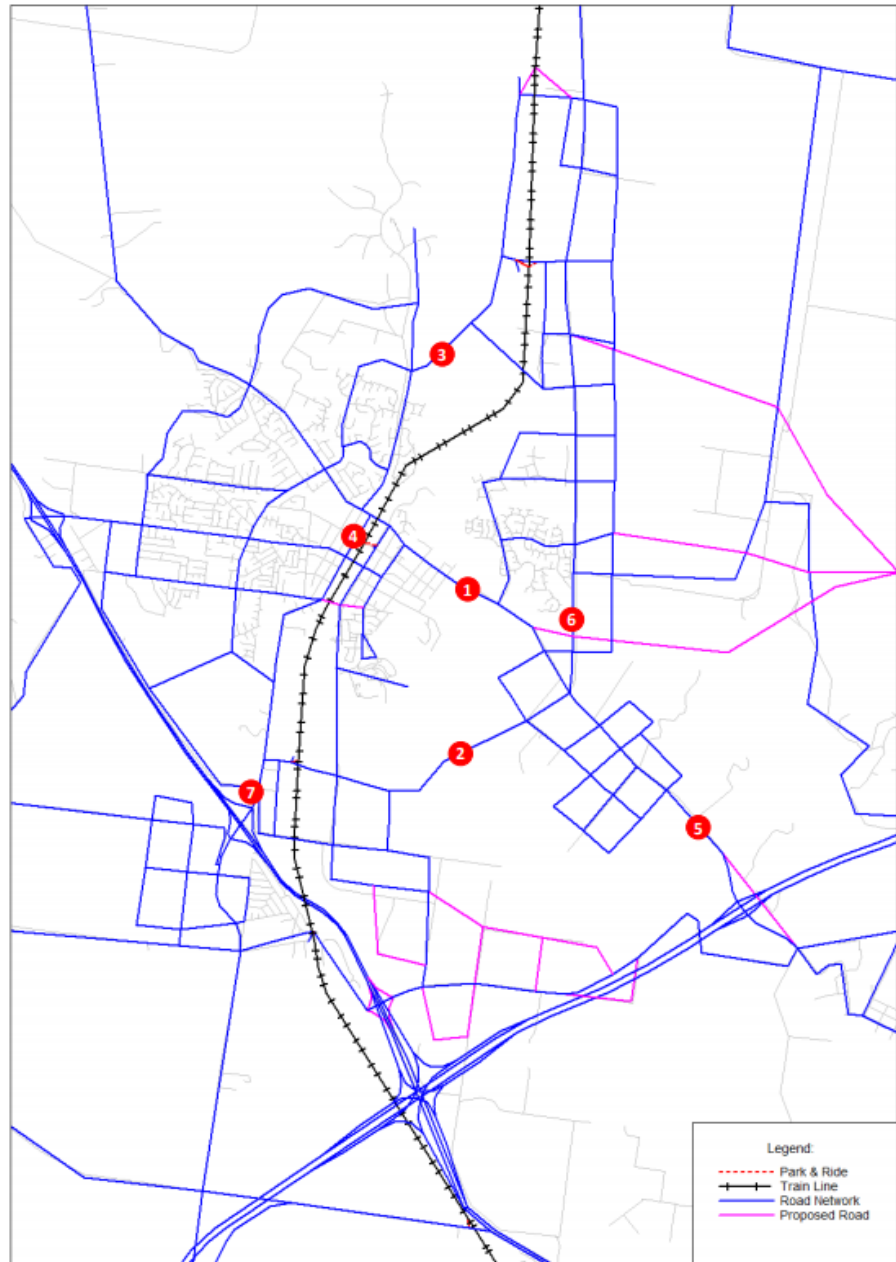


Table 7.2: Daily Volume Links – 2046 (two-way combined)

No	Road Name	2011	Opt1	Opt2	Opt3	Opt4	Opt5	Opt6	Opt7	Opt8	Opt9
1	Sunbury Road between Evans Street and Francis Boulevard	23,200	37,600	44,400	40,500	47,900	37,900	43,800	44,200	49,300	59,000
2	Jacksons Creek Crossing in Sunbury South PSP	-	10,600	11,200	-	-	11,100	20,800	21,500	-	-
3	Jacksons Creek Crossing in Lancefield Road PSP	-	14,300	-	15,200	-	14,300	17,400	-	18,700	-
4	Home Street between Gap Road and Riddell Road	16,300	24,100	24,200	26,900	24,600	24,000	28,000	27,800	33,100	32,800
5	Sunbury Road north of Bulla-Diggers Road	24,600	79,900	80,900	79,800	80,700	80,100	60,000	53,000	64,500	64,800
6	Melbourne-Lancefield Road south of Gellies Road	7,800	40,700	46,200	38,800	44,900	41,000	34,200	40,300	30,600	39,500
7	Vineyard Road north of interchange	17,900	53,300	53,200	54,600	54,400	52,300	60,700	63,300	59,500	59,000

- 7.1.9 The modelling also projected train station usage for the existing Sunbury Station and the two additional stations under consideration for each scenario, with daily patronage levels for each scenario tested summarised in Table 7.3.

Table 7.3 Sunbury Corridor – Modelled Rail Station Utilisation (Daily) (Source GTA Oct 2015)

Station		2011 Base	Interim Year	2046 Opt1	2046 Opt2	2046 Opt3	2046 Opt4	2046 Opt5	2046 Opt6	2046 Opt7	2046 Opt8	2046 Opt9
Sunbury South Station	Boarding	-	-	12,514	12,530	-	-	12,433	11,877	11,674	-	-
	Alighting	-	-	10,796	10,807	-	-	12,326	11,733	11,685	-	-
Sunbury Station	Boarding	5,212	12,341	8,872	9,106	12,426	12,687	8,831	10,189	10,418	13,547	13,855
	Alighting	4,372	12,862	9,213	9,565	11,028	11,417	9,131	10,615	11,017	12,154	12,526
Roes Road Station	Boarding	-	-	18,026	18,370	18,368	18,688	17,953	20,364	20,688	19,578	20,035
	Alighting	-	-	17,144	17,394	17,399	17,617	17,084	19,262	19,469	18,497	18,877
Total	Boarding	5,212	12,341	39,412	40,006	30,794	31,375	39,217	42,430	42,780	33,125	33,890
	Alighting	4,372	12,862	37,153	37,766	28,427	29,034	38,541	41,610	42,171	30,651	31,403

- 7.1.10 It is understood that the results of the modelling undertaken informed the preparation of the Sunbury South and Lancefield Road PSPs as exhibited, with the results, in my opinion, supporting the inclusion of the following infrastructure items in the Sunbury South PSP.

- the southern connector link across Jackson Creek;
- connections to the south to Watsons Road to provide an alternate link to Bulla Diggers Rest Road and the Calder Freeway via Fox Hollow Drive and Crinnion Road;
- connections to Jacksons Hill; and
- ultimate development of a railway station in South Sunbury.

7.2 Sunbury Growth Corridor DCP Modelling Supplementary Report 2017

Overview

- 7.2.1 GTA was subsequently commissioned in November 2016 by Villawood and Capitol Property Group to assess the impact of initial development of in PSP 1074 and 1075 and to model the likely impact of development on the existing road network but specifically to Sunbury Road and within the Sunbury Town Centre.
- 7.2.2 Options for mitigating works were considered in conjunction with initial development including:
- Do nothing (ie. no initial mitigating works)
 - Construction of the southern creek crossing and a link to Watson Road and the Calder Freeway via Bulla Diggers Rest Road
 - Duplication of the Bulla Bridge
 - Duplication of Sunbury Road between Bulla Diggers Rest Road and Wildwood Road, and
 - Duplication of Sunbury Road from Vineyard Road to Wildwood Road.
- 7.2.3 Scenarios tested represented 25% of development by 2021 (equivalent to 5000 additional lots in the PSP areas, and 8000 additional lots in the wider area) and 50% by 2026 (equivalent to 10,000 additional lots in the PSP areas and 16,000 overall).

- 7.2.4 Variations of the options were subsequently modelled for progressive development scenarios as shown in Table 2.1 of the November 2016 report reproduced in Table 7.4.

Table 7.4 – Modelled Options for Mitigating Works (Source: GTA Table 2.1 October 2016)

Description	Ref. Case	Do Nothing	Option				
			1	2	3	4	5
Development Assumed	0%	25% & 50%	25% & 50%	25% & 50%	25% & 50%	25%	25% & 50%
Jackson Creek Crossing (1 lane in each direction)			✓	✓			✓[1]
Bulla Bridge Duplication (2 lanes in each direction)				✓	✓		
Sunbury Road Duplication between Wildwood Road and Bulla – Diggers Rest Road (2 lanes in each direction)					✓		
Sunbury Road Full Duplication between Vineyard Road and Wildwood Road (2 lanes in each direction)						✓	

Ref. Case = Reference Case (no development in PSPs)

Development Assumed is for PSP's of Lancefield Road, Sunbury South, Sunbury North, Diggers Rest and Sunbury West

Note: Options 1 to 5 above are different to the Option numbering in the 2015 Report in Table 1.1

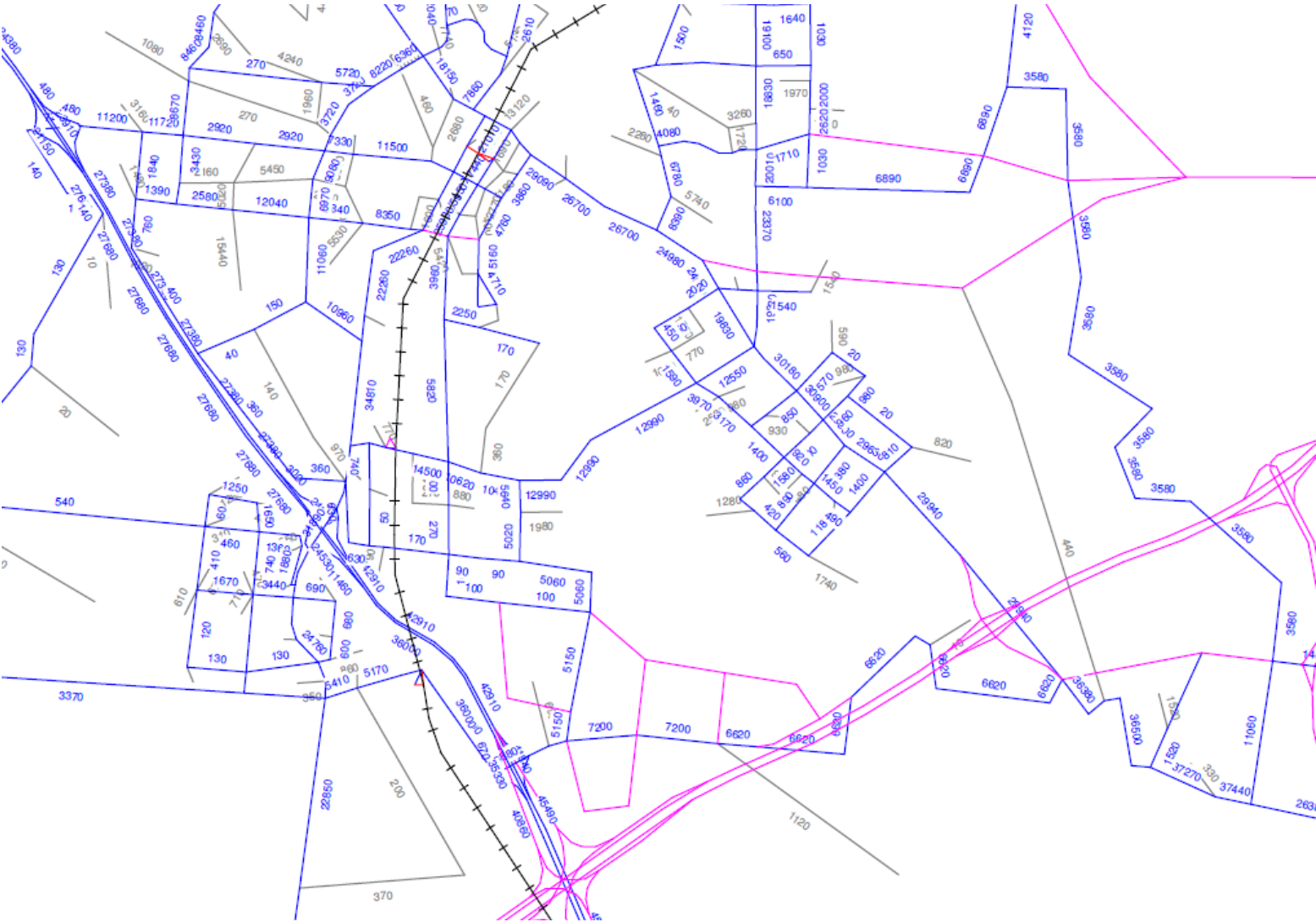
[1] Same scenario as Option 1, except for an at-grade railway level crossing.

- 7.2.5 The aim of the option testing was noted as being to model the relative benefit that potential new links or capacity increases would have on Sunbury Road south of Lancefield Road and on streets within Sunbury Town Centre.
- 7.2.6 Options 1 and 5 were designed to assess the implications of the construction of the southern creek crossing and connections to Watson Road and / or Vineyard Road, while Options 2, 3 and 4 were designed to assess the implications of capacity increases to Sunbury Road, through partial or complete duplication.
- 7.2.7 The report provides details of the analysis undertaken and concludes that the provision of the southern creek crossing Jacksons Creek and commensurate connections to the south via Watson Road as tested in Option 1, offers significant benefit resulting in a net reduction of traffic through Sunbury Town Centre and a shift in traffic movements towards the Calder Freeway, such that traffic increases on Sunbury Road south of Lancefield Road are avoided (or minimised).

Traffic Modelling of Southern Creek Crossing

- 7.2.8 Traffic modelling for Option 1 was undertaken, assuming 25% of development of the Sunbury South and Lancefield Road PSPs by 2021, and construction of the eastern section of the Southern Creek Crossing and connection to Watsons Road.
- 7.2.9 Development of 8,000 additional lots is assumed by 2021 in the Sunbury / Diggers Rest Corridor, including 5000 new dwellings in the Sunbury South and Lancefield Road PSPs, generating additional volumes of 39,784 vehicle movements per day or 7.96 movements per dwelling per day.
- 7.2.10 Modelled 2021 daily volumes with the southern creek crossing in place are provided in the Appendix to the report reproduced in part in Figure 7.2.

Figure 7.2 Daily Volume Plot – Sunbury Growth Corridor Option 1 – 25% Development Scenario (Source GTA November 2017)



7.2.11 The preceding plot shows the following daily volumes on key links, compared with 2016 volumes.

Table 7.5 – GTA Modelled 2021 Daily Volumes – Option 1 v Existing

Road	Section	2016	Modelled 2021
Sunbury Road	Nth of Bulla Diggers Rest Rd	26,700 vpd	29,900 vpd
Vineyard Road	North of Calder Freeway	-	34,800 vpd
Bulla Diggers Rest Road	East of Calder Freeway	-	7,200 vpd
Southern Ring Road	South of Sunbury Road	--	12,500 vpd

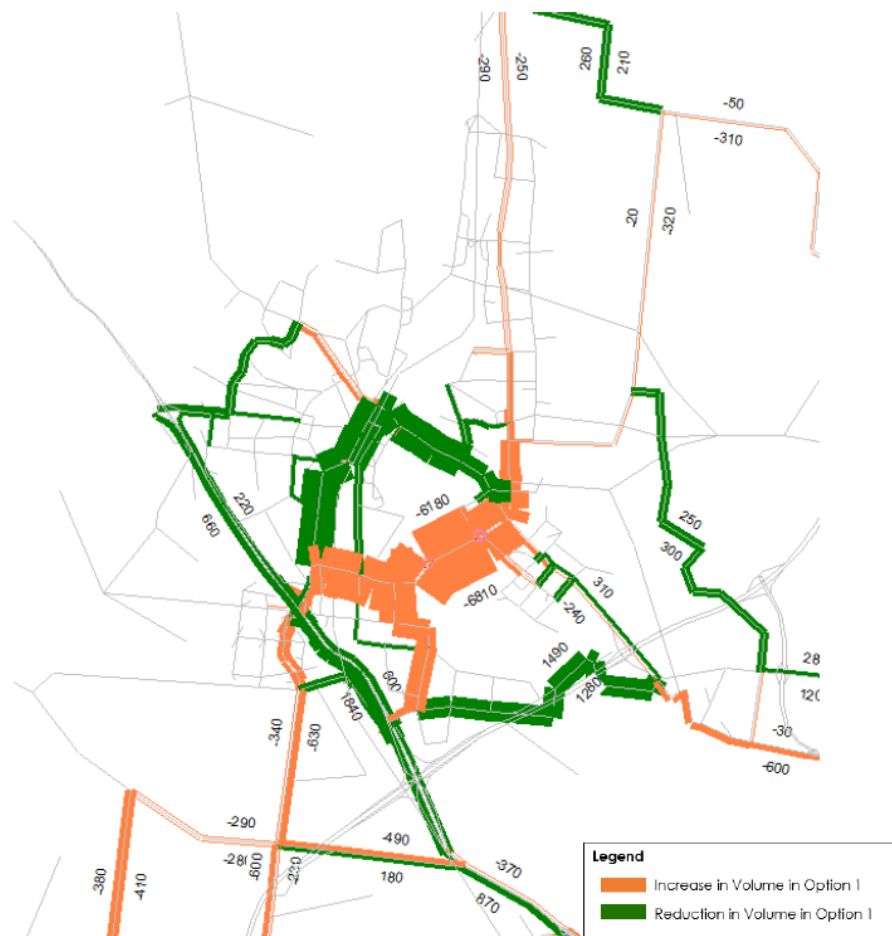
7.2.12 The modelling shows that a southern link is likely to attract in the order of 12,500 vehicle movements per day, resulting in moderation of traffic growth on Sunbury Road and Vineyard Road, and a reduction in traffic movements through Sunbury Town Centre.

7.2.13 The net changes to daily volumes are illustrated in Figure 3.1 of the GTA report and reproduced in Figure 7.3.

7.2.14 The results indicate that the construction of the southern Jackson Creek crossing can be expected to:

- Reduce traffic volumes through Sunbury Town centre by up to 10,000 vehicles per day.
- Reduce traffic on Bulla Diggers Rest Road south of Sunbury Road by up to 3,000 vehicles per day.
- Moderate traffic growth on Sunbury Road by providing a direct access to the Bulla Diggers Rest interchange to the Calder Freeway.

Figure 7.3 Daily Volume Changes 2021 (Option 1 vs Do Nothing) – Source GTA 2017 Fig 3.1)



Sunbury Road Duplication

7.2.15 The GTA analysis also tested the implications of the duplication of Sunbury Road in the 2021 (25% Development Scenario), including consideration of the following, assuming the southern Jackson Creek link is not constructed:

- Full duplication between Macedon Street west of Jacksons Creek in Sunbury to Wildwood Road east of Bulla.
- Duplication only between Bulla Diggers Rest Road and Wildwood Road.
- Duplication of the Bulla Bridge only.

7.2.16 The modelling showed that, if undertaken in isolation, upgrading of the capacity of Sunbury Road would result in negligible improvements to operation of the overall network, with additional capacity achieved being absorbed by development traffic.

7.2.17 In particular, duplication of Sunbury Road without construction of the southern Jackson Creek link, has little impact on reducing traffic volumes within Sunbury Town Centre.

8.1 Overview of Existing Situation

- 8.1.1 The Sunbury Diggers Rest Growth Corridor is extremely well located in transport terms, having regard to its accessibility to both the metropolitan and state freeway network and the rail network providing direct access to central Melbourne and regional Victoria via Sunbury Rail Station.
- 8.1.2 The progressive development of the Sunbury area has resulted in establishment and growth of commercial, retail and community facilities which provide a strong base for serving the proposed planned future growth of Sunbury. Further development of the Town Centre and establishment of new Activity Centres and employment area will continue to contain generated traffic in a manner which is often difficult to achieve in establishing growth areas elsewhere in Melbourne.
- 8.1.3 While the Sunbury Growth area enjoys excellent access to transport options, a number of physical constraints have resulted in a truncated transport network whereby movements are currently concentrated to a limited number of links and connections, which result in congested traffic conditions being experienced, particularly at peak periods.
- 8.1.4 Particular issues which have been identified are discussed as follows.

East West Connections across the Bendigo Melbourne Rail Line

- 8.1.5 The Bendigo Melbourne Rail line runs in a north south direction through Sunbury, with only two connections currently available between the eastern and western sections of the town:
 - A level crossing at Station Road providing two traffic lanes in each direction between the roundabout at Horne Street to the west and the signalized intersection at Evans Street to the east.
 - A grade separated crossing at Macedon Street providing a bridge over the rail line between roundabouts at Horne Street / Riddell Road to the west and Evans Street to the east.
- 8.1.6 The limited capacity of the two connections results in restricted access to the Town Centre from areas to the west of the rail line and similarly poor access to Vineyard Road and the Calder Freeway interchange from areas to the east.
- 8.1.7 Both connections experience high levels of congestion during peak periods throughout the day.
- 8.1.8 The lack of a connection across the rail line south of Station Road has long been considered an issue in relation to access to the Jacksons Hill Precinct, with the Local Structure Plan adopted for the development of the Precinct identifying the need for a new connection to be the west to be provided utilising an existing railway viaduct bridge. That connection has proved to not be achievable, and all access to Jackson Hill remains restricted to movements from the north via the Town Centre and Station Road.

Jacksons Creek

- 8.1.9 Jackson Creek runs north south through Sunbury providing a further restriction to east west movements.

- 8.1.10 At present only one crossing point of Jacksons Creek is available via a two lane bridge along Macedon Street.
- 8.1.11 Consequently, all eastbound access from areas of Sunbury west of the creek, including Jacksons Hill and the Town Centre is concentrated to Macedon Street.
- 8.1.12 Similarly, the Goonawarra area west of Lancefield Road has limited access to the Town Centre, West Sunbury and connections to the Calder Freeway at Vineyard Road and Gap Road restricted by the capacity of the single two-lane bridge at Macedon Street.

Sunbury Road / Bulla Road

- 8.1.13 Sunbury Road provides one of two direct connections between Sunbury Town Centre and its existing residential communities and the balance of Metropolitan Melbourne.
- 8.1.14 East of Macedon Street, Sunbury Road has an undivided carriageway, providing essentially of two east bound traffic lanes and a single westbound lane to the Francis Boulevard roundabout, reverting to a single traffic lane in each direction to just west of Shepherd Lane, where it widens to a four lane undivided carriageway to the Bulla Diggers Rest Road roundabout.
- 8.1.15 South of Bulla Diggers Rest Road, Sunbury Road becomes Bulla Road and has an undivided cross-section with steep grades and a winding horizontal geometry, crossing Deep Creek at a two lane bridge prior to rising through Bulla Township, connecting to the Tullamarine Freeway north of Melbourne airport.
- 8.1.16 Sunbury Road / Bulla Road carries approximately 30,000 vehicles per day catering for traffic movements from both Sunbury and the Romsey / Clarkefield areas via Lancefield Road.
- 8.1.17 The route is characterised by congested traffic conditions at peak periods, particularly through Bulla, exacerbated by the horizontal and vertical geometry and the concentrations of traffic resulting from limited alternate connections for east Sunbury to the Calder Freeway.

8.2 Opportunities afforded by the Sunbury South and Lancefield Road PSPs

- 8.2.1 Background studies prepared in association with the development of the Sunbury / Diggers Rest Corridor Plan and the subsequent Sunbury South and Lancefield Road PSPs now under consideration, recognise the physical constraints in the existing transport network serving Sunbury and the surrounding area.
- 8.2.2 The studies however clearly identify the opportunities made available through the urban development of the PSP areas including land to the south and north of Sunbury, to provide for improved connections to address existing constraints and accessibility issues.

Sunbury South

- 8.2.3 The Sunbury South PSP encompasses land which runs to the east of Vineyard Road, south of Jacksons Hill and across Jacksons Creek and hence to the east of Sunbury including land on the east side of Lancefield Road to Gellies Road.

- 8.2.4 The rezoning of this land for urban development and the consequent requirement to construct new roads and connections to support development, provides the only realistic opportunity to facilitate and fund key “missing” transport links which constrain movement across and around Sunbury currently.
- 8.2.5 Within Sunbury South, as shown in the exhibited Urban Structure Plan and Street Network Plan, this includes the following projects which not only benefit the proposed community of Sunbury South, but the wider existing area:
- The construction of a new road between Sunbury Road and Vineyard Road providing a southern crossing of Jacksons Creek and ultimately a grade separated crossing of the rail line to Vineyard Road.
 - Construction of improved connections to the south to Bulla Diggers Rest Road providing alternate access to the Calder Freeway from Jacksons Hill and existing areas in the Goonawarra area.
 - The opportunity to develop a new railway station in Sunbury South linking to central Melbourne to take advantage of additional capacity within the rail network resulting from the Melbourne Metro Rail Project.
 - Sufficient funding through an ICP to largely fund the projects as well as significant regional intersection upgrades such as the ultimate development of Sunbury Road / Lancefield Road.
 - The opportunity through GAIC funding to facilitate regional improvements such as the duplication of Sunbury Road and possibly the Bulla Bypass.
 - Develop new Activity Centres within the Sunbury South PSP, including the Redstone Hill Major Activity Centre, which will provide convenient facilities for not only the proposed growth areas but also to existing residents of East Sunbury and reduce the intensity of traffic movements to and through the existing Sunbury Town Centre.
- 8.2.6 As evidenced by the traffic modelling undertaken, the development of these transport improvements, particularly the initial construction of the southern Jackson Creek crossing, will provide a net community benefit, offsetting additional traffic generated by the urban development within the Sunbury South PSP.

Lancefield Road PSP

- 8.2.7 The Lancefield Road PSP encompasses land which runs to the east of Racecourse Road, and across Jacksons Creek and hence to the east of Sunbury including land on both sides of Lancefield Road.
- 8.2.8 The rezoning of this land for urban development and the consequent requirement to construct new roads and connections to support development, provides the only realistic opportunity to facilitate and fund key “missing” transport links which constrain movement across and around Sunbury currently.
- 8.2.9 Within the Lancefield Road PSP, as shown in the exhibited Urban Structure Plan and Street Network Plan, this includes the following projects which not only benefit the proposed community, but the wider existing area:

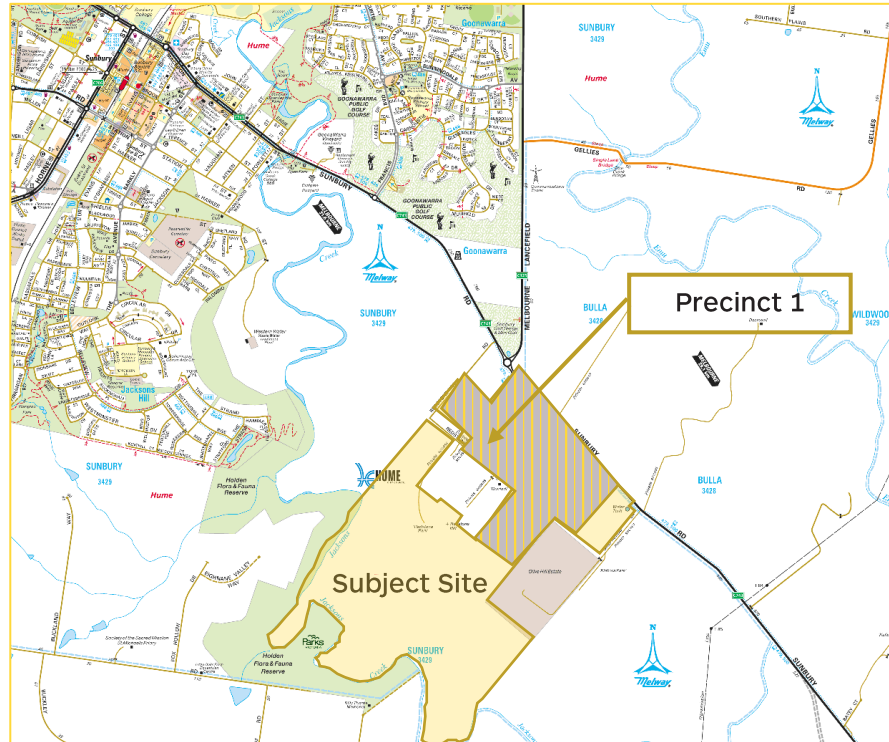
- The construction of a new road between Racecourse Road and Lancefield Road providing a northern crossing of Jacksons Creek and two grade separated crossings of the Bendigo Rail line to rail line to Lancefield Road.
- The opportunity to develop a new railway station in Sunbury North linking to central Melbourne to take advantage of additional capacity within the rail network resulting from the Melbourne Metro Rail Project.
- Sufficient funding through an ICP to fund the projects as well as significant regional intersection upgrades such as the ultimate development of Sunbury Road / Lancefield Road.
- The opportunity through GAIC funding to facilitate regional improvements such as the duplication of Sunbury Road and possibly the Bulla Bypass.
- Develop new Activity Centres within the Lancefield Road PSP, which will provide convenient facilities for not only the proposed growth areas but also to existing residents of Goonawarra and Rolling Hills and reduce the intensity of traffic movements to and through the existing Sunbury Town Centre.

8.2.10 As evidenced by the traffic modelling undertaken, the development of these transport improvements will provide a net community benefit, offsetting additional traffic generated by the urban development within the Lancefield Road PSP

9.1 Redstone Hill Precinct 1

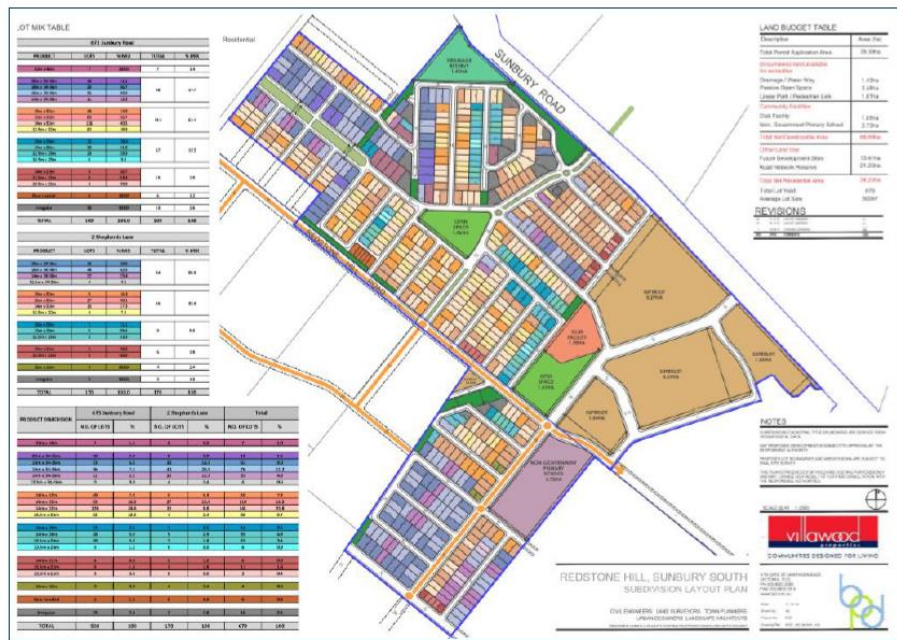
- 9.1.1 Precinct 1 of the Redstone Hill Development is located on the south west side of Sunbury Road east of Redstone Hill Road as shown in Figure 9.1.

Figure 9.1 – Redstone Hill Precinct 1 Site Location



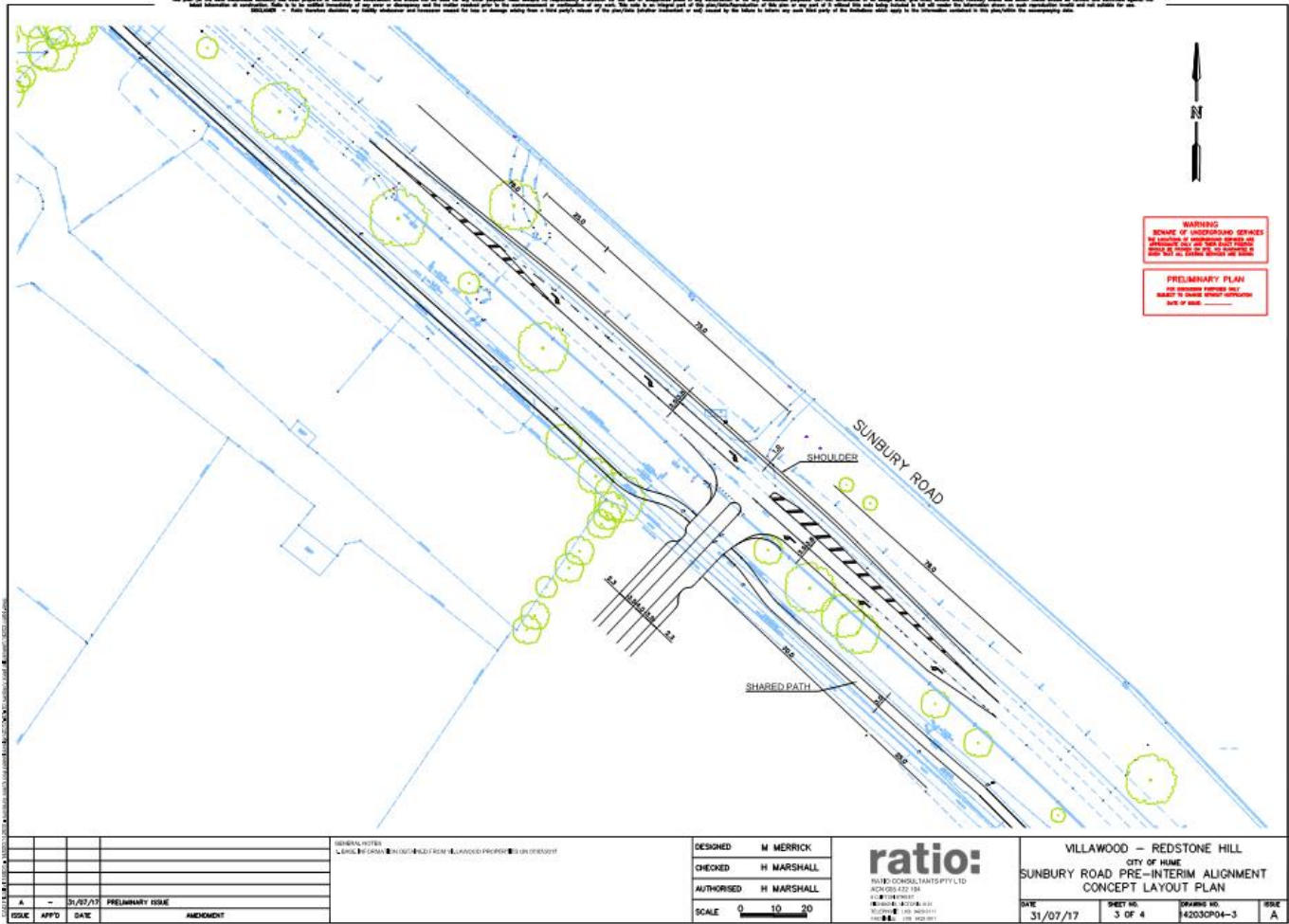
- 9.1.2 As shown, the site is part of a larger overall land parcel which has a frontage of approximately 1.3 kilometers to Sunbury Road, a depth of 2 kilometers and an overall area of 273 hectares. The overall site borders Jacksons Creek to the south east.
- 9.1.3 A preliminary development plan for the overall site indicates that ultimately it will contain:
- approximately 2000 residential lots;
 - a Major Town Centre with up the 25,000 sqm of floor area,
 - community facilities including active and passive open space, and non-government private schools.
- 9.1.4 The Precinct 1 application consists of land known as 675 Sunbury Road and 80 Redstone Hill Road and comprises approximately 78.39 hectares of residential development in the north-west corner of the site and to the east of Redstone Hill Road.
- 9.1.5 The proposed Precinct 1 Development Plan proposing 679 residential lots is shown in Figure 9.2.

Figure 9.2 – Redstone Hill Precinct 1 Development Plan



- 9.1.6 It is noted that the Precinct 1 land abuts the proposed Redstone Hill Major Town Centre, which will be the subject of a future planning permit application.
- 9.1.7 It is proposed that initial access to Precinct 1 will be provided via a new fully directional access point to Sunbury Road, located approximately 450 metres south east of the Lancefield Road intersection.
- 9.1.8 The access is proposed to allow fully directional movements into and out of the estate from Sunbury Road, facilitated by auxiliary left and right turn lane treatments in Sunbury Road as shown in Fig 9.3.
- 9.1.9 Ultimately, when Sunbury Road is duplicated, the proposed initial access intersection will revert to left in / left out only, as shown in the Sunbury South PSP Street Network Plan shown previously in Figure 4.2.
- 9.1.10 In my opinion, right turn movements out into Sunbury Road will need to be prevented prior to duplication or safety and capacity reasons, with south east bound traffic at that stage facilitated by left turn out movements and U-turns at The Lancefield Road / Sunbury Road roundabout located 450 metres to the north west.

Figure 9.3 – Sunbury Road Pre-interim Connector Road Access



- 9.1.11 As subdivision proceeds to the north-west, access to Precinct 1 will become available via the north west / south east portion of Redstone Hill Road, which will then provide the opportunity for secondary access to Sunbury Road via the Redstone Hill Road / Sunbury Road intersection, located approximately 170 metres north west of the Lancefield Road intersection.
- 9.1.12 In addition, in conjunction with the initial development of the Redstone Hill Major Town Centre immediately to the south east, of Precinct 1, a new signalised intersection to Sunbury Road will be constructed as contemplated in the Sunbury South PSP and the Precinct Infrastructure Plan.
- 9.1.13 I am instructed that it is likely that initial development of the Town Centre in the form of a supermarket and associated retail tenancies is expected to occur by 2022 and, at that time, connector road access to the proposed signalised intersection will be provided to provide alternate access to the Precinct 1 residential neighborhoods.
- 9.1.14 It is noted that, the Redstone Hill land holdings does not include land on the south west side of Sunbury Road between Redstone Hill Road and the Lancefield Road intersection.
- 9.1.15 As such the development of the future southern leg of the Lancefield Road intersection, forming the initial section of the Sunbury Ring Road, is not possible in association with initial development of the Redstone Hill area, and cannot be facilitated until such time as the land parcel opposite Lancefield Road (which is currently in separate ownership) is developed by others.
- 9.1.16 It is also noted that the proposed alignment of the Southern Ring Road, south of Sunbury Road passes initially through this land, linking the south west / north east section of Redstone Hill Road prior to continuing to the south west to the proposed crossing point of Jacksons Creek.
- 9.1.17 The proposed alignment of the Sunbury Ring Road, including the initial connection from Lancefield Road to Redstone Hill Road and the road reserve widening of Redstone Hill Road proposed on the north-west side, required to construct the Boulevard Connector cross-section nominated for the route, is all located outside of the Redstone Hill land holding.

9.2 Cardno Application Report

- 9.2.1 The Redstone Hill Precinct 1 Application was supported by a Traffic and Transport Assessment Report prepared by Cardno dated 14th December 2015.
- 9.2.2 I was employed by Cardno at that time but was not directly involved in the preparation of the report.
- 9.2.3 The Cardno assessment assessed initial development of Redstone Hill for up to 815 residential lots, although the Precinct 1 application contained 670 lots. It was noted that the analysis would ensure that initial access options tested would continue to operate satisfactorily beyond the completion of Stage 1.
- 9.2.4 The analysis was undertaken adopting the following methodology:
- Establishment of base traffic conditions established from counts undertaken at the intersection of Sunbury Road and Lancefield Road on Friday 17th July 2014

- Adoption of a traffic generation rate of 8.7 vehicle movements per dwelling per day sourced from case study data collected at a similar residential subdivision in Werribee
- Development of a trip distribution matrix for the proposed residential subdivision based on trip types identified in the Victorian Integrated Survey of Travel and Activity undertaken by the Department of Transport in 2007 and 2008 and the location of work places and local facilities.
- Based on this data, adoption of the assumption that all generated trips would initially be external to the site (to and from Sunbury Road) and that 60% of trips would be generated to and from existing facilities and services to the north west (located within Sunbury) and 40% to the south east (to the broader metropolitan area).
- Adoption of a compound growth rate of 3% per annum for base traffic on Sunbury Road, based on advice from VicRoads.
- Subsequent increases in traffic volumes assuming a development rate of 150 lots per annum to 2021.
- Assessment of the operation of the initial intersection to Sunbury Road using SIDRA, to test the operation of the intersection and required timing of upgrades and development of additional access points.

9.2.5 Based on the analysis undertaken, the following access strategy was identified and recommended.

1. Provide interim access via a fully directional access to Sunbury Road, located approximately 450 metres south east of Lancefield Road, designed to provide access for up to 200 occupied lots.
2. Undertake a review of traffic conditions following completion of 150 lots in order to determine the need or otherwise to restrict traffic movements (right turns out in particular) and the most appropriate second point of access and staging of access at hat time.

9.2.6 It is understood that, in association with the preparation of the Cardno TIAR report, that consultation was undertaken with VicRoads in relation to the methodology adopted, appropriate growth rates to be applied to Sunbury Road traffic volumes and the access strategy proposed.

9.3 GTA Modelling of Interim Conditions

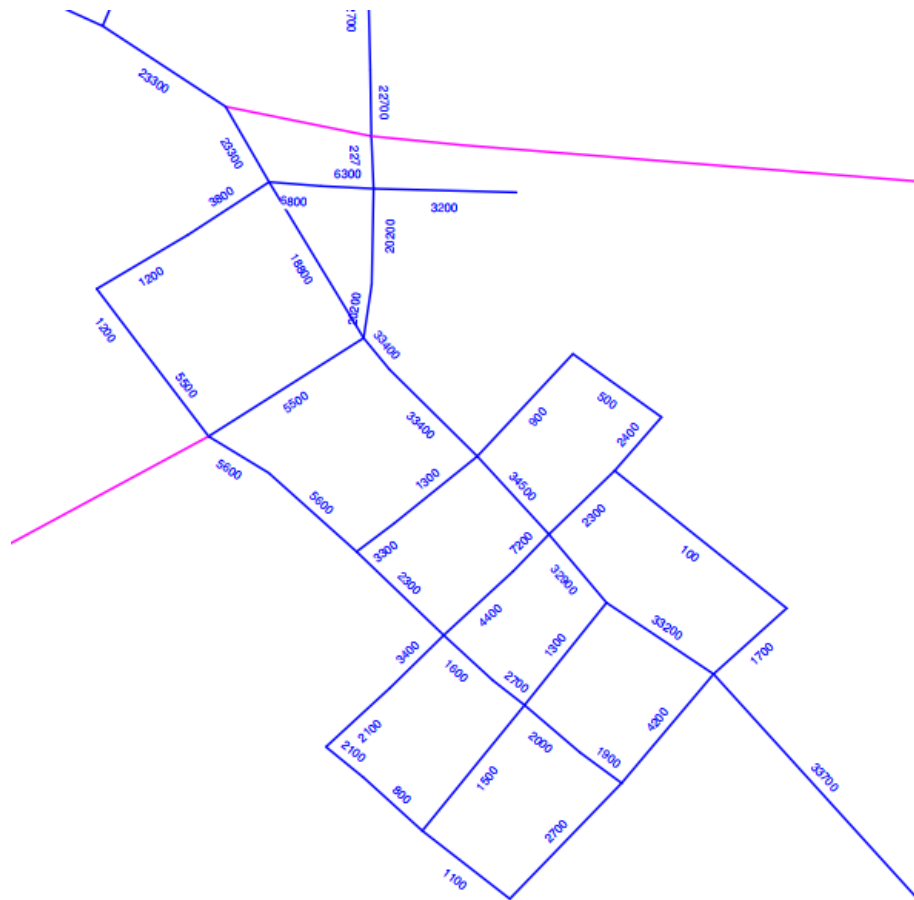
9.3.1 Traffic modelling undertaken by GTA in the “Strategic Transport Modelling of the Sunbury and Diggers Rest Growth Corridor” report prepared in October 2015, discussed in Section 7.1 above, as well as modelling various options for infrastructure provision in the 2046 Ultimate Development Scenarios, also tested one scenario under interim (2031) conditions.

9.3.2 This option tested development of 75% of the Sunbury South and Lancefield Road PSP areas by 2031, without construction of either the southern or northern additional crossings of Jacksons Creek contemplated by the completion of the Sunbury Ring Road.

9.3.3 The modelling for the interim scenario assumes that the Bulla Bypass and the full duplication of Sunbury Road has been undertaken by 2031.

- 9.3.4 The GTA modelled 2031 daily volumes in the vicinity of Sunbury Road / Lancefield Road and within the Redstone Hill are shown in Figure 9.3.

Figure 9.3 – GTA Strategic Modelling – Interim (2031) Daily Traffic Volumes



- 9.3.5 The modelling shows that, without the construction of the southern creek crossing, volumes on Sunbury Road will increase to 33,400 vpd south of Lancefield Road.
- 9.3.6 Traffic volumes on a new southern leg to the Lancefield Road / Sunbury Road intersection (without a connection across Jackson Creek) are modelled at 5,500 vpd, while the Town Centre access road carries 7,200 vehicle movements per day.
- 9.3.7 GTA concluded, based on the analysis of the 2031 interim scenario that the construction of the two creek crossings to complete the Sunbury Ring Road would “provide more flexibility in the network and reduce volumes in the town centre. Notwithstanding, the results demonstrate that the two PSPs are able to function regardless of the introduction of the river crossings”.

9.4 Review of Traffic Analysis Undertaken and Proposed Access Strategy

Access to Sunbury Road

- 9.4.1 In order to provide a basis for a review of the traffic analysis undertaken in 2015 in support of the Redstone Hill Section 96A application, updated traffic movement counts were conducted by Ratio at the intersection of Lancefield Road and Sunbury Road on Thursday 22nd June 2017.
- 9.4.2 A comparison between the June 2017 counts and the July 2014 surveys undertaken by Cardo and used for analysis purposes is provided in Table 9.1.

Table 9.1: Peak Hour Traffic Volume Comparison

Approach	Movement	AM Peak 2014	AM Peak 2017	Difference	PM Peak 2014	PM Peak 2017	Difference
North	Right	27	53	26	35	78	43
	Left	432	444	12	105	127	22
East	Right	70	65	-5	368	274	-94
	Through	282	201	-81	849	814	-35
West	Left	30	34	4	47	84	37
	Through	920	957	37	298	297	-1
Total Intersection Movements		1761	1754	-7	1702	1674	-28

- 9.4.3 As shown in the preceding table, the traffic volumes are very similar to the counts undertaken 3 years ago with a slight decrease in traffic volumes in both the AM peak hour and the PM peak hour.
- 9.4.4 Peak hour traffic movements on Sunbury Road and Lancefield Road recorded in 2017 are summarised in the following table:

Table 9.2: Through Volumes on Sunbury Road and Lancefield Road 2017

Road	Peak	Eastbound Northbound	Westbound Southbound	Total
Sunbury Road, south east of Lancefield Rd	AM Peak	1401	266	1667
	PM Peak	424	1088	1512
Lancefield Road, north of Sunbury Road	AM Peak	99	497	596
	PM Peak	358	205	563

- 9.4.5 Traffic volume data collected in 2017 shows no appreciable increase in traffic volumes on Sunbury Road south east of Lancefield Road during the AM and PM peak periods since 2014, despite expected growth in overall traffic in the Sunbury area during that period.
- 9.4.6 Based on the review of this data, it is considered that the traffic analysis undertaken by Cardno as a means of testing the proposed access strategy, assuming that traffic volumes on Sunbury Road will increase by 3% per annum compound, is very conservative.
- 9.4.7 As such, the recommended “trigger” of 150 occupied dwellings for additional analysis to be undertaken to test the requirement for modifications to the initial access and for a second access to be considered is likely to be conservative.
- 9.4.8 Nevertheless, I am comfortable that the proposal that additional traffic analysis be undertaken when 150 lots are occupied to determine the ongoing access requirements provides a sufficiently robust basis for further assessment.
- 9.4.9 In my opinion, while the analysis demonstrates that fully directional access can be accommodated for up to 200 lots in capacity terms, from a road safety perspective, it is preferable for the initial intersection to be confined to left in and right in, but left out only.
- 9.4.10 The prevention of right turns out is satisfactory in accessibility terms given the location of the proposed intersection in close proximity to the existing Lancefield Road roundabout, allowing city bound traffic to conveniently perform a u-turn before preceding back to the south east.
- 9.4.11 The initial recommended restriction to left out only has the added advantages of:
- Avoiding potential safety issues of right turns out seeking to pick gaps in the south east bound traffic stream during the morning peak period.
 - Avoiding potential difficulties of subsequently implementing a right turn ban after development of say 200 lots.
 - The strategic advantage of initially directing exiting traffic away from Sunbury Road and Bulla Road.
 - The likelihood that in excess of 200 lots could be accommodated prior to a second access point being required.

Development of Southern Creek Crossing

- 9.4.12 It is clear from the traffic modelling undertaken, that the early development of a southern crossing of Jacksons Creek, and the subsequent connections to Bulla Diggers Rest Road and the Calder Freeway interchange, provides significant traffic improvements to the Sunbury area by reducing traffic intensity on Sunbury Road and reduction traffic through Sunbury Town Centre.
- 9.4.13 On this basis, I agree with the recommendations implicit in the Sunbury Infrastructure and Coordination Strategy, that the early delivery of this link should be pursued as a short-term priority, and as a focus for initial expenditure of ICP funding.
- 9.4.14 It is noted however that the development of the link between Sunbury Road and the Jacksons Creek crossing through works in kind is not a feasible option in association with the development of Redstone Hill.

- 9.4.15 This is recognized in the Table 2 of the draft SICADS which suggests that construction of the link between Sunbury Road and Jacksons Creek be undertaken by Council in partnership with Capital Projects, utilising ICP funds.
- 9.4.16 It is also noted that the Strategy recommends that contribution to the proposed connection through upgrading of Watsons Road and Crinnion Drive be undertaken by Council in partnership with Villawood, utilising ICP funds.
- 9.4.17 In my opinion, use of ICP funding generated by development of Redstone Hill Precinct 1 for the construction of Watson Road and Crinnion Road, while ultimately providing a valuable contribution to the delivery of the overall southern connection, is only useful in improving access to the area if the construction of the southern connector and the creek crossing is already in place.

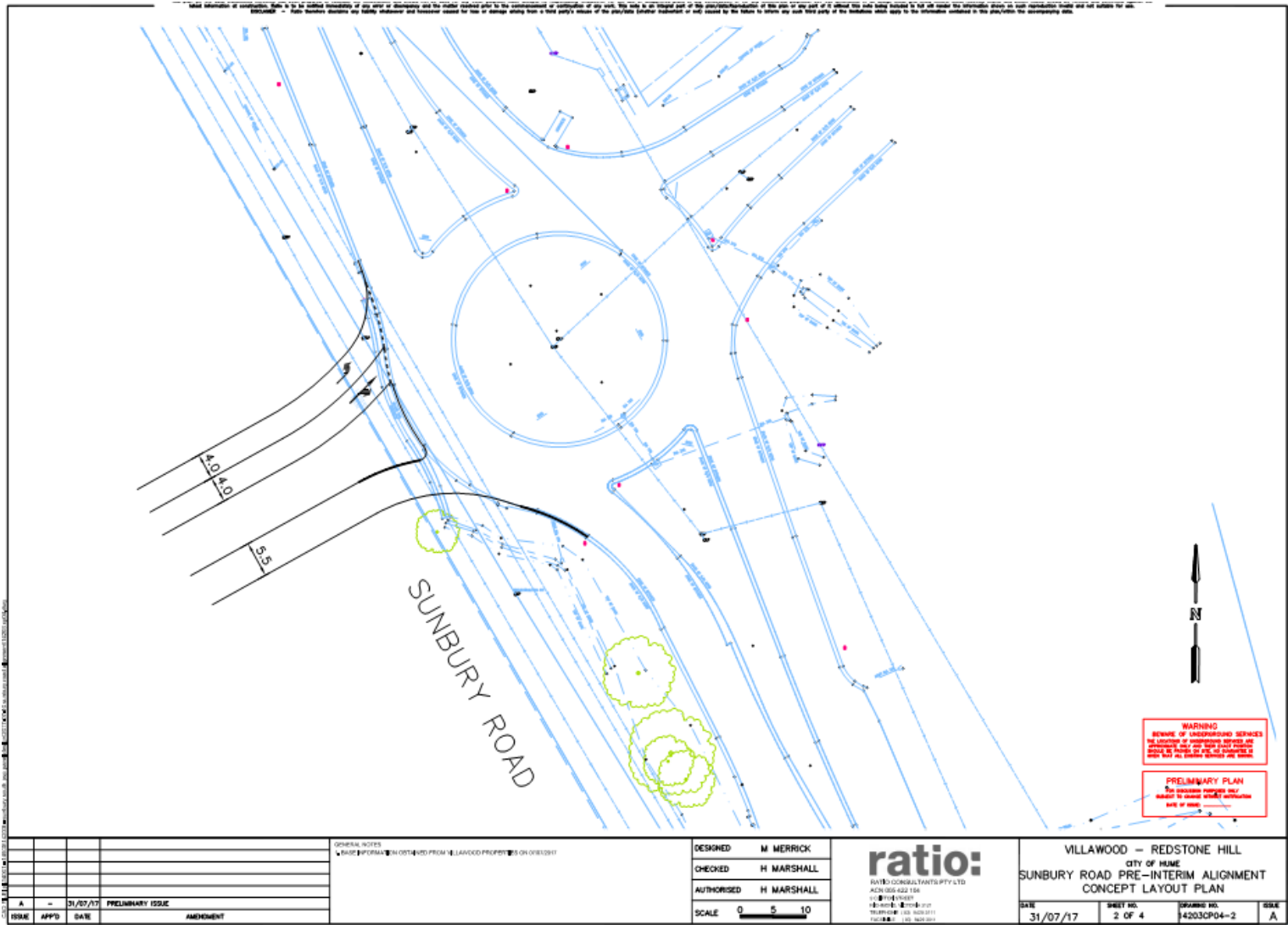
9.5 Traffic Implications of Proposal and Required Accommodating Works

- 9.5.1 Access to Redstone Hill Precinct 1 will initially be directed to Sunbury Road with the access strategy proposed outlined in Section 8.1 above.
- 9.5.2 Over time, as development within Sunbury South proceeds, the southern crossing of Jacksons Creek will be developed and alternate access to the south west made available, initially through connections to Watson Road and Bulla Diggers Rest Road and ultimately to Vineyard Road through construction of a grade separated crossing of the Sunbury Rail line.
- 9.5.3 Modelling undertaken shows that, with these connections in place, a more permeable transport network will be established resulting in not only traffic generated by the development of Sunbury South being accommodated, but a net overall improvement to regional traffic conditions.
- 9.5.4 Analysis undertaken by Cardno shows that traffic generated by Redstone Hill can be accommodated by progressive provision of intersections to Sunbury Road as proposed.
- 9.5.5 Sunbury Road to the south east has limited capacity to absorb additional traffic at peak times as evident from the stable peak hour traffic volumes recorded between 2014 and 2017. It is likely that this will continue as development of Sunbury South proceeds, with generated traffic absorbed through spreading of peaks and redistribution of existing trips as available capacity is absorbed by additional development.
- 9.5.6 Ultimately this will be relieved by construction of the southern creek crossing and connections to the south and south west, with peak hour capacity issues to the south east addressed over time by the construction of the Bulla bypass and duplication of Sunbury Road.
- 9.5.7 I am satisfied that while congested traffic conditions will continue in the short term, traffic generated by development in Sunbury South can be absorbed until such time as the southern creek crossing can be developed.
- 9.5.8 I also am of the opinion that, while duplication of Sunbury Road (and the construction of the Bulla Bypass) is critical regional infrastructure which is clearly required, the imperative for improvements to the transport network is the early delivery of the southern creek crossing and the proposed southern connection.

9.6 Delivery of the Southern Connection

- 9.6.1 The delivery of the southern connection can only occur in conjunction with development of Sunbury South and the construction of the route through funding generated by the ICP.
- 9.6.2 I agree with the recommendations of SICADS which proposes development of the crossing as a short-term priority.
- 9.6.3 In my opinion, the key to ensuring that the route is delivered as required is the early development of the southern leg of the Lancefield Road / Sunbury Road intersection. Ideally this would be undertaken in conjunction with development of early stages of development of subdivisions on the south side of Sunbury Road, however this cannot be achieved until land opposite Lancefield Road, on the alignment of the proposed route is developed.
- 9.6.4 The exhibited Sunbury South PSP shows the intersection of Lancefield Road and Sunbury Road upgraded to traffic signals in the location of the exiting roundabout.
- 9.6.5 In my opinion the upgrading to traffic signals as proposed should be a longer term project, with significant capacity available within the existing two lane roundabout to enable it to continue to function satisfactorily as development proceeds.
- 9.6.6 A southern leg of the exiting roundabout, forming the commencement of the southern connector link, can be constructed without significant modification to the existing roundabout as shown in Figure 9.4, allowing the route to be commenced without a need for ICP funding to be allocated to the intersection upgrade.
- 9.6.7 The construction of the route as a Boulevard Connector is funded within the ICP, which will facilitate development of the route. Hence when the land opposite Lancefield Road is developed (or made available), the early construction of the southern leg can be readily achieved commencing as the fourth leg of the existing roundabout.
- 9.6.8 Initial investigations indicate that a fourth leg to the roundabout would support the development of Precinct 1 of Redstone Hill Road as well as the Capitol property should development be configured to connect to a southern leg of the intersection.
- 9.6.9 In my opinion, rather than use of the existing Redstone Hill Road alignment to Sunbury Road as secondary access to Precinct 1 of Redstone Hill as proposed, it would be preferable to connect to the southern leg of the roundabout if land was available.
- 9.6.10 It is noted that construction of the 4th leg of the roundabout would be a pre-interim design option and would not be refundable under the ICP. The Boulevard Connector road to the roundabout is however included as an ICP item and would therefore be refundable.
- 9.6.11 My preference for the pre-interim roundabout option is predicated on the ability to gain access to the land immediately south of the roundabout.

Figure 9.4 - Sunbury Road / Lancefield Road Pre-Interim Treatment



10.1 Sunbury Road Cross Section

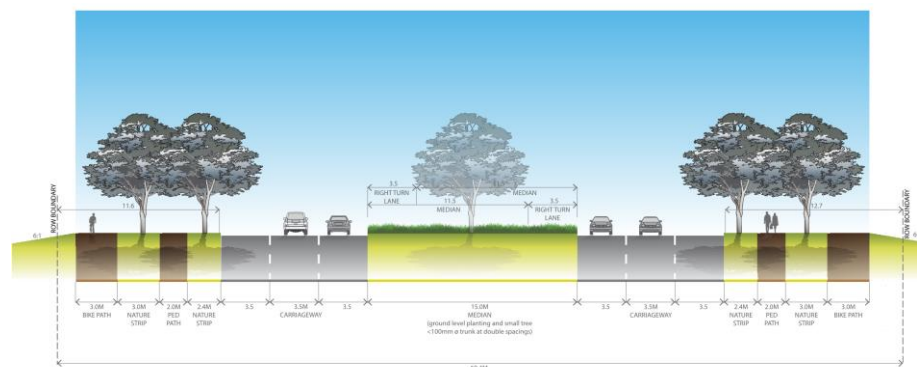
Existing Conditions

- 10.1.1 Sunbury Road currently comprises a 60 metre wide road reserve, which comprises a single traffic lane in each direction south of the Lancefield Road roundabout, widening to 4 lanes adjacent to the southern end of the Villawood site.
- 10.1.2 A 66kv power line is located along the southern side of Sunbury Road within the road reserve. The alignment of the power lines varies and is not consistently offset from the road reserve boundary.
- 10.1.3 In addition to the power lines there are 3 water mains located within the road reserve along the southern edge. Two of the water mains are large and form the primary source of water supply to Sunbury. The third pipe is understood to be smaller and relocatable if necessary. The smallest of the three pipes is located closest to the southern road reserve boundary. I have been advised that the 2 primary water mains cannot be disturbed, relocated or built over with road pavement.
- 10.1.4 Similar to the power lines, the alignment of the water main varies along the frontage of the Villawood property.

VPA Proposed Cross Section

- 10.1.5 The Cross Section proposed within the Sunbury South PSP is shown below:

Figure 10.1: Sunbury Road Cross Section – VPA Proposed



- 10.1.6 It is understood that the aim of the cross section is to provide a landscaped Boulevard type entry into Sunbury.
- 10.1.7 The following Issues have been raised with respect to the proposed Sunbury Road cross section:
 - The existing services, including a high voltage power lines and 3 water mains, are not taken into account. With the exception of the smallest of the water mains, the services are too costly to relocate.
 - The central median allows for a significant tree to be planted, however insufficient clear zones are provided on both the northern and southern sides to allow the planting as shown. The proposed cross section would result in the loss of most existing trees, and would ultimately only allow one large tree in the centre of the road.

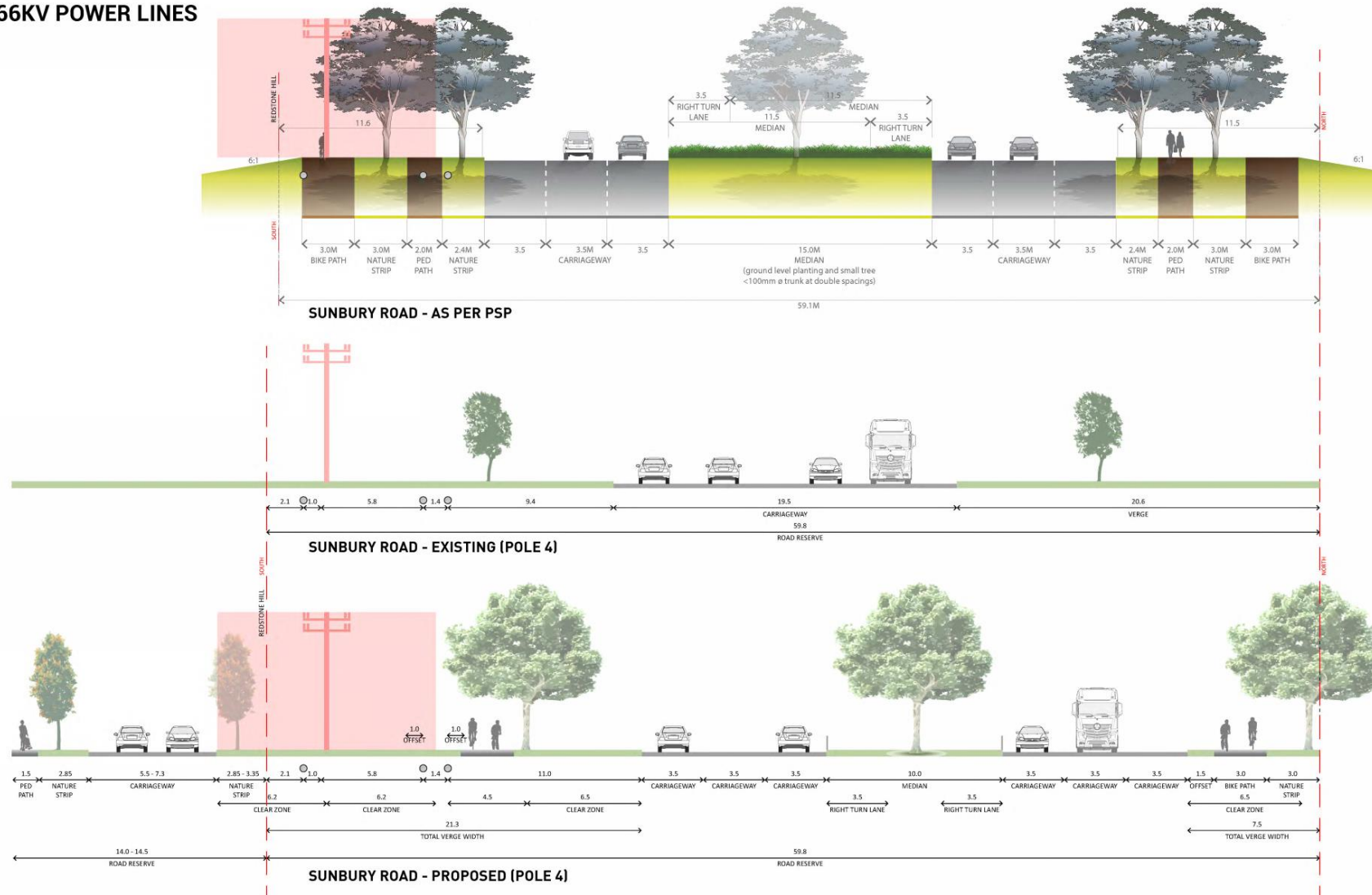
- The proposed alignment has no relation to the existing road pavement, which adds significant costs as well as making the road significantly harder to construct.

Proposed Sunbury Road Cross Section

- 10.1.8 Ratio has met with VicRoads (Transport for Victoria), VPA and Council to highlight the issues with the proposed cross section and propose an alternative.
- 10.1.9 The proposed cross section which has been developed by Ratio, Mesh and Villawood is shown below:

Figure 10.2: Comparison of Sunbury Road Cross Sections

66KV POWER LINES



- 10.1.10 As proposed, the revised cross section allows for a large canopy tree to be located in the central median, as well as on both sides of the road.
- 10.1.11 An appropriate offset of 5.0 metres has been shown around the electricity lines to satisfy CFA fire regulations.
- 10.1.12 The shared path on the southern side is also retained.
- 10.1.13 It is my understanding that VicRoads and the VPA supports the modified Sunbury Road alignment. VicRoads also support the provision of a single shared path, however it is un-clear whether VPA also support the shared path only arrangement.
- 10.1.14 Due to the meandering services along the southern boundary, it is proposed to also meander the shared path along the southern side to suit the required offsets for services.
- 10.1.15 In my opinion a shared path will adequately service the anticipated demand for cyclists and pedestrians, noting that additional bike and pedestrian routes will be provided throughout the Redstone Hill estate.

10.2 Ultimate Intersection Designs

- 10.2.1 The ultimate alignment of Sunbury Road and the associated intersections along the frontage of the Villawood site extending to the intersection with Lancefield Road, are shown in the following figures. The Ultimate Road alignment plans have been designed in accordance with the proposed Sunbury Road cross section.

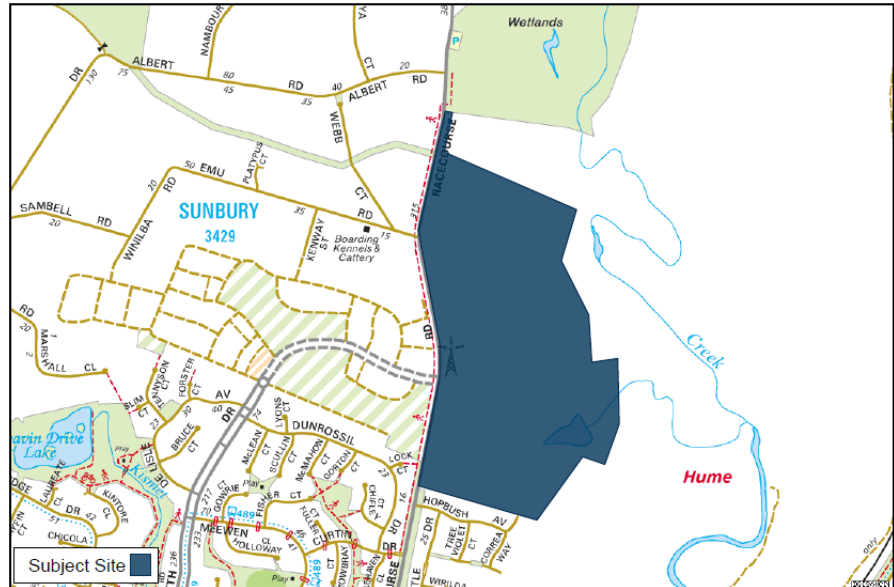
10.3 Interim Road Design

- 10.3.1 The interim Sunbury Road alignment and intersections along the frontage of the Villawood site including the intersection with Lancefield Road are shown in Appendix B.
- 10.3.2 The Interim road design assumes that the outside lanes of the ultimate road alignment will be constructed.
- 10.3.3 As shown in the interim road plans, the median will be 17 metres wide, until future widening occurs to provide three lanes in each direction along Sunbury Road.
- 10.3.4 It is my expectation that the Interim Intersection designs will form the basis of the intersections included within the future ICP.

11.1 Sherwood Heights

- 11.1.1 Sherwood Heights is located on the eastern side of Racecourse Road opposite the recently constructed Elizabeth Drive extension as shown in Figure 11.1.

Figure 11.1 – Sherwood Heights - Site Location



- 11.1.2 The site has a frontage of 1.2 kilometers to Racecourse road, a depth of 600 metres and a total site area of approximately 50 hectares. The site borders Jacksons Creek along its eastern boundary.
- 11.1.3 A residential subdivision known as Sunbury Fields is currently being developed on the western side of Racecourse Road, opposite the site.
- 11.1.4 The Sunbury Fields subdivision will ultimately contain approximately 390 residential lots and a Neighbourhood Activity Centre with a floor area of approximately 5,000 square metres.
- 11.1.5 In association with the development of Sunbury Fields, Elizabeth Drive has been extended to the north and east to provide a new connection to Racecourse Road, with the intersection of Racecourse Road and Elizabeth Drive controlled by a single lane roundabout.
- 11.1.6 The proposed Development Plan for Sherwood Heights, which contemplates 407 lots is shown in Figure 11.2.

LOT MIX

Lot Size	Count	Percentage
10,000	11,000	4.7%
12,000	12,000	5.1%
14,000	14,000	5.7%
16,000	16,000	6.3%
18,000	18,000	6.9%
20,000	20,000	7.5%
22,000	22,000	8.1%
24,000	24,000	8.7%
26,000	26,000	9.3%
28,000	28,000	9.9%
30,000	30,000	10.5%
32,000	32,000	11.1%
34,000	34,000	11.7%
36,000	36,000	12.3%
38,000	38,000	12.9%
40,000	40,000	13.5%
42,000	42,000	14.1%
44,000	44,000	14.7%
46,000	46,000	15.3%
48,000	48,000	15.9%
50,000	50,000	16.5%
52,000	52,000	17.1%
54,000	54,000	17.7%
56,000	56,000	18.3%
58,000	58,000	18.9%
60,000	60,000	19.5%
62,000	62,000	20.1%
64,000	64,000	20.7%
66,000	66,000	21.3%
68,000	68,000	21.9%
70,000	70,000	22.5%
72,000	72,000	23.1%
74,000	74,000	23.7%
76,000	76,000	24.3%
78,000	78,000	24.9%
80,000	80,000	25.5%
82,000	82,000	26.1%
84,000	84,000	26.7%
86,000	86,000	27.3%
88,000	88,000	27.9%
90,000	90,000	28.5%
92,000	92,000	29.1%
94,000	94,000	29.7%
96,000	96,000	30.3%
98,000	98,000	30.9%
100,000	100,000	31.5%
102,000	102,000	32.1%
104,000	104,000	32.7%
106,000	106,000	33.3%
108,000	108,000	33.9%
110,000	110,000	34.5%
112,000	112,000	35.1%
114,000	114,000	35.7%
116,000	116,000	36.3%
118,000	118,000	36.9%
120,000	120,000	37.5%
TOTAL	420 Lots	100%

LEGEND & LAND BUDGET

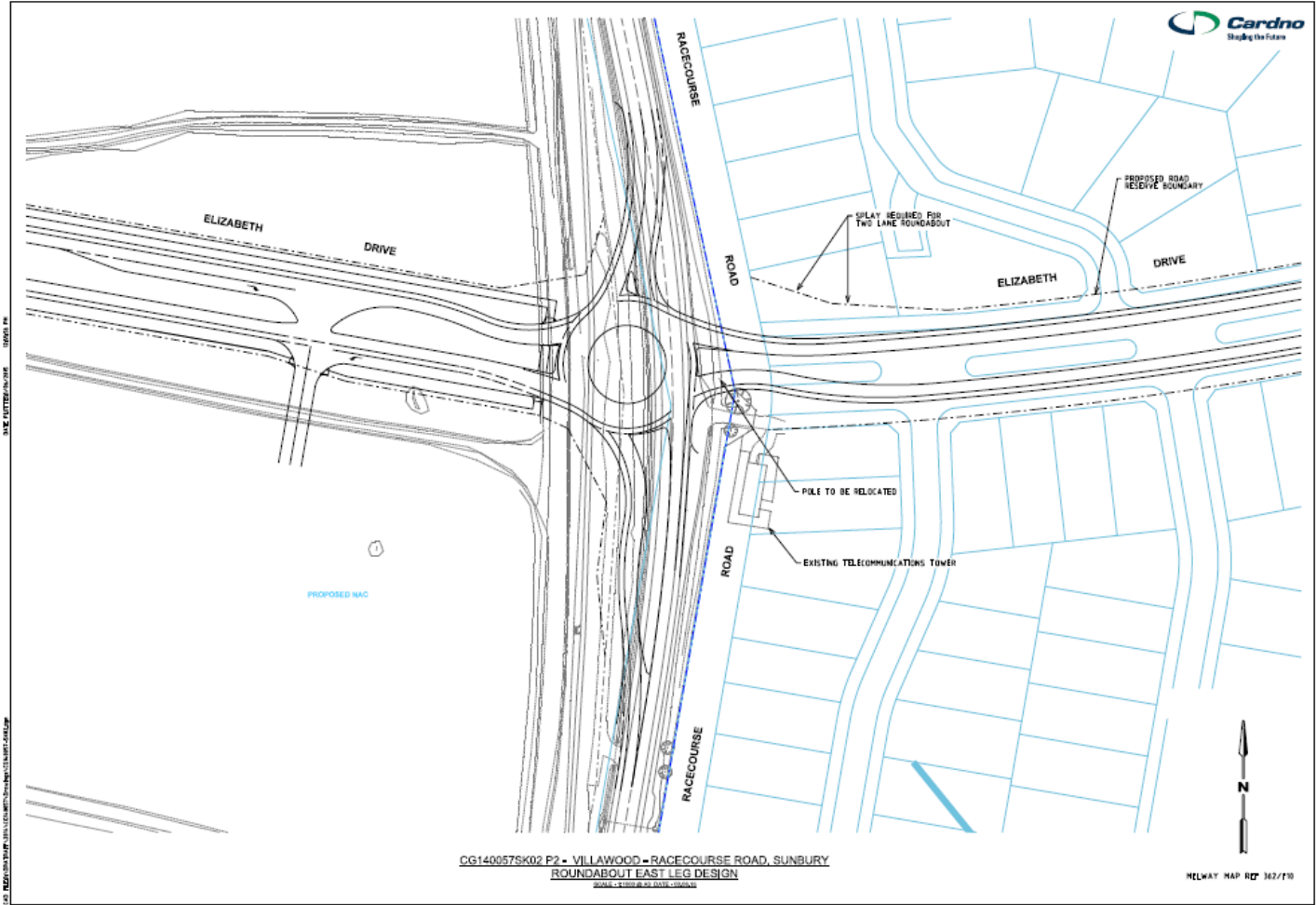
Category	Area (sq ft)	Percentage
Total Project Area	420,000	100%
Residential Area	380,000	90%
Non-Residential Area	40,000	10%
Open Space Area	10,000	2%
Water Area	10,000	2%
Other Area	10,000	2%
Average Lot Size	10,000	2%

REVISIONS

Revision	Description	Date
1	Initial Design	01/01/2020
2	Revised Design	02/01/2020
3	Final Design	03/01/2020
4	Construction Documents	04/01/2020
5	As-Built Documents	05/01/2020

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Figure 11.3 – Elizabeth Drive / Racecourse Road Roundabout – Concept Design (Source :Cardno 2015)



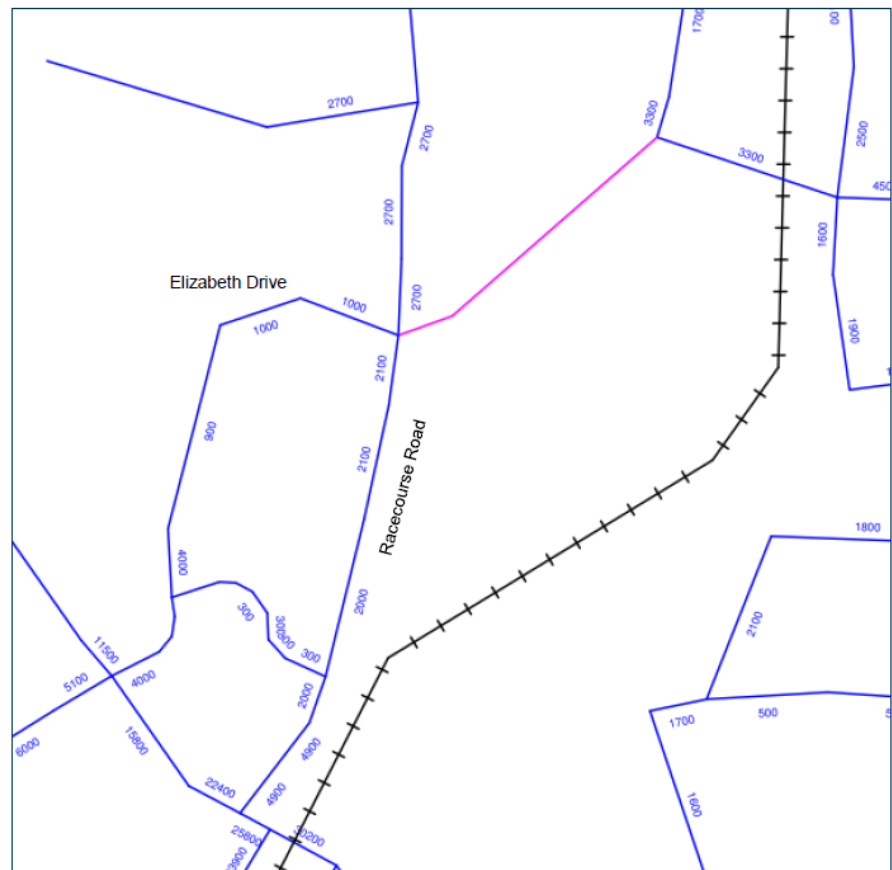
11.2 Cardno Application Report

- 11.2.1 The Sherwood Heights Section 96A Application was supported by a Traffic and Transport Assessment Report prepared by Cardno dated 30th November 2015.
- 11.2.2 I was employed by Cardno at that time but was not directly involved in the preparation of the report.
- 11.2.3 The Cardno assessment assessed development of Sherwood Heights for up to 407 residential lots.
- 11.2.4 The analysis was undertaken adopting the following methodology:
- Establishment of base traffic conditions established from estimates of future volumes at the intersection of Racecourse Road / Elizabeth Drive intersection prepared by Cardno in association with assessment of the Sunbury Fields Development in August 2013.
 - Adoption of a traffic generation rate of 8.7 vehicle movements per dwelling per day sourced from case study data collected at a similar residential subdivision in Werribee
 - Development of a trip distribution matrix for the proposed residential subdivision based on trip types identified in the Victorian Integrated Survey of Travel and Activity undertaken by the Department of Transport in 2007 and 2008 and the location of work places and local facilities, including the adjacent Neighbourhood Activity Centre.
 - Based on this data, adoption of the assumption that all generated trips would initially be external to the site and that 30% of trips would be generated to and from existing facilities and services to the west (using Elizabeth Drive west) and 70% to the south via Racecourse Road (to Sunbury Town Centre and the broader metropolitan area via either Macedon Street or Horne Street.
 - Adoption of a compound growth rate of 2% per annum for base traffic on Racecourse Road and Elizabeth Drive assuming completion of development by 2018.
 - Subsequent increases in traffic volumes assuming a development rate of 150 lots per annum to 2018.
 - Assessment of the operation of the intersection of Racecourse Road / Elizabeth Drive and the northern Racecourse Road access point using SIDRA, to test the operation of the intersections following full development.

11.3 GTA Modelling of Interim Conditions

- 11.3.1 Traffic modelling undertaken by GTA in the “Strategic Transport Modelling of the Sunbury and Diggers Rest Growth Corridor” report prepared in October 2015, discussed in Section 7.1 above, as well as modelling various options for infrastructure provision in the 2046 Ultimate Development Scenarios, also tested one scenario under interim (2031) conditions.
- 11.3.2 This option tested development of 75% of the Sunbury South and Lancefield Road PSP areas by 2031, without construction of either the southern or northern additional crossings of Jacksons Creek contemplated by the completion of the Sunbury Ring Road.
- 11.3.3 The modelling for the interim scenario is understood to assume that the Bulla Bypass and the full duplication of Sunbury Road has been undertaken by 2031.
- 11.3.4 The GTA modelled 2031 daily volumes in the vicinity of Racecourse Road / Elizabeth Drive and within the Sherwood Heights is shown in Figure 9.3

Figure 11.4 – GTA Strategic Modelling – interim (2031) Daily Traffic Volumes



- 11.3.5 As modelled, Racecourse road south of Elizabeth Drive is anticipated to carry in the order of 2,100 vehicles per day , increasing to 4,900 vehicles per day north of Riddell Road in the interim design period, prior to the construction of the Jacksons Creek northern crossing.

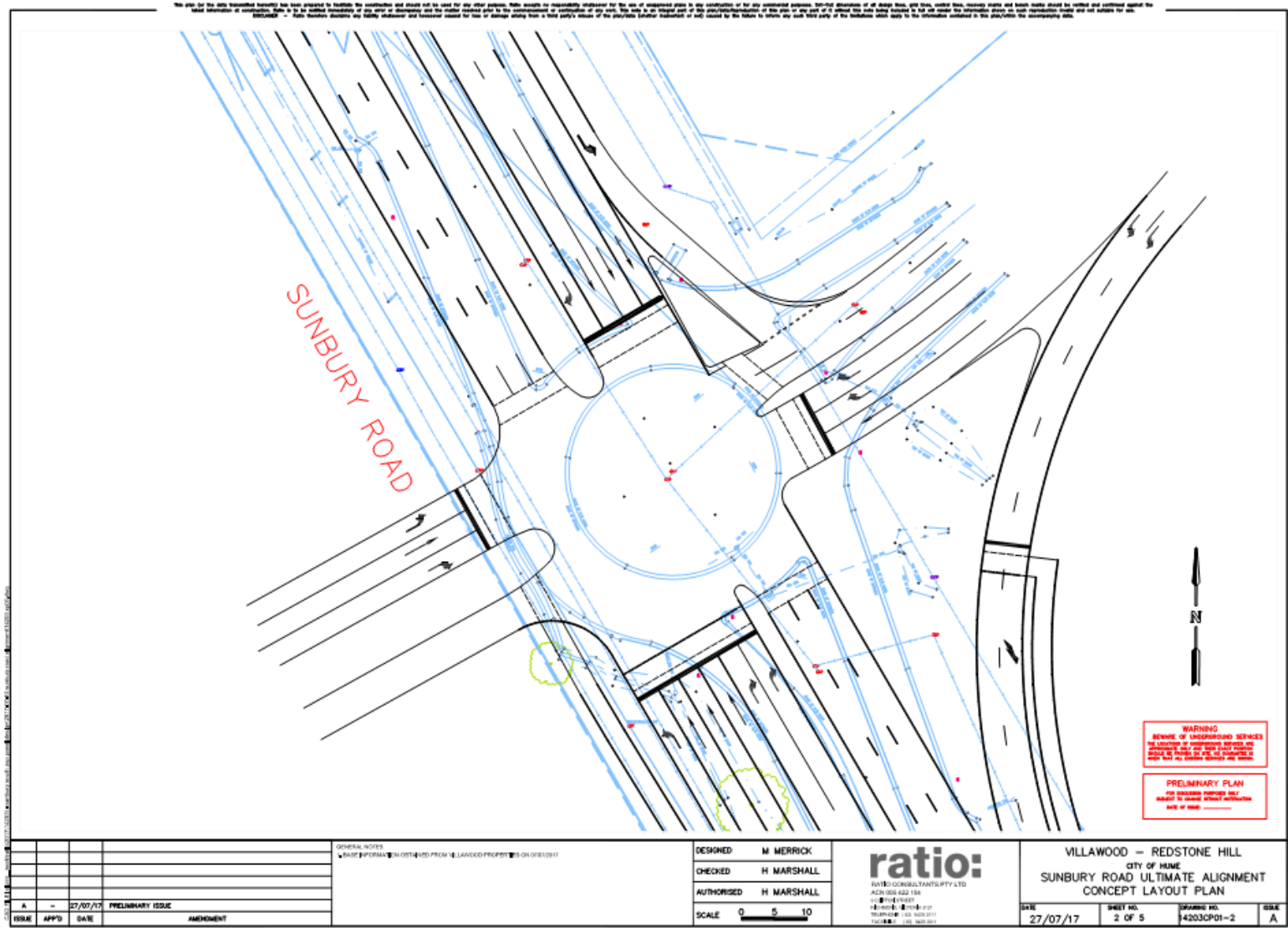
11.4 Traffic Implications of Proposal and Required Accommodating Works

- 11.4.1 The proposed development of the Sherwood Heights Estate containing 407 residential lots is expected to generate approximately 3,500 vehicle movements per day which will initially distribute to the existing road network via Racecourse Road and Elizabeth Drive.
- 11.4.2 Ultimately, when the northern crossing of Jacksons Creek is constructed in association with the Lancefield Road PSP, alternate access will be available to the east and south, via the continuation of Elizabeth Drive.
- 11.4.3 In my opinion, traffic generated by the development of Sherwood Heights can be absorbed by the existing road network in the first instance, assisted by the recent extension of Elizabeth Drive through the Sunbury Fields Estate to Racecourse Road and the further extension of Elizabeth Drive to the south of Mitchells Lane to Vineyard Road.
- 11.4.4 It is considered that the upgrade of the Elizabeth Drive / Racecourse Road intersection and the construction of Elizabeth Drive east of Racecourse Road as part of the future Sunbury Ring Road provides an appropriate contribution towards regional transport infrastructure.



Appendix A Sunbury Road Ultimate Alignment

Ultimate Lancefield Road / Sunbury Road Intersection



VILLAWOOD - REDSTONE HILL
CITY OF HUME
SUNBURY ROAD ULTIMATE ALIGNMENT
CONCEPT LAYOUT PLAN

DESIGNED: M. MERRICK
CHECKED: H. MARSHALL
AUTHORISED: H. MARSHALL

ratio:
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ACN 685 422 154
1/100 RIVERVIEW DRIVE
SYDNEY NSW 1585
TEL: 02 9550 8000
WWW.RATIOCONSULTANTS.COM.AU

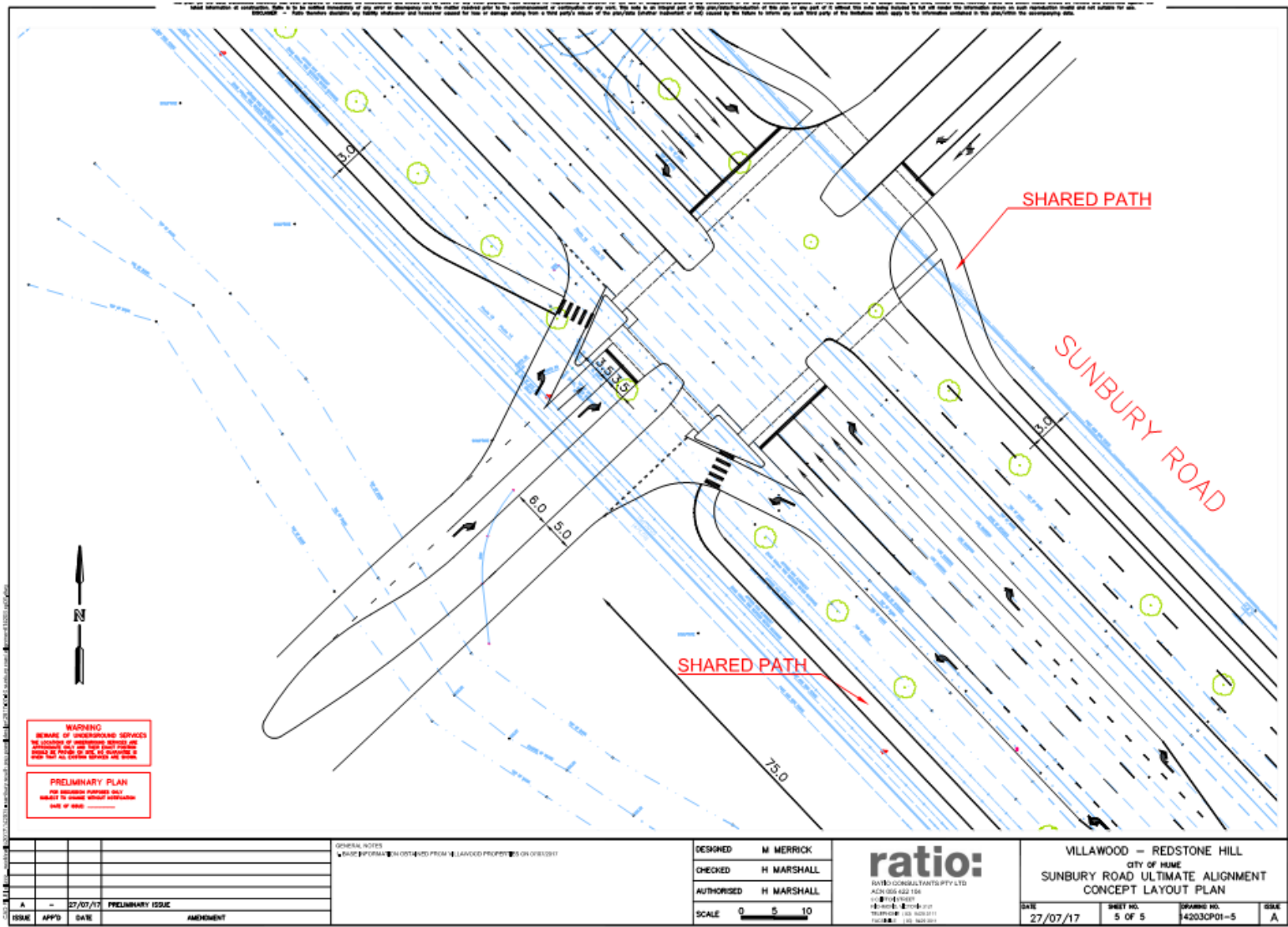
SCALE: 0 5 10

ISSUE	APP'D	DATE	DESCRIPTION
A	-	27/07/17	PRELIMINARY ISSUE

GENERAL NOTES:
1. BASED ON INFORMATION OBTAINED FROM LANDSCAPE PRESENTATIONS ON 08/08/2017.

DATE: 27/07/17
SHEET NO.: 4 OF 5
DRAWING NO.: S4203CP01-4
ISSUE: A

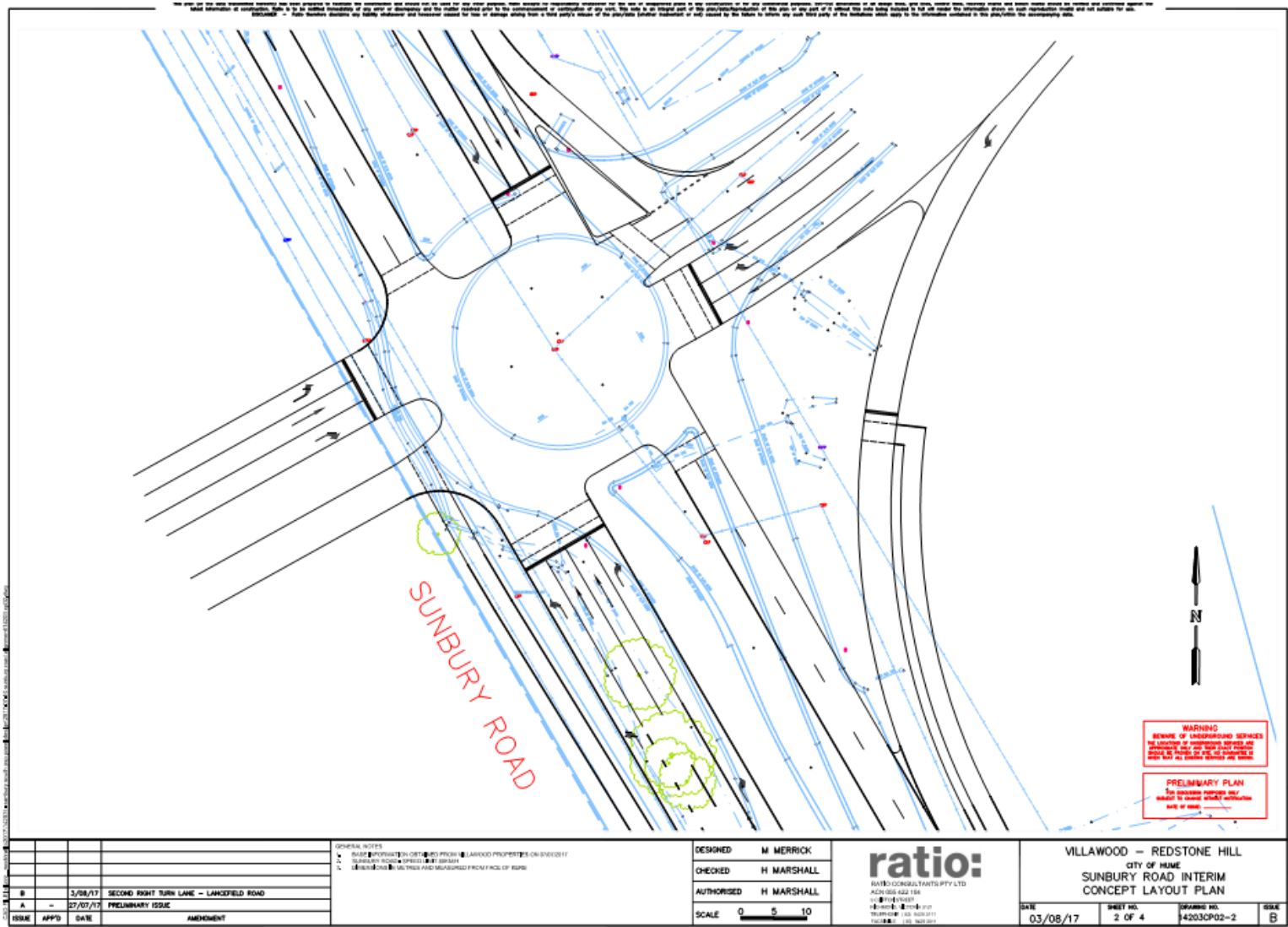
Ultimate Sunbury Road / Town Centre Intersection



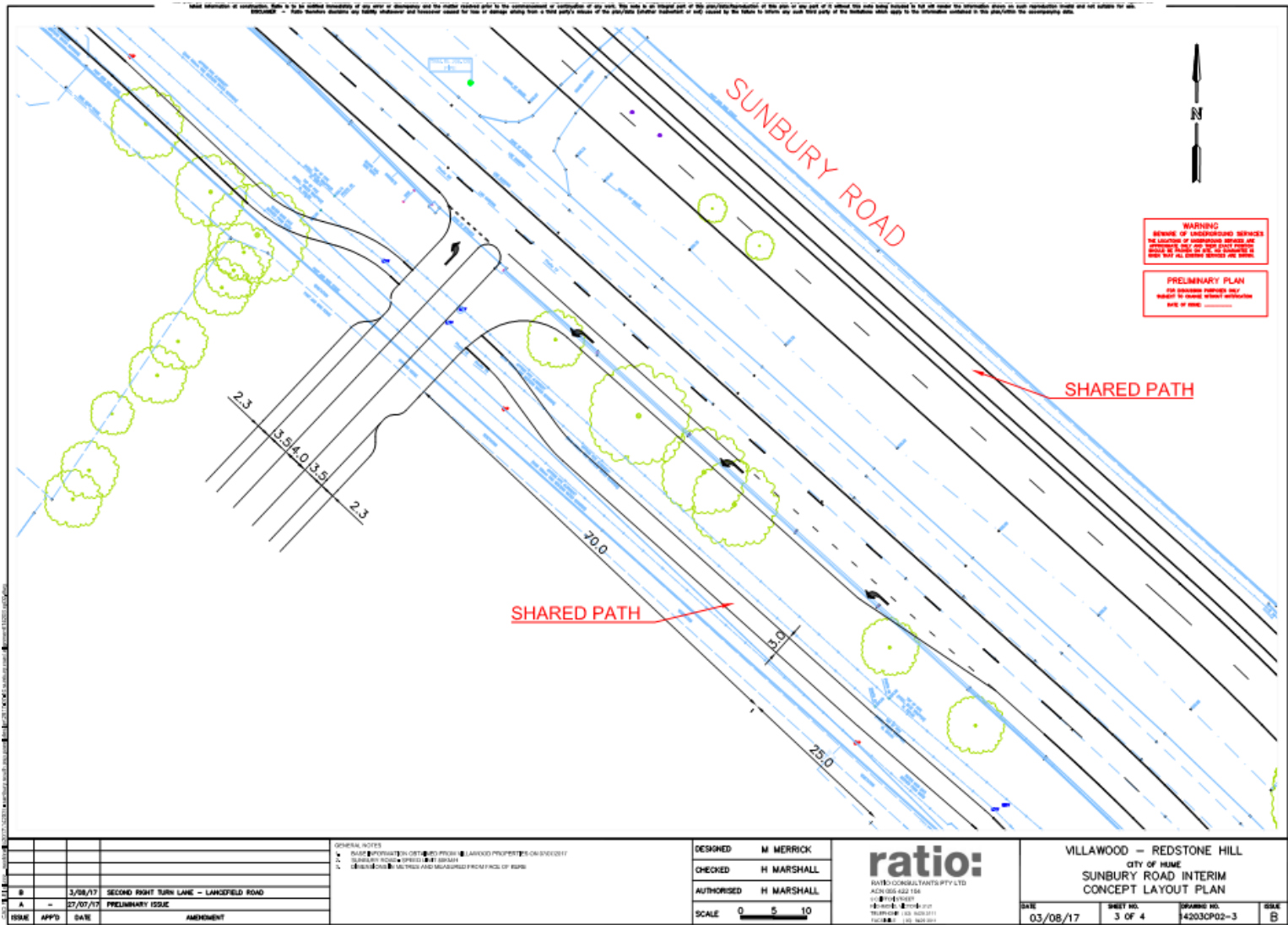


Appendix B Sunbury Road Interim Alignment

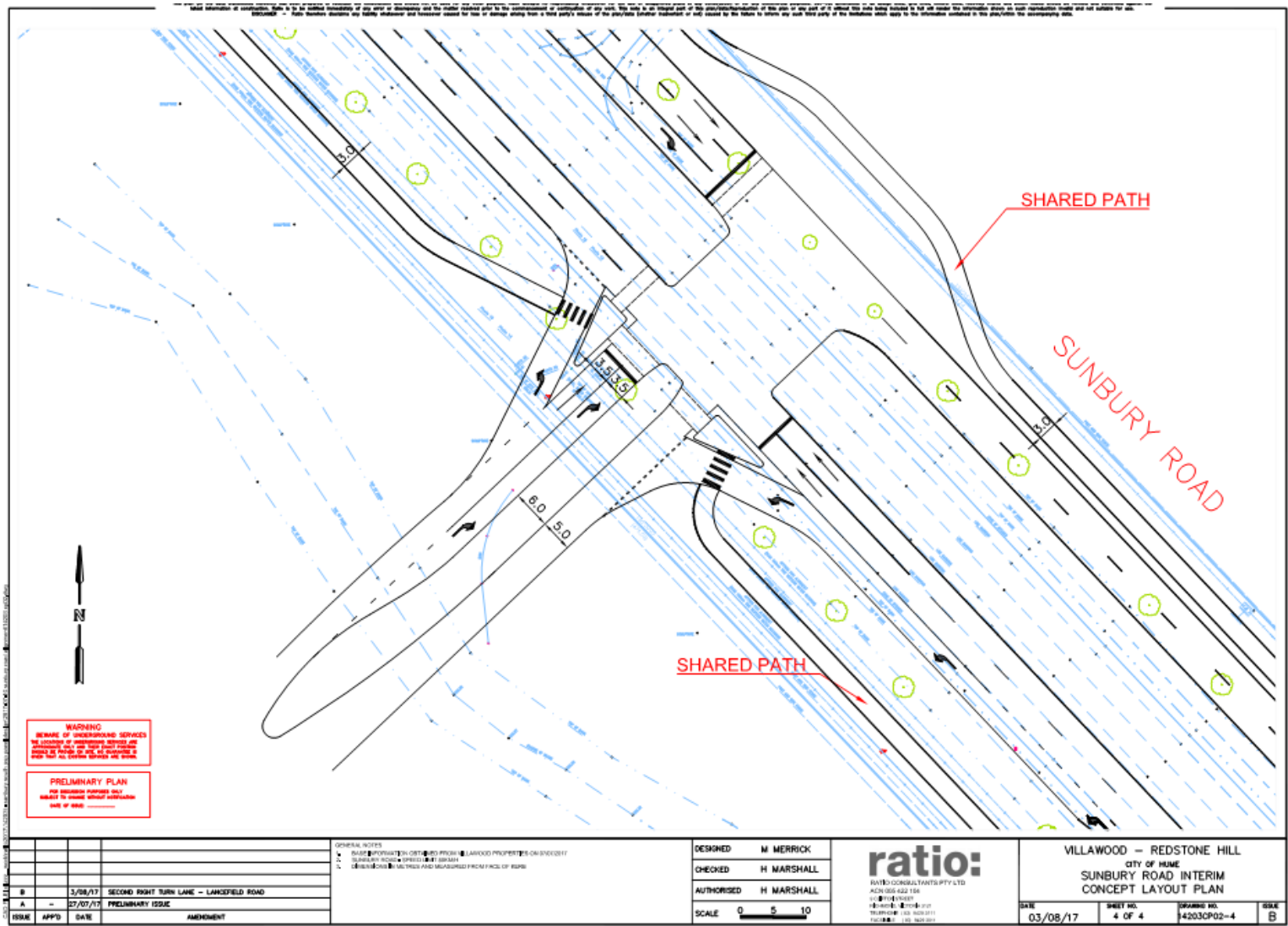
Interim Sunbury Road / Lancefield Road Intersection



Interim Sunbury Road / Connector Road Intersection



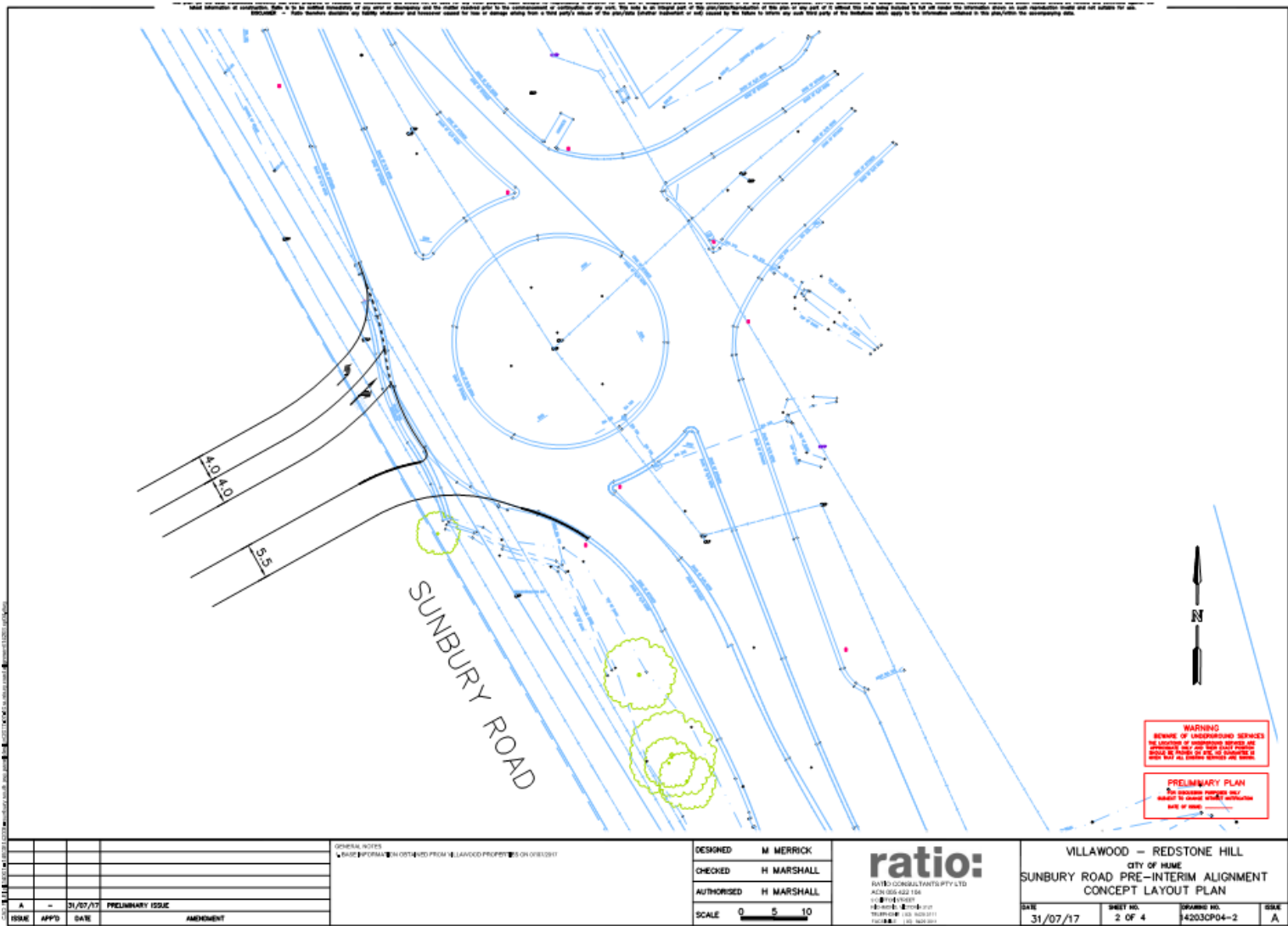
Interim Sunbury Road / Town Centre Intersection



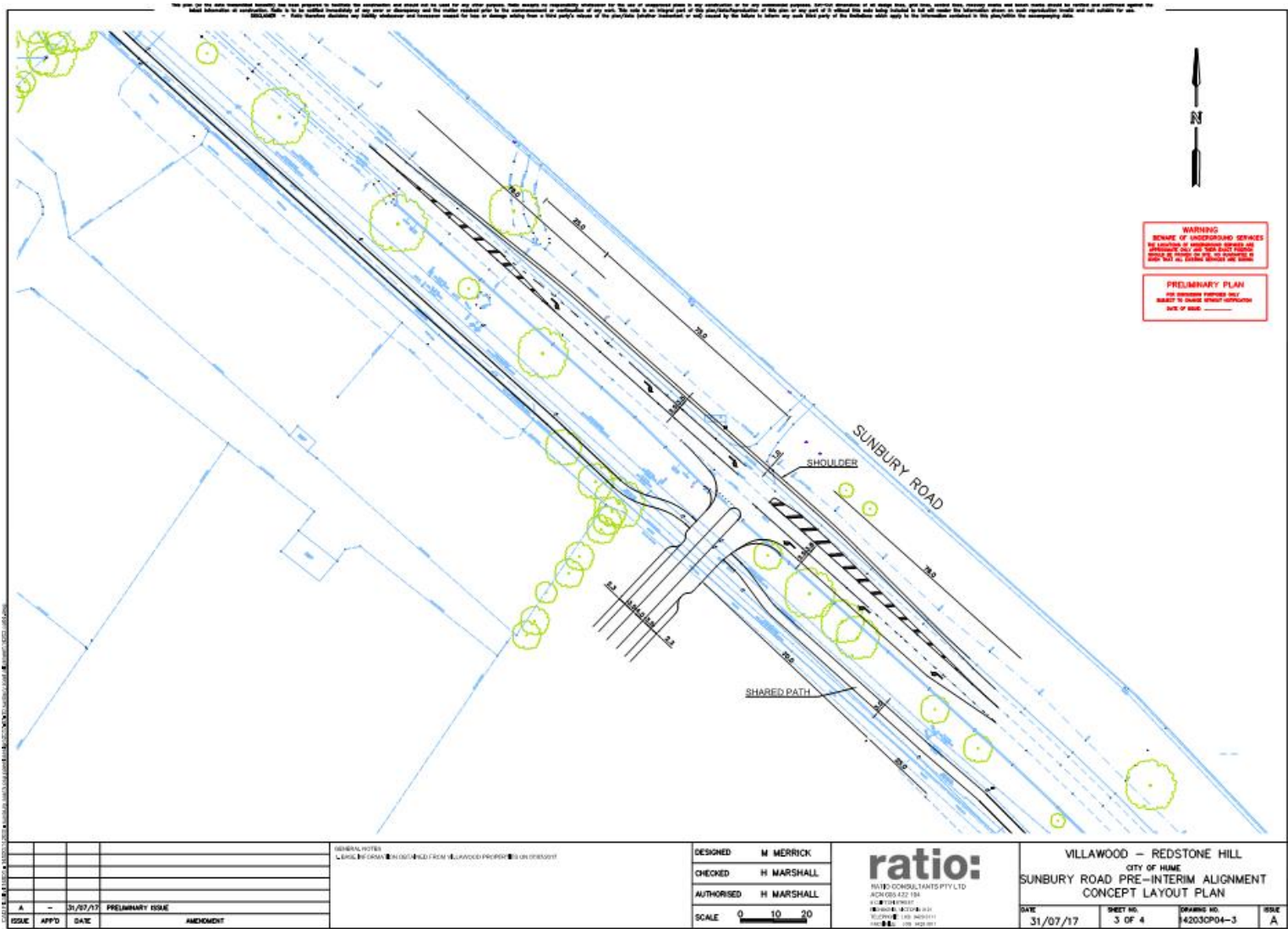


Appendix C Sunbury Rd Pre-Interim Road Design

Sunbury Road / Lancefield Road Pre-Interim Treatment



Sunbury Road / Connector Road Pre-Interim Treatment



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