

ARUP

**Marsden Park Industrial
(Employment) Precinct**

Transport and Access
Study

ARUP

**Marsden Park Industrial
(Employment) Precinct**

Transport and Access
Study

Final Report for ILP
Exhibition

August 2009

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This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 205773/00

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Year 2036 Network Traffic Model Volume Plots

1 Background - Introduction

The Marsden Park Industrial (Employment) Precinct (MPIP) is a major new employment precinct which is proposed to be developed over a total land area, in various ownerships, of approximately 550 hectares, generally on the western side of Bells Creek, to the north and west of the locality known as Colebee – Stonecutters Ridge.

The majority of the land in the precinct lies on the western side of Richmond Road and is bounded to the south by the future “Castlereagh Motorway” road reservation. There is currently no formal timeframe for the eventual future construction of this road and its need and timing is conceptually more related to the development of areas further to the west, eg in Penrith rather than in Blacktown LGA.

The precinct land is generally bounded to the west by another major land parcel, the “Air Services Australia” land, for which there is no urban development proposal either currently or in the foreseeable future.

The core development area of the MPIP precinct is roughly rectangular and is approximately 2.5 kilometres from east to west and approximately 2 kilometres from north to south.

An additional smaller precinct area to the east is isolated from the rest of the precinct by both Bells Creek and Richmond Road. This eastern area is likely to be primarily used in the future as a “conservation area” which is to be retained in an undeveloped state to provide “environmental offsets” for the future development of other areas. In this case this land will be unlikely to have significant traffic generating potential in the future.

2 Precinct Masterplanning Assumptions

The precinct currently contains mainly low intensity rural and rural industrial land uses, former quarries, some highway related commercial/industrial uses fronting Richmond Road and the caravan park and Mosque on sites near the southern edge of the precinct which are currently accessed via Hollinsworth Road.

The precinct masterplanner (LFA) is working in conjunction with a working group which consists of the Growth Centres Commission (now DoP), Blacktown City Council, APP who are the representatives of the primary precinct landowners and various infrastructure and environmental planning consultants.

A series of precinct masterplanning options were prepared by LFA during November 2008 to May 2009.

The most likely future development of the precinct is now primarily employment/industrial land including significant commercial/business park areas for a future total workforce of up to 10,000 persons, together with a number of smaller areas of residential development (1,100 additional dwellings in total) which are to be mainly located at the northern end of the precinct where they will be close to the future Marsden Park Town Centre.

This report summarises the precinct transport and access investigations which have been undertaken as part of the precinct masterplanning process to date. The precinct transport planning analysis has been undertaken by Arup, based on the results of a regional scale (Sydney Wide) NETANAL traffic network model prepared by Glen Varley of Road Delay Solutions Pty Ltd, which incorporates the full development of the precinct, together with all the other development precincts of the North West Growth Centre in the year 2036.

The Marsden Park Industrial (Employment) Precinct is the sixth of sixteen North West Growth Centre Precincts for which detailed precinct masterplanning has been undertaken to date and follows the “release” and public exhibition of detailed precinct masterplanning for five other precincts namely;

- Alex Avenue
- Colebee
- North Kellyville
- Riverstone, and
- Riverstone West

In concept, the Marsden Park Industrial (Employment) precinct is strategically well located with respect to future freight transport access to the M7 Motorway transport corridor and it will form one of three major future North Western Sydney employment centres representing almost one third of the predicted future total employment growth target (+38,000 jobs) which will provide the minimum desirable future target ratio of 60% local jobs vs households for the North West Growth Centre of Sydney (+63,500 dwellings).

When combined with the adjacent future Marsden Park Town Centre development to the north, which is located in the main “Marsden Park” precinct which is not actually part of the current precinct transport planning and masterplanning investigations, the combined future employment “centre” at Marsden Park will have a significant “critical mass” of related commercial and employment functions which will create a major future focus of public and private transport access routes in the area.

The existing bus service network is essentially limited to a single infrequent local bus route which follows a circuitous route from Riverstone to Rooty Hill/Mount Druitt (Route 757) as illustrated by the map of bus routes in **Figure 1**

The future prospects for heavy rail access for either passenger or freight transport to and from the Marsden Park area are not promising as the area is remote from the existing heavy rail network and proposals to date to improve heavy rail access to the area, eg the North West Heavy Rail or Metro Line or the various Intermodal Freight Terminal site options in the North West Region of Sydney, have failed at critical times to generate the necessary State or Federal Government support.

For this reason, the transport analysis in this report assumes that “ordinary bus” or “transitway bus” based public transport will be the primary future option for public transport access for the future workforce, visitors and residents travelling to and from the area.

The future potential options for rail transport access to and from the area have not been examined in detail other than to establish the most likely points of transfer to and from the rail network for either car or bus feeder travel which will be either Schofields (the new Schofields South Station probably), Mount Druitt or Blacktown.

3 Existing Road Hierarchy and Traffic Volumes

The Existing Road Network and Hierarchy in the study area is illustrated by the attached extract from the 2002 RTA Traffic Volumes Summary Publication, **Map 1**.

The existing major arterial road access to the area is by Richmond Road, which connects with the M7 Motorway and Rooty Hill Road North, approximately 1 kilometre south east of the southern boundary of the precinct study area.

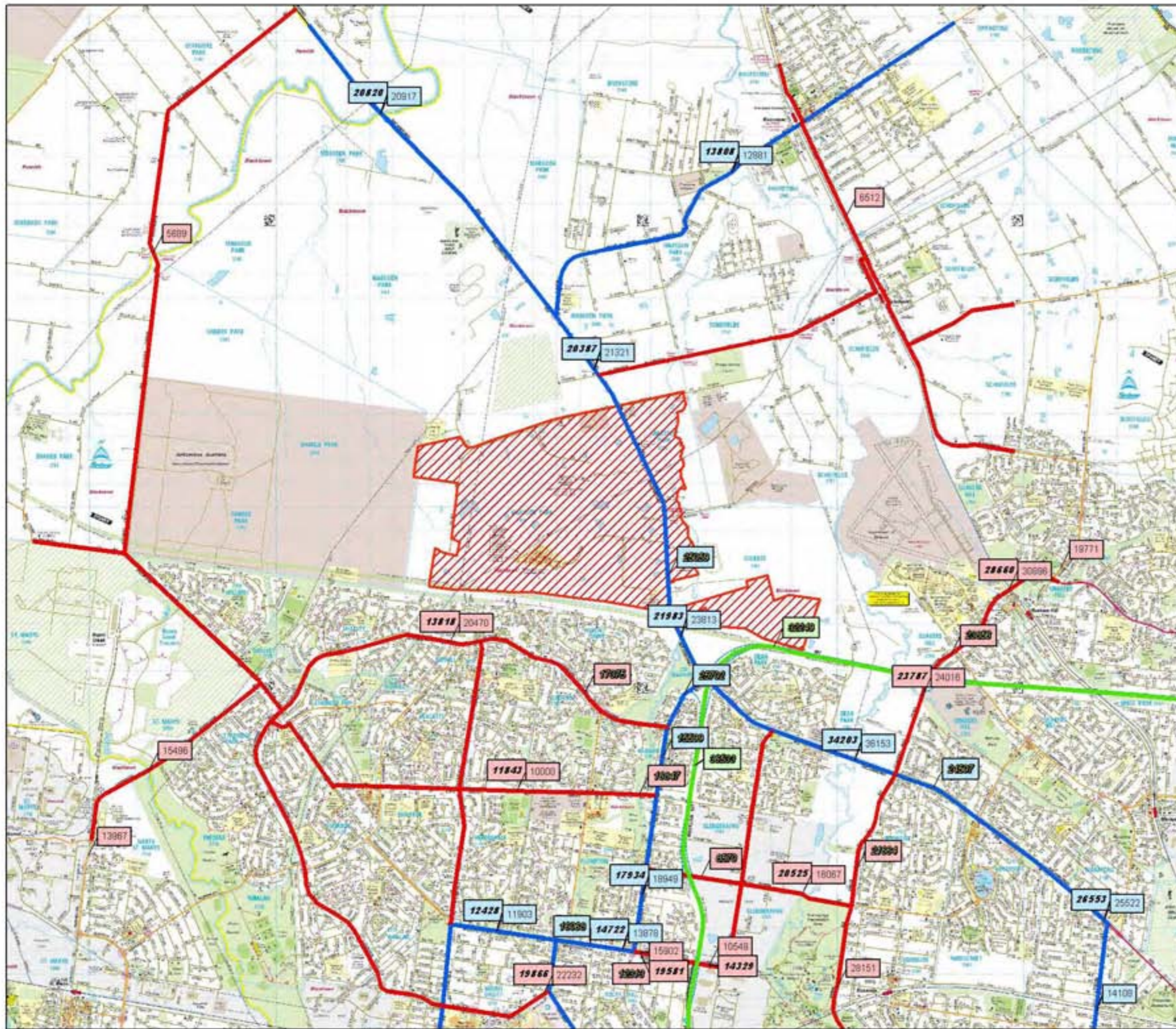
Richmond Road is a two lane road which has historically carried daily traffic volumes in the range of 20,000 to 22,000 vehicles per day over most of the past ten years but this daily traffic usage has recently increased to approximately 25,000 vehicles per day north of the M7, following the opening of the M7 Motorway.

The road has a high percentage of heavy vehicles in the traffic flow, including many large trucks generated by the existing rural/industrial activity in the area. It is already subject to significant peak hour traffic congestion and delays and there are also road safety concerns



EXISTING BUS ROUTES

FIGURE 1



Legend

Traffic Volumes

21321	Arterial, 2002
21321	Arterial, 2005
20907	Arterial, 2007
20907	Motorway, 2007
21321	Sub-Arterial, 2002
21321	Sub-Arterial, 2005
20907	Sub-Arterial, 2007

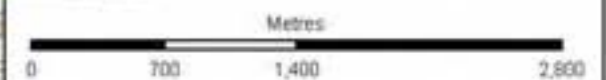
Road Classifications

	Motorway
	Arterial
	Sub-Arterial
	The Precinct

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Drawing Title
**Existing road hierarchy
 and daily traffic volumes**

Scale at A3 1:40,000	Job No 205773-00
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Coordinate System GDA94 MGA Zone 56	Figure No MAP 001
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with accidents involving heavy vehicles increasing the general risk of injury/fatality to persons in traffic accidents.

The RTA has in place a concept design proposal to upgrade the section of Richmond Road from the M7 Motorway/Rooty Hill Road North intersection to Grange Avenue at Marsden Park to four lanes, within the relatively short term future eg within the next five years and later to six lanes as part of the ultimate future traffic development scenario for the area.

Provisional agreements are already in place between the RTA and the developers of land in the North West Growth Centre Precincts of “Colebee” and “Marsden Park Industrial” for the reconstruction and widening of the relevant adjacent sections of Richmond Road to be directly funded by the precinct land owners according to a timeframe to be agreed with the RTA. There are also a number of existing commercial and other properties directly fronting Richmond Road on the eastern side which have existing vehicular access to and from Richmond Road and service roads will be required to maintain this property access in the future.

The other relevant existing roads in the study area are all local roads currently, ie South Street and Hollinsworth Road on the western side of Richmond Road and South Street and Townson Road on the eastern side of Richmond Road. These roads currently provide separate (non interconnected) access to a range of existing rural sites in either the northern or the southern parts of the precinct.

These local roads are all relatively lightly trafficked and do not currently require traffic signal controlled access to Richmond Road as a result. The existing total levels of rural residential development and employment generating land use in the precinct are relatively low. These are currently estimated by means of the Ministry of Transport’s Travel Zone Database (Zone 680) which shows approximately 68 households and approximately 243 jobs, in the year 2006.

Further to the south and physically separated from the precinct by the undeveloped land of the “Castlereagh Motorway” road reservation, there are extensive existing urban areas, including the existing residential “urban fringe” suburbs of Hassall Grove, Bidwill, Shalvey and Willmot. These suburbs are served by a network of existing sub arterial roads of which Luxford Road and Carlisle Avenue are currently the major traffic routes and are classified as Sub Arterial roads in the existing road hierarchy.

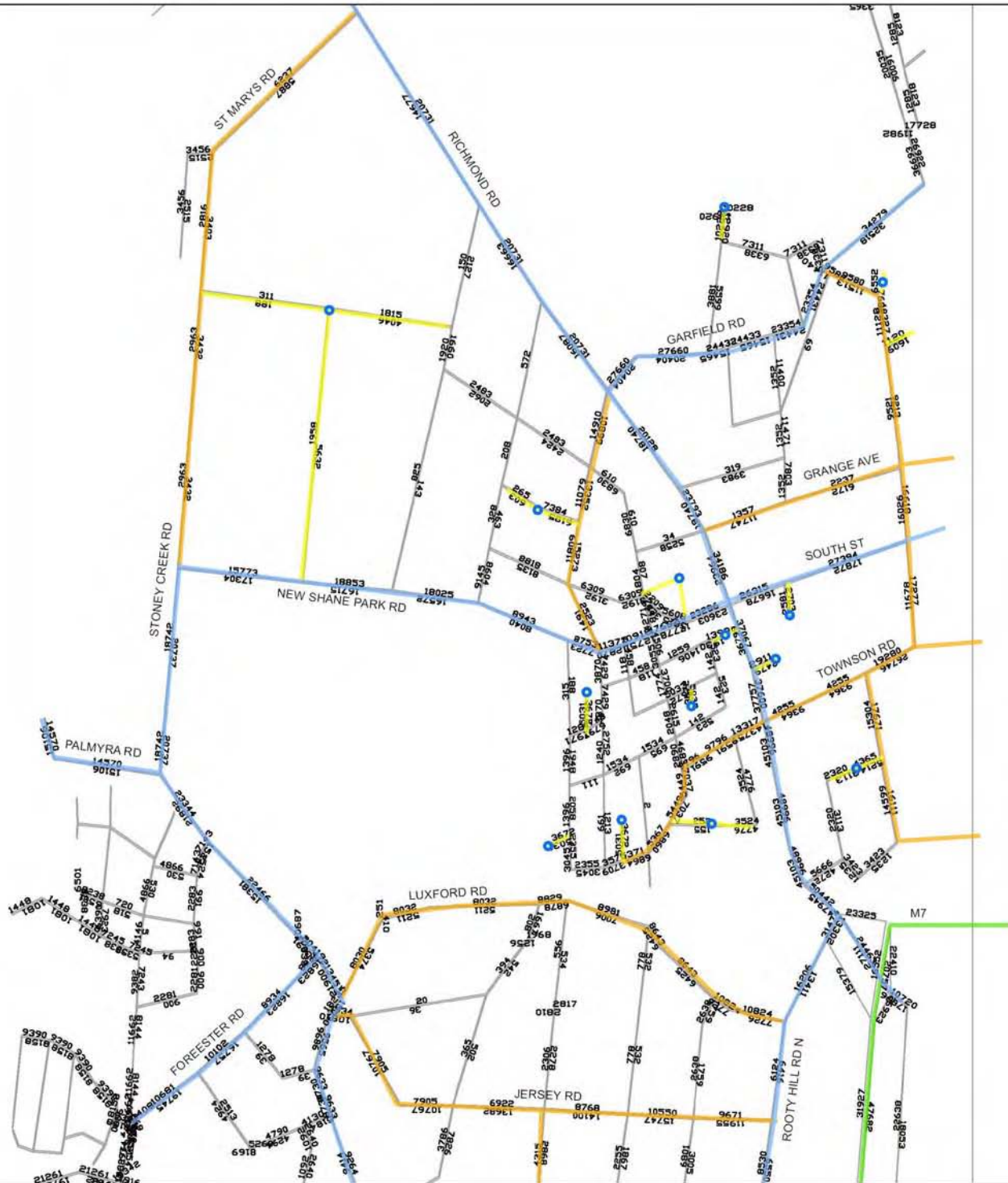
There is also an existing “stub end” road reserve of Daniels Road which connects northwards from Luxford Road towards the Marsden Park Industrial Precinct. The provision of a future public road connection within this road reserve is not essential for the future development of any Marsden Park precinct but would probably be desirable for a range of future reasons, eg as a bus route and for providing improved local access to employment and other services.

4 Future Road Hierarchy and Traffic Volumes

The future regional road network hierarchy and traffic volumes for major roads both internal and external to the precinct has been determined, based on the results of the year 2036 NETANAL traffic model for the precinct which has been developed by Glen Varley of Road Delay Solutions Pty Ltd in an interactive manner with the precinct masterplan road network.

The predicted future daily traffic volumes for all the major road network links are illustrated by the attached **Map 2**, Future Regional Road Hierarchy and Daily Traffic Volumes - Year 2036.

The full detailed road network traffic volume output plots from the traffic model, including morning and afternoon peak hour volume plots, are included as **Appendix A** to this report.



Legend

- Centroid Locations
- Road Hierarchy**
- Motorway
- Arterial > 35000
- Sub-Arterial range 10000 to 35000
- Centroid Volumes N/A

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Job Title
**Marsden Park Industrial
 (Employment) Precinct Study**

Drawing Title
**Future regional road hierarchy
 and daily traffic volumes in 2036**

**Note: Drawings
 are not to scale.**

Coordinate System
GDA94 MGA Zone 56

Job No
205773-00

Figure No
MAP 002

These future “full development” precinct road network daily traffic volumes for the year 2036 should be used to determine both the internal and external future precinct road hierarchy according to the following table which is a summary of the road hierarchy definitions and road cross section design requirements for roads in the Growth Centres Commission Development Code.

Table 1 GCC Road Hierarchy and Road Design Requirements

Road Type	Traffic Load (Vehicles/Day)	Road Corridor Width	Road Carriageway Lanes, Number and Width	Blacktown City Council Cycleway Preference
Arterial Road	35,000 +	To be determined by the RTA, (Nominally 50 metres for Richmond Road)	To be determined by the RTA	Off Street Shared Path 2x 2.5-3m
Transit Boulevard	30,000-35,000	41 metres	4 Lanes Divided plus 2x 5.5 metre service roads	Off Street Shared Path 2x 2.5-3m
Sub Arterial Road	10,000-35,000	35 metres	4 Lanes Divided plus 2x 1.8 metres cycle lanes	Off Street Shared Path 2x 2.5-3m
Local Collector Street	3,000-10,000	18 metres	12 metres or 13 metres if a bus route	Off Street Shared Path 1x 2.5-3m
Other Local Street	1,000-3,000	16 metres	10-11 metres	Off Street Shared Path 1x 2.5-3m
Minor Street	Under 1,000	To be determined through DCP	To be determined through DCP	Off Street Shared Path 1x 2.5-3m
Town Centre Street	Up To 20,000	24.9 metres	14.4 metres	
Special Street	Adjoining Reserves	To be determined through DCP	To be determined through DCP	

Source: GCC Development Code, 2006

It is also relevant to consider in the future precinct road hierarchy and design, the current subdivision road design requirements of the Blacktown City Council Engineering Guide for Development – February 2005 which recommends the following road cross section and corridor widths.

- Industrial Collector Road (within new industrial areas), 23 metre road corridor width, 15.5 metre road carriageway, 2 travel lanes and 2 parking lanes
- Other Industrial Roads, 20.5 metre road corridor width, 13.5 metre road carriageway, 2 travel lanes and 2 parking lanes
- Sub Arterial Road (within Zone 5c), 25 metre road corridor width, 12.5 metre road carriageway separated by a 4 metre wide median, 4 travel lanes and no parking.

Blacktown City Council have advised for the purposes of this study that Council is now in the process of adopting a new road corridor reserve width requirement of 27 metres for Sub Arterial roads, including 14 metres width of road carriageway, separated by a 4.5 metre median strip and incorporating 4.25 metre width cycleway/footway/verges on either side.

The future predicted year 2036 internal precinct daily traffic volumes for the main internal connecting roads of the precinct and the regional road network daily traffic volumes (for roads external to the precinct), with the corresponding road corridor design width requirements are summarised in the following **Table 2** and **Table 3**

The recommended future precinct internal road network hierarchy and the corresponding road design sections are illustrated by the attached maps, **Map 3**, Future Precinct Road Hierarchy and **Map 4**, Future Road Works Sections

Table 2, Future Year 2036 Daily Traffic Volumes For Internal Precinct Roads.

Item Refer Map 4	Road Section and Location	Existing Year 2006/7 Daily Traffic Volume	Year 2036 Daily Traffic Volume	Future Road Classification under GCC Design Code
1	South Street, west of Richmond Road	400-500	35000-47000	Arterial, (Route Subject to RTA Design and SIC Levy Funding)
2	South Street, west of Main North-South Road	300-400	24000	Sub Arterial, (Route Subject to RTA Design and SIC Levy Funding)
3	South Street, west of Second North-South Road	200-300	16000	Sub Arterial, (Route Subject to RTA Design and SIC Levy Funding)
4	Eastern Collector, east of Main North-South Road	New Road	6000	Collector (Industrial)
5	Southern Collector, south of Townson Rd Extension	0-200, (Private Road to Mosque)	1000-8000	Collector (Industrial), refer to Blacktown City Council design Code
6	Main North-South Road, South Street to Townson Rd Extension	New Road	5000-8000	Collector (Industrial) type road traffic volumes. However for future precinct urban design and drainage reasons, a Sub Arterial type divided road cross section is appropriate
7	Second North-South Road, South Street to Hollinsworth Road Extension	New Road	2000-12000	Typically Collector (Industrial) type road traffic volumes , refer to Blacktown City Council design Code
8	South Street, west end of existing road (West End Road)	100-200	1000-5000	Collector (Industrial), refer to Blacktown City Council design Code
9	Townson Rd Extension, Richmond Rd to Main North-South Road	New Road	19000-28000	Sub Arterial

Item Refer Map 4	Road Section and Location	Existing Year 2006/7 Daily Traffic Volume	Year 2036 Daily Traffic Volume	Future Road Classification under GCC Design Code
10	Hollinsworth Road Existing Section, Main North-South Road to Site of Caravan Park	0-200	12000	Sub Arterial
11	Hollinsworth Road Extension, from Caravan Park to West End Road	New Road	5000-7000	Collector (Industrial), refer to Blacktown City Council design Code
12	First Minor E-W Link, 200 metres south of South Street	New Road	2000-3000	Local Road (Could be Town Centre Street in GCC Code)
13	Second Minor E-W Link, 500 metres south of South Street	New Road	0-1000	Minor Local Road (Industrial)
14	Third Minor E-W Link, 900 metres south of South Street	New Road	2000-3000	Minor Local Road (Industrial)
15	First Minor N-S Link, 0-200 metres south of South Street	This road is the existing Fulton Road	0-1000	Minor Local Road (Could be Town Centre Street in GCC Code)
16	Second Minor N-S Link, 900-1500 metres south of South Street	New Road	0-1000	Minor Local Road (Industrial)
17	Residential Collector 1	New Road	0-4000	Collector (Residential)
18	Service Road 1	New Road	2000-3000	Collector (Industrial)
19	Service Road 2	New Road	2000-3000	Collector (Industrial)
20	Residential Collector 2	New Road	0-1000	Collector (Residential)
21	New Access Road to Colebee/Medallist Development	New Road	9000-10000	Collector

Source: NETANAL Network Traffic Model Results (Year 2036)

Table 3, Future Daily Traffic Volumes For Regional Road Network

Item	Road Section and Location	Existing Year 2006/7 Daily Traffic Volume	Year 2036 Daily Traffic Volume	Future Road Classification Under GCC Design Code
1	Grange Avenue, east of Richmond Road	5000-5500	8000-13000	Sub Arterial
2	South Street, east of Richmond Road	400-500	43000-45000	Arterial (Route Subject to RTA Design and SIC Levy Funding)

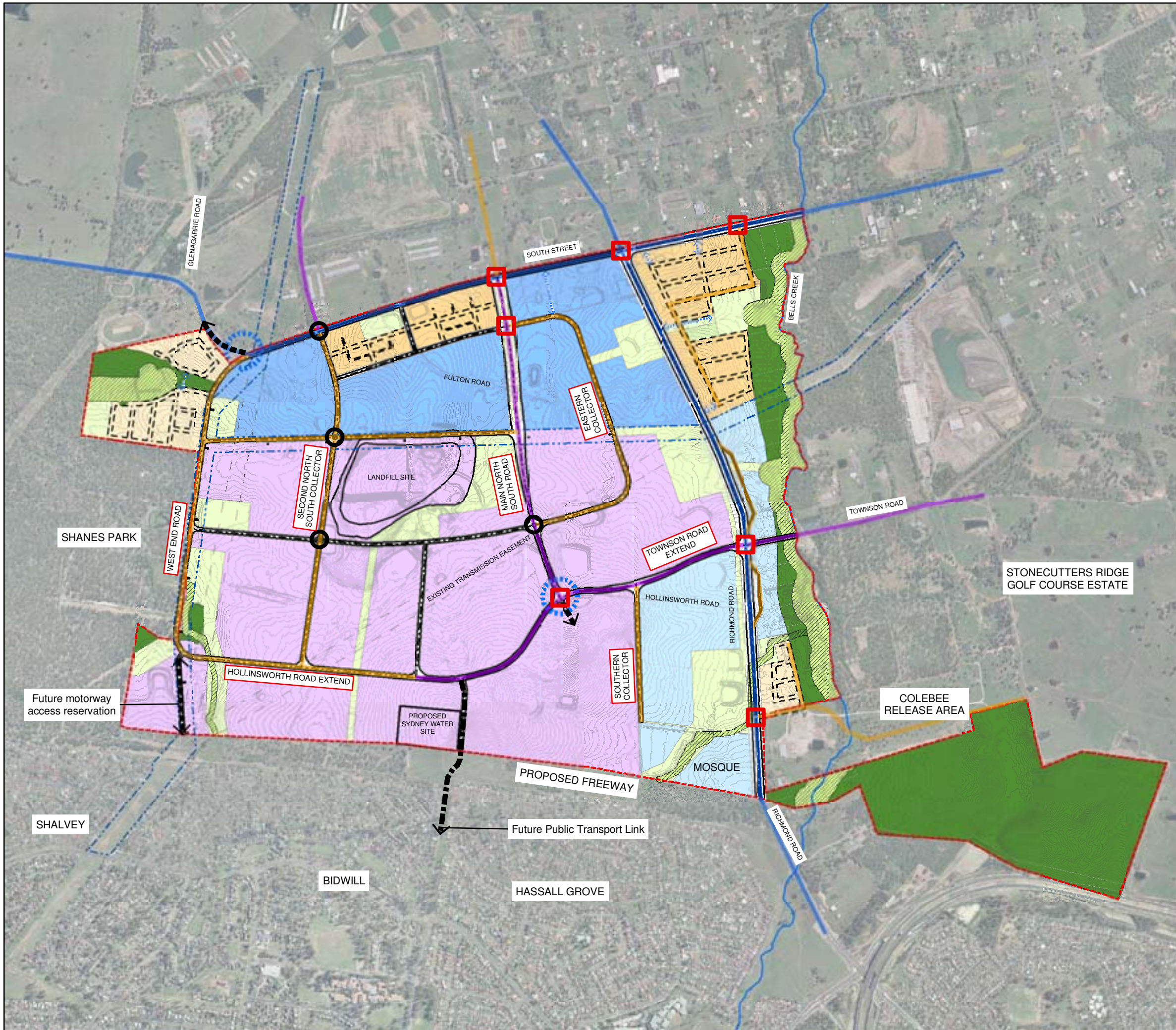
3	Townson Road, east of Richmond Road	2000-2500	14000	Sub Arterial (Route Subject to RTA Design and SIC Levy Funding)
4	Garfield Road West, east of Richmond Road	13808	40000-48000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
5	Garfield Road Extension, west of Richmond Rd	New Road	24000-27000	Sub Arterial
6	Grange Avenue, west of Richmond Road	600-700	5000	Collector (Could be Town Centre Street in GCC Code)
7	New Shane Park Road, west of precinct	New Road	17000-36000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
8	Stony Creek Road, north of Palmyra Ave	5689	39000	Arterial
9	Richmond Road North of Garfield Road West	20820	35000-37000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
10	Richmond Road, South of Garfield Road West	20387	39000-42000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
11	Richmond Road, South of Grange Ave	23000-25000	58000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
12	Richmond Road South of South St	23000-25000	74000-75000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
13	Richmond Road South of Townson Road	25059	94000	Arterial (Route Subject to RTA Design and SIC Levy Funding)
14	Richmond Road north of M7	25059	98000	Arterial (Route Subject to RTA Design and SIC Levy Funding)

Source: NETANAL Network traffic Model Results (Year 2036)

5 Future Road Network Requirements

For the future major Sub Arterial roads which are not subject to RTA design requirements, the following urban standard (70 km/hr design speed – 60 km/hr operating speed) and rural standard (90 km/hr design speed – 80 km/hr operating speed) four lane divided road carriageway widths and cross sections are recommended by Arup, for future daily traffic volumes in the range 25,000 to 45,000 vehicles per day for the North West Growth Centre Precincts.

- Urban Major Road corridor width (4 lanes dual carriageway) should be a minimum 34 metres cross section comprising 2 x 7 metre wide carriageways, plus 2 x 4 metre wide cycle/parking lanes, plus 2 x 4 metre wide paved footpaths at each side, plus a central 4 metre wide landscaped median strip.



- Legend**
- Traffic Signals
 - Roundabout
 - Proposed Transmission Easement
 - Proposed Transmission Easement
 - Precinct Boundary
 - Bells Creek
 - Road centreline
 - Preferred Location for Neighbourhood Services

- Road Hierarchy**
- Arterial
 - Sub Arterial
 - Collector

- Landuse**
- Business Park
 - Business Zones
 - Drainage and Infrastructure
 - Light Industrial
 - Low Density Residential
 - Medium Density Residential
 - Conservation Areas
 - Recreation Area
 - Riparian Corridor

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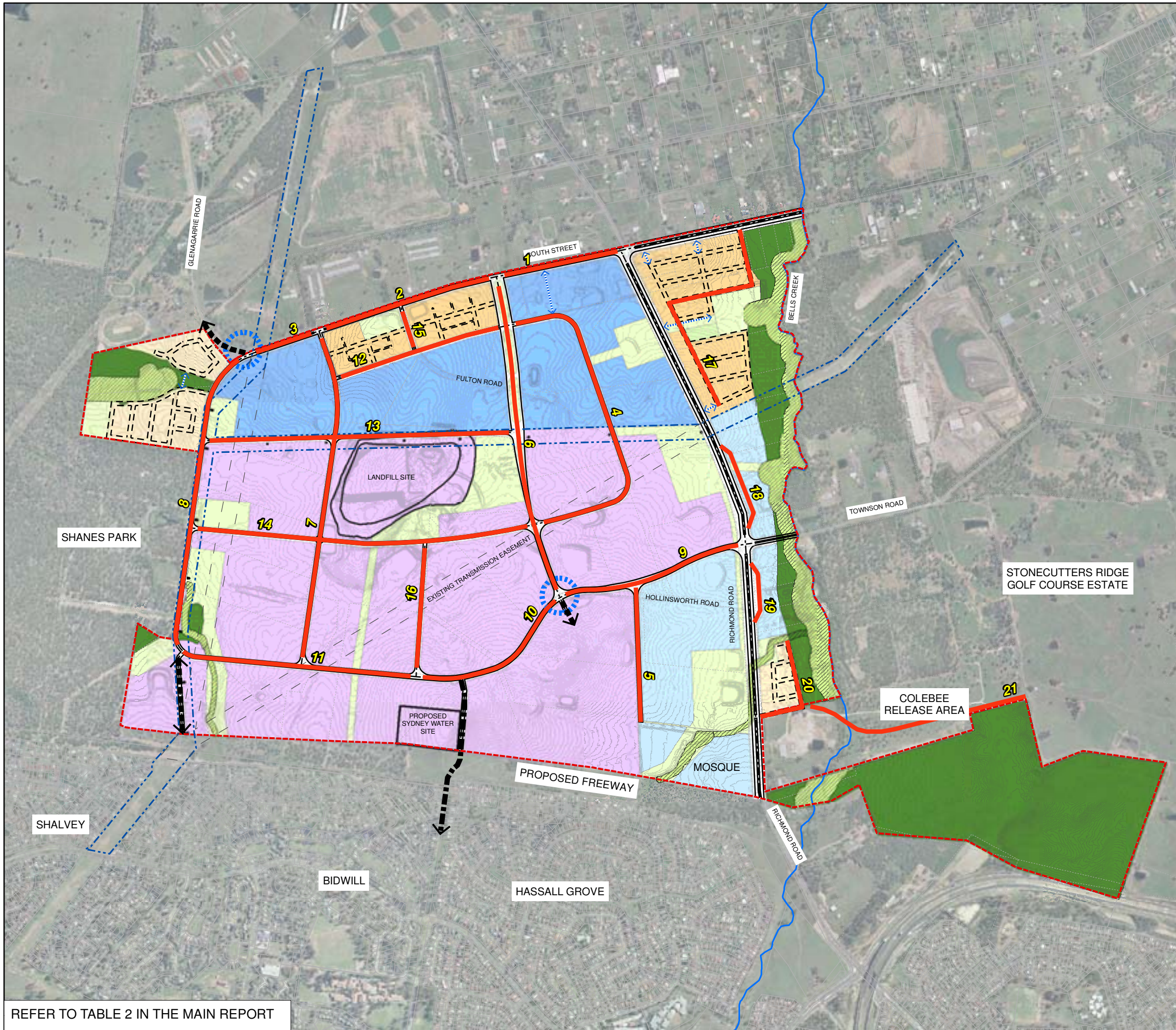
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Drawing Title
Future Precinct Road Hierarchy

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Coordinate System GDA94 MGA Zone 56	Figure No MAP 003
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J:\205773 Marsden Park EP Traffic-Transport\GIS\Projects



- ### Legend
- 11** Reference Number
 - — — Future Precinct Road Sections
 - - - Proposed Transmission Easement
 - - - - - Proposed Transmission Easement
 - - - - - Precinct Boundary
 - Bells Creek
 - - - - - Road centreline
 - - - - - Preferred Location for Neighbourhood Services
- ### Landuse
- Business Park
 - Business Zones
 - Drainage and Infrastructure
 - Light Industrial
 - Low Density Residential
 - Medium Density Residential
 - Conservation Areas
 - Recreation Area
 - Riparian Corridor

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Future Precinct Road Works

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REFER TO TABLE 2 IN THE MAIN REPORT

J:\205773 Marsden Park EP Traffic-Transport\GIS\Projects

- Rural Major Road corridor width (4 lanes dual carriageway) should be a minimum 30 metres cross section comprising 2 x 7 metre wide carriageways, plus 2 x 2 metre wide sealed shoulders, plus 2 x 4 metre wide footpath/verges at each side, plus a central 4 metre wide landscaped median strip.
- For any future sections of Major Roads which are to be designated as Transit Boulevards, an additional 7 metres road corridor width also needs to be incorporated into these road cross sections to provide 2 transit lanes in the future, increasing the necessary road corridor width to 41 metres in an urban (60-70 km/hr) speed environment and 37 metres in a rural (80-90 km/hr) speed environment.

For the future Arterial Roads which are subject to RTA design requirements and have predicted future daily traffic volumes generally above 45,000, one additional traffic lane in each direction is recommended for each additional increment of 20,000 vehicles daily above 45,000, unless a "Freeway Standard" road design can be provided, ie a road with no frontage access and either severely limited turning movements or grade separation at relevant major intersections

The Arup recommended major Sub Arterial four lane divided road corridor width cross section of 34 metres, which is defined above, includes provision for on-street cycle / parking lanes if required, but does not include any future provision for service roads eg for frontage access to commercial or industrial type sites along any major road.

Depending on the future frontage land uses, there may be locations where future on-street cycle / parking lanes are either not required or not appropriate on Sub Arterial roads. In these cases the Blacktown City Council recommended Industrial Sub Arterial road corridor width of 27 metres can be adopted. This accommodates combined footway /cyclepaths within the road verges on each side of the road.

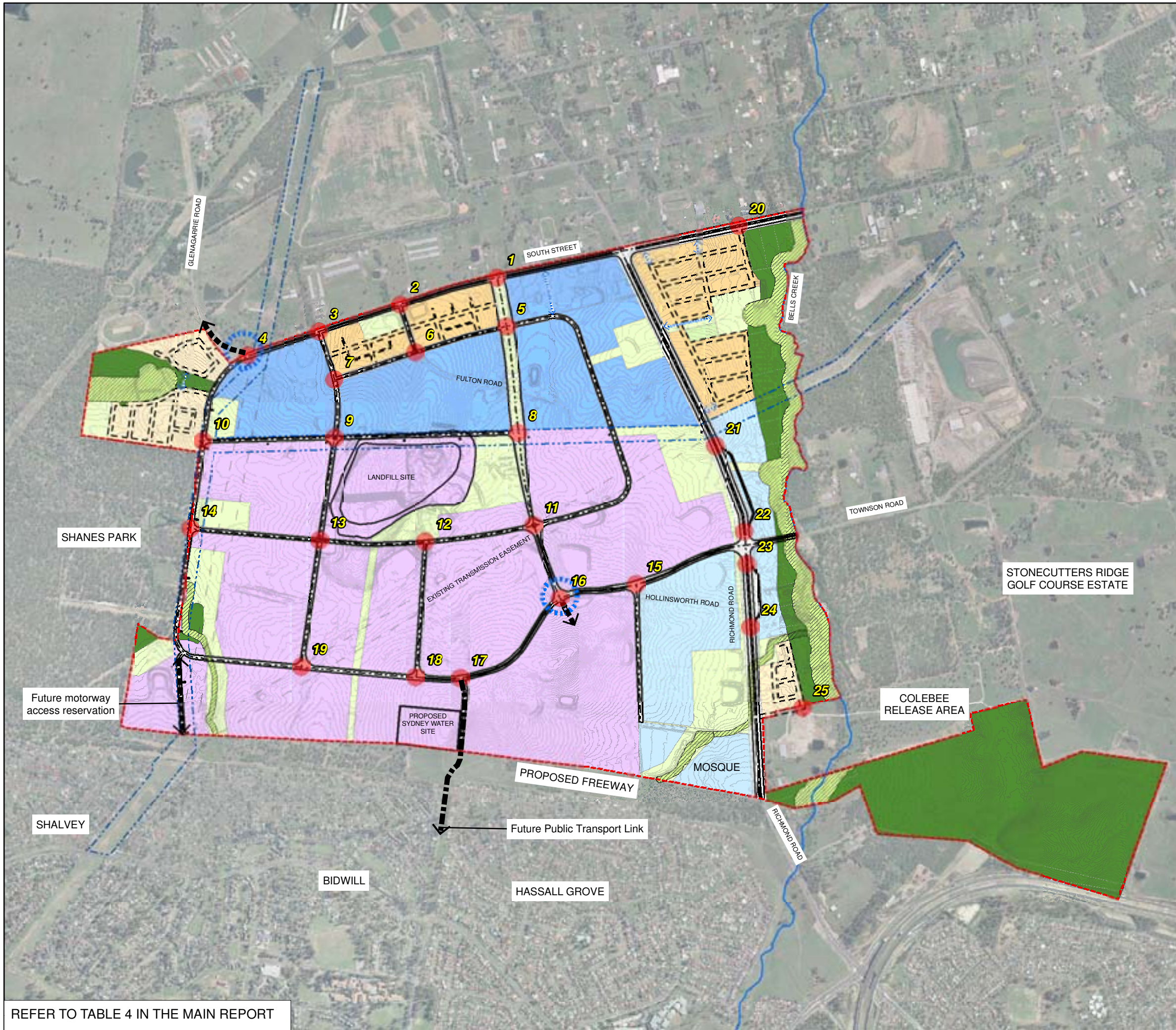
For the future Collector (Industrial) and Local (Industrial) roads, it is generally recommended that the Blacktown City Council Industrial Subdivision Road Design Standards be adopted (15.5 metre road width in a 23 metre wide road corridor and 13.5 metre road width in a 20.5 metre wide road corridor respectively), in preference to the GCC recommended road corridor widths which do not specifically relate to Industrial Precincts.

The Development Control Plan which is being prepared for the Marsden Park Industrial (Employment) Precinct includes a schedule of future proposed road widths which represent a combination of the above referenced standards, which have been specifically determined as being appropriate for the precinct.

6 Future Intersection Requirements

The corresponding future intersection design requirements to maintain road safety and traffic capacity have been assessed by Arup for each intersection location as illustrated by the attached **Map 5**, Future Precinct Intersection Reference Numbers. These future intersection design requirements have been determined according to the following general methodology.

The recommended future traffic controls at intersections, e.g. traffic signal controlled intersections or roundabouts, both within the precinct and at external major road access intersections to Richmond Road, have been determined with reference to the predicted future am peak hour and pm peak hour intersection traffic volumes, and are summarised for all relevant precinct internal and external intersections in the following **Table 4** and **Table 5**. The recommended intersection treatments for all the future internal precinct access intersections which are referenced in **Map 5** are summarised in **Table 4** below.



Legend

- 11** Reference Numbers
- Future Precinct Intersections
- - - Proposed Transmission Easement
- - - Proposed Transmission Easement
- - - Precinct Boundary
- Bells Creek
- - - Road centreline
- ▬ Preferred Location for Neighbourhood Services

Landuse

- Business Park
- Business Zones
- Drainage and Infrastructure
- Light Industrial
- Low Density Residential
- Medium Density Residential
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- Recreation Area
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Future Precinct Intersections

Scale at A3 1:15,000	Job No 205773-00
Coordinate System GDA94 MGA Zone 56	Figure No MAP 005

REFER TO TABLE 4 IN THE MAIN REPORT

J:\205773 Marsden Park EP Traffic-Transport\GIS\Projects

Table 4 Future Internal Precinct Intersection Traffic Volumes

Item Refer to Map 5	Intersection Location Main/Cross Street	Existing Intersection Type	Forecast Year 2036 am and pm peak traffic volumes	Recommended Future Intersection Type
1	South Street/ Main North-South Road	No Intersection Currently	3600-3400	Future X-Junction Traffic Signals (3 lanes traffic capacity on each approach)
2	South Street /Fulton Road	Existing T junction	2200-2300	Future Minor Intersection – Left Turn Traffic Only
3	South Street/ Second North-South Road	No Intersection Currently	2600-2700	Future X Junction, Large Roundabout (2 lanes traffic capacity on each approach)
4	South Street/ Third Major Intersection (western section of South Street)	T Junction with Glengarrie Road	1400-1500	Future T Junction, unsignalised Two Lanes on each approach
5	Main North-South Road/ Eastern Collector/ First Minor E-W Link	No Road or Intersection Currently	900-800	Future X-Junction. Traffic signals are not required for intersection capacity needs but are desirable for future precinct pedestrian access network
6	First Minor N-S Link (part of Fulton Road)/ First Minor E-W Link	No Intersection Currently	100-100	Future T Junction, Unsignalised
7	Second North-South Road/ First Minor E_W Link	No Road or Intersection currently	1100-1200	Future T Junction, Unsignalised
8	Main North-South Road/ Second Minor E-W Link	No Road or Intersection Currently	800-800	Future T Junction, Unsignalised
9	Second North-South Road/ Second Minor E-W Link	No Road or Intersection Currently	1300-1400	Future X Junction. A Medium Sized Roundabout (either one or two lanes on each approach) will be required for the road design configuration at this intersection
10	West End Road/ Second Minor E-W Link	No Intersection Currently	400-500	Future T Junction, Unsignalised
11	Main North South Road/ Eastern Collector/ Third Minor E-W Link	No Road or Intersection Currently	400-600	Future X Junction. A Medium Sized Roundabout (either one or two lanes on each approach) will be required for the road design configuration at this intersection
12	Second Minor N-S Link/ Third Minor E-W Link	No Road or Intersection Currently	150-200	Future T Junction, Unsignalised

Item Refer to Map 5	Intersection Location Main/Cross Street	Existing Intersection Type	Forecast Year 2036 am and pm peak traffic volumes	Recommended Future Intersection Type
13	Second North-South Road/ Third Minor E-W link	No Road or Intersection Currently	300-400	Future X Junction. A small roundabout (one lane on each approach) will be adequate for this intersection
14	West End Road/ Third Minor E-W Link	No Intersection Currently	400-400	Future T Junction, Unsignalised
15	Townson Road Extension/ Southern Collector/	No Road or Intersection Currently	2100-2200	Future T Junction, A Large Roundabout or Seagull Type traffic intersection (two lanes on each approach) will be required for capacity reasons. A Seagull Type intersection will require less land probably, so is preferable
16	Hollinsworth Road / Main North-South Road	No Intersection Currently	1300-1500	Future T Junction, A Large Roundabout or Traffic Signals (two lanes on each approach) will probably be required for traffic capacity. Traffic Signals are preferable for future pedestrian accessibility to local services in the area
17	Hollinsworth Road/ Potential Link to the south via Luxford Road	No Intersection Currently	1000-1000	Future T Junction, Unsignalised
18	Hollinsworth Road/ Second Minor N-S Link	No Road or Intersection Currently	1000-1050	Future T Junction, Unsignalised
19	Hollinsworth Road Extension/ Second North South Road	No Road or Intersection Currently	600-600	Future T Junction, Unsignalised
20	South Street/ Residential Collector Road 1	No Intersection Currently	4800-5400	Future T Junction or X Junction. Depends on future precinct development to the north. Either a Seagull Type intersection or Traffic Signals will be required.
21	Richmond Road/ Service Road 1 (north end)	No Intersection Currently (Direct Property Access to Richmond Road)	3400-2000	Future T Junction, Southbound Carriageway, Unsignalised left in left out access only
22	Richmond Road/ Service Road 1 (south end)	No Intersection Currently (Direct Property Access to Richmond Road)	3400-2000	Future T Junction, Southbound Carriageway, Unsignalised left in left out access only

Item Refer to Map 5	Intersection Location Main/Cross Street	Existing Intersection Type	Forecast Year 2036 am and pm peak traffic volumes	Recommended Future Intersection Type
23	Richmond Road/ Service Road 2 (north end)	No Intersection Currently (Direct Property Access to Richmond Road)	3700-3300	Future T Junction, Southbound Carriageway, Unsignalised left in left out access only
24	Richmond Road/ Service Road 2 (south end)	No Intersection Currently (Direct Property Access to Richmond Road)	3700-3300	Future T Junction, Southbound Carriageway, Unsignalised left in left out access only
25	New Access Road to Colebee-Medallist Precinct/ Residential Collector Road 2	No Intersection Currently	850-550	Future T Junction, Unsignalised

Source: Arup Analysis based on year 2036 Forecast Traffic Volumes

In this analysis where the total future intersection traffic volumes are less than approximately 1300 to 1600 vehicles per hour, unsignalised intersections will probably operate satisfactorily in terms of overall traffic delays in most situations.

At future locations with more than 1600 vehicles per hour, intersections with alternative traffic control measures (either roundabouts, traffic signals, seagull type intersections or left turn only access) are normally required.

For future traffic signals, one additional traffic lane on each approach is normally required for each addition increment of 1600 vehicles per hour above the initial 1600 vehicles of total intersection traffic volume. For roundabouts, a large roundabout with two traffic lanes on each approach can normally accommodate a total intersection traffic volume of up to 4000-4500 vehicles per hour on all approaches.

Generally at all future four way access intersections, including intersections on relatively minor roads, traffic control measures such as small roundabouts will probably be necessary for traffic safety reasons.

Also, where future roundabouts are provided at four way intersections on the minor and collector road industrial networks, it will generally be necessary for the central islands to be fully trafficable (i.e. constructed from heavy duty concrete road pavement material) in order to permit turning movements by large trucks, for example B-Doubles or potentially even B-Triple type trucks in the longer term.

On the two existing and future major arterial roads, eg Richmond Road and South Street, any intersection which does not have grade separation or traffic signals will generally have to have future traffic movements restricted to left turn movements only.

Table 5 Future Richmond Road Intersection Traffic Volumes

Item	Intersection Location Main/Cross Street	Existing Intersection Type	Forecast Year 2036 am and pm peak traffic volumes	Recommended Future Intersection Type
1	Garfield Road West/ Richmond Road	Traffic Signals	6100-6400	Additional lanes will be required at Traffic Signals to provide 4 lanes traffic capacity on each approach
2	Richmond Road/ Grange Avenue	X - Junction	4800-4700	A four way, left in left out intersection, with no Traffic Signals and no cross traffic movement is recommended by RTA at this location
3	Richmond Road/ South Street	X - Junction	9400-9400	Initially Traffic Signals should be provided (5 lanes capacity on each approach). A grade separated intersection will be required in the ultimate future year 2036 design scenario
4	Richmond Road/ Townson Road	T – Junction	7600-7400	Future X-Junction Traffic Signals (5 lanes capacity on each approach)
5	Richmond Road/Hollinsworth Road	T-Junction	N/A	Existing Intersection is to be closed and Hollinsworth Road traffic diverted to the future Townson Road X Junction
6	Richmond Road/ New Colebee-Medallist Access Road	No Access	7100-6900	Future T Junction Traffic Signals (4-5 lanes capacity on each approach)

Source: Arup Analysis based on year 2036 Forecast Traffic Volumes

In initial comments relating to the future road design for the upgrading of Richmond Road, the RTA have indicated that they do not favour closely spaced traffic signal controlled intersections along major arterial roads such as Richmond Road.

In the context of the future development of the Marsden Park Industrial (Employment) Precinct, the future spacing between the two “proposed” traffic signal controlled intersections at Townson Road and the New Colebee/Medallist Access Road, at the southern end of the precinct, will be less than 800 metres. This spacing does not meet the future desired RTA requirement for arterial traffic flow of 2 kilometre spacing typically for

traffic signals along Richmond Road, so will be reviewed in the ongoing design work for the Richmond Road Upgrade on this basis.

However if any alternative design with no traffic signals in the future is adopted at this location on Richmond Road, the future local vehicular access to residential areas on the eastern side of Richmond Road and the future local pedestrian access in the area (eg to and from public transport services travelling along Richmond Road) will be made much more difficult as a result

7 Future Public Transport, Walking and Cycling Access

The existing travel modes for the Marsden Park area and other similar “Non Rail Corridor” travel zones of the Blacktown North section of Blacktown LGA, (eg areas more than 2 kilometres distant from the railway line) have been determined from analysis of the years 1997/2004 HTS travel data provided by the TPDC which includes all types of travel at all times of the day as summarised below in **Table 6** of this report.

Table 6 Future Target Changes For Local Area Travel Mode Share (Marsden Park Area)

Travel Mode For All Trip Purposes	Existing Travel Mode Share 2001 %	Future Travel Mode Share Target 2036 %
Car Driver	60.57%	52.09%
Car Passenger	24.44%	24.44%
Train	3.74%	5.46%
Bus	2.66%	3.88%
Bicycle	0.41%	2.00%
Walk	7.91%	11.55%
Other	0.27%	0.39%
Total	100%	100%

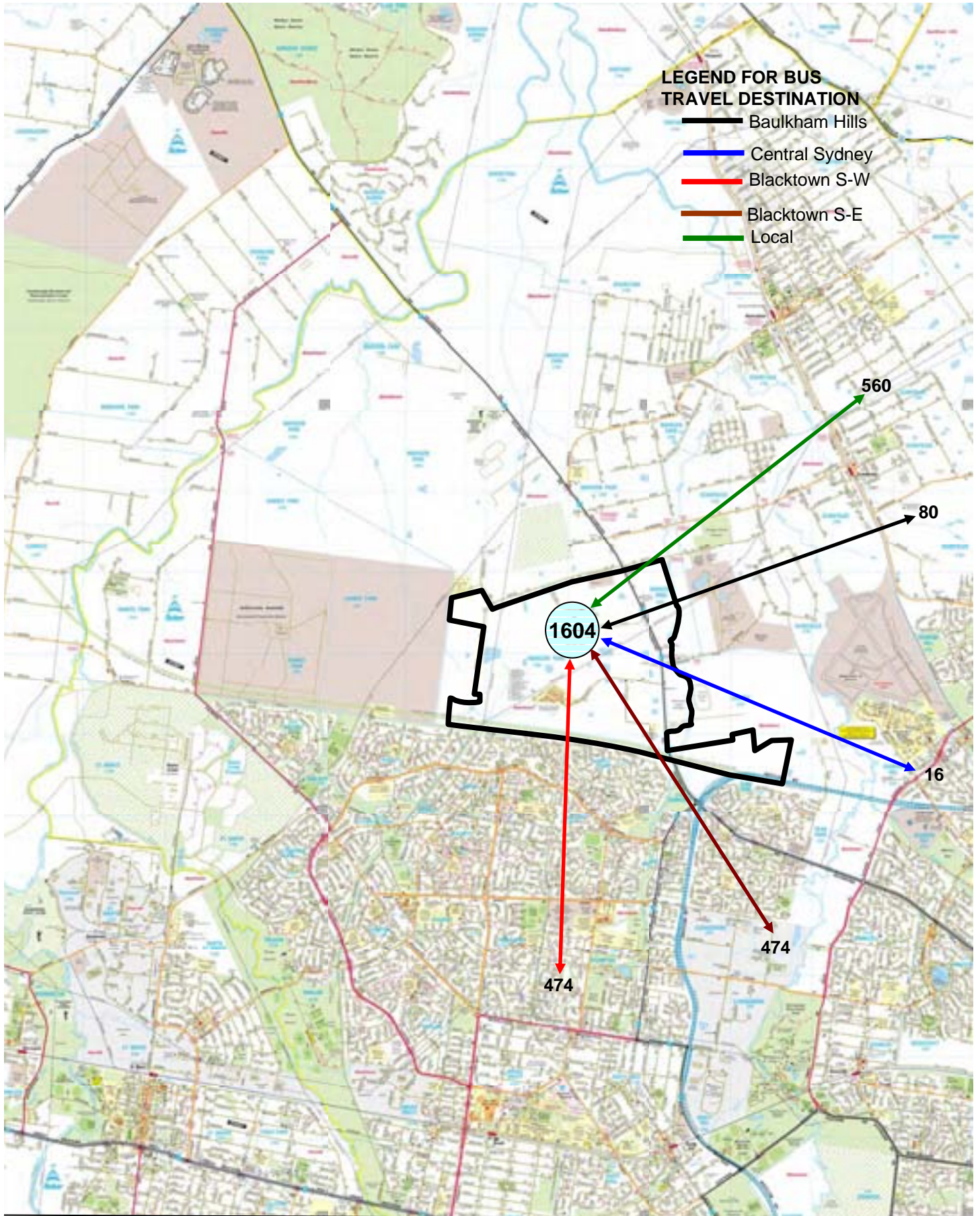
Source : Arup Analysis of Year 1997/2004 HTS Travel Data for Blacktown LGA

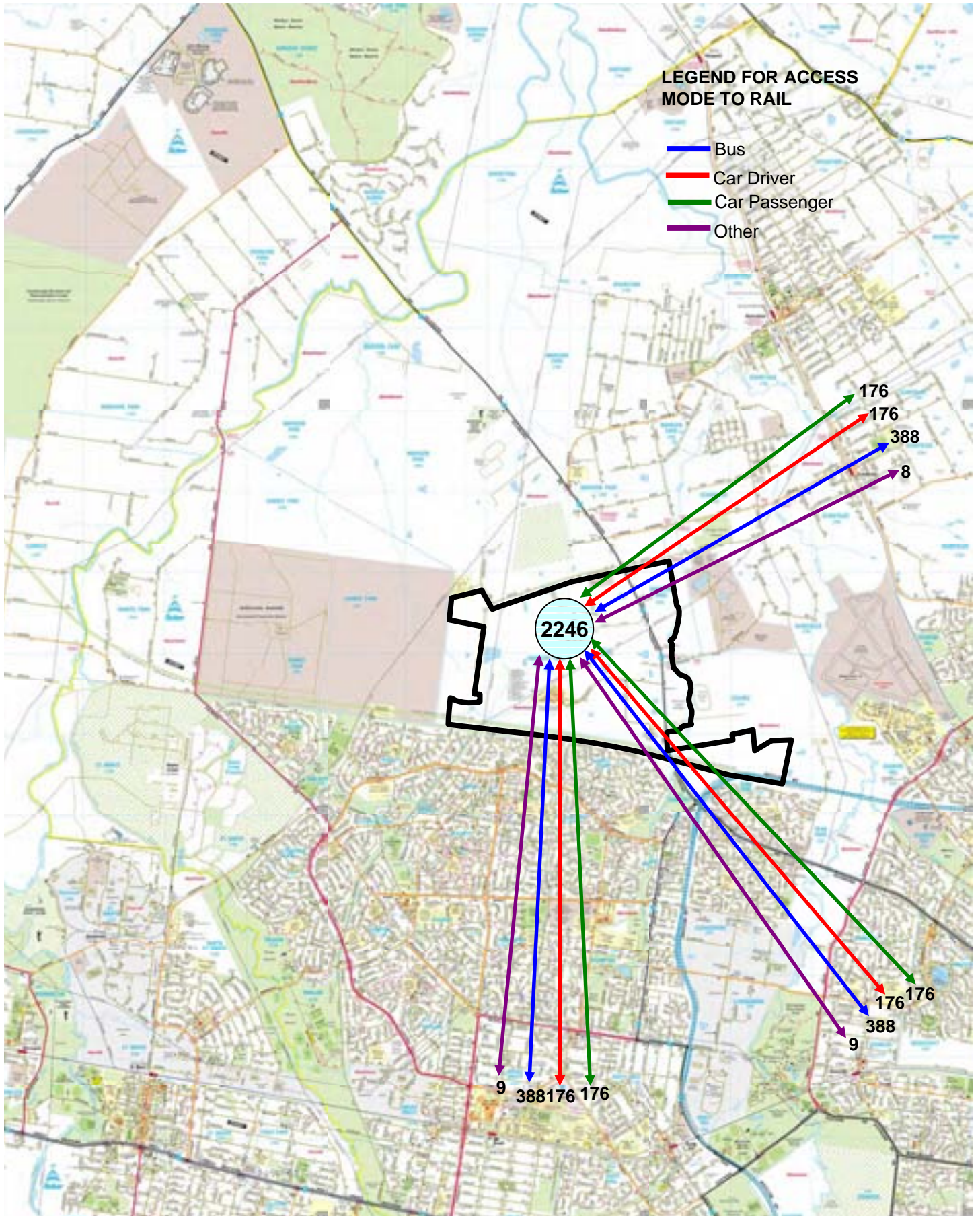
As part of the future longer term precinct development and travel pattern changes with increasing urbanisation of the precinct and improved access to public transport services, (eg new regional bus services), there will be an approximate 14% reduction (factor x 0.86) in the overall future car driver travel mode share, with consequent proportional increases in the future travel mode shares for the other travel modes, as summarised by **Table 6** .

It is assumed that car passenger travel will remain constant in this analysis, as while it is likely that the demand for car sharing and higher car occupancy for journeys will tend to increase in the future, there will be less overall opportunities for car passenger travel as there will be proportionally fewer car driver journeys travelling on the roads.

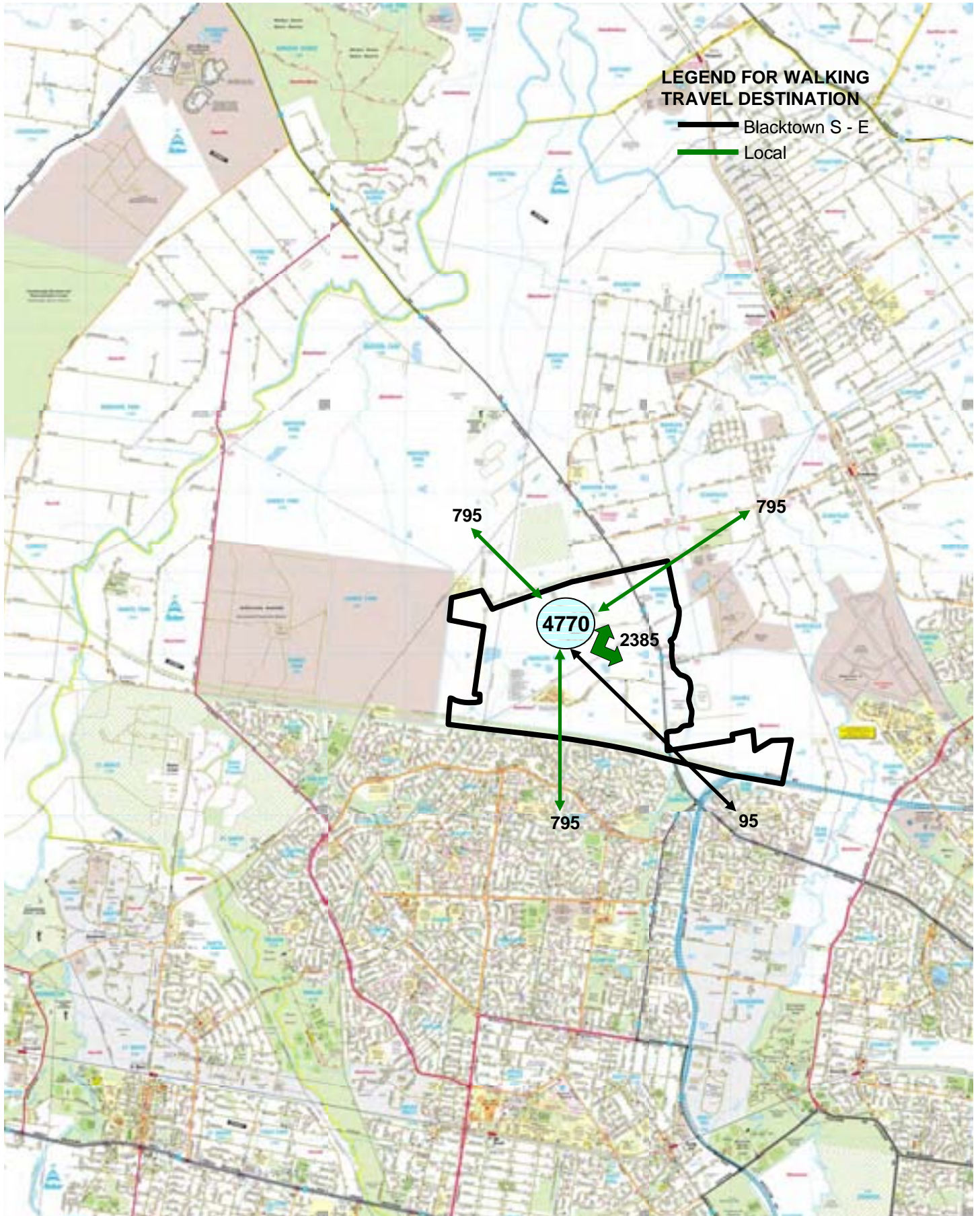
In this analysis, it is also assumed that the overall future level of cycling as a travel mode share will increase significantly from the “very low” level of approximately 0.4% currently to approximately 2.0% in the future and the combined future travel mode share for the other three “sustainable” travel modes (eg Walk, Rail and Bus) will increase by a factor of (x 1.46) from a total of 14.3% currently to 20.9% in the future year 2036.

The future Year 2036 travel mode share targets which are proposed in **Table 6** above result in the future projected full development travel demand volumes for non car based travel for the Marsden Park Industrial (Employment) Precinct for future Rail, Bus and Cycle and Walking Travel, that are illustrated in **Figures 2a,2b,2c and 2d** of this report.





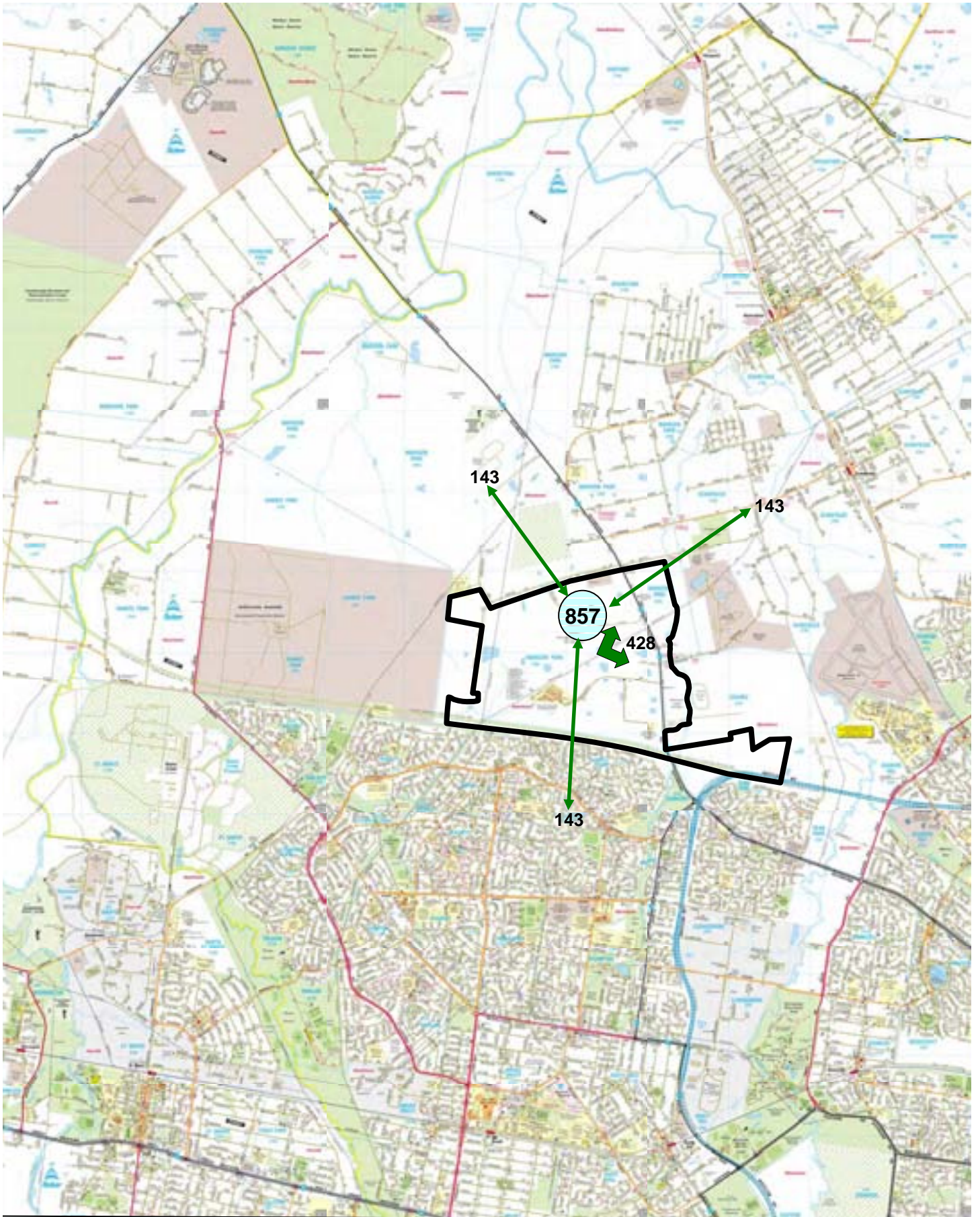
MARSDEN PARK INDUSTRIAL – TRANSPORT & ACOUSTIC ASSESSMENT
FUTURE ADDITIONAL TWO WAY (ALL DAY) RAIL TRIPS
(5.46% MODE SHARE) FIGURE 2b



MARSDEN PARK INDUSTRIAL – TRANSPORT & ACOUSTIC ASSESSMENT

FUTURE ADDITIONAL TWO WAY (ALL DAY) WALK TRIPS

(11.55% MODE SHARE) FIGURE 2c



The figures presented are the total daily travel demand in all directions. For future bus and rail travel, the likely directions and typical destinations of this travel demand are reasonably easy to predict. The future daily walking and cycling based travel demand will be more locally based and have less well defined destinations, The assumed two way total movements shown are to a range of local destinations both within and external to the precinct.

For future bus travel, including bus feeder access movement to the rail network, there are three future significant regional bus corridors identified where the future bus passenger demand from the MPIP precinct, in combination with other demand from adjoining precincts, would warrant the development of new bus routes and services, namely

- A new route to and from the East via South Street, to the New Schofields Station and the Rouse Hill Town Centre
- A new route to and from the South East, via Richmond Road, to and from the Blacktown Town Centre and Railway Station
- A new route to and from the South, preferably on a direct future route via Daniels Road, to and from the Mount Druitt Town Centre and Railway Station

8 Future Heavy Vehicle Routes and Volumes

On a similar basis to the future travel mode share projection estimates for rail, bus, walking and cycling travel modes, the future predicted daily heavy vehicle traffic movement generation and “desire lines”, ie the directions of the main origins and destinations for this traffic have been determined according to the TPDC Commercial Vehicle Traffic Study (CTS) database.

This database relates the existing and the estimated future heavy vehicle traffic movements per day from any employment area to the total workforce in the area. For similar areas within Blacktown LGA, the predicted future daily heavy vehicle movement traffic generation rate is 0.32 trips per employee per day, which corresponds to an estimated future 3200 daily heavy vehicle trips for the future estimated total precinct employment of 10,000 additional jobs.

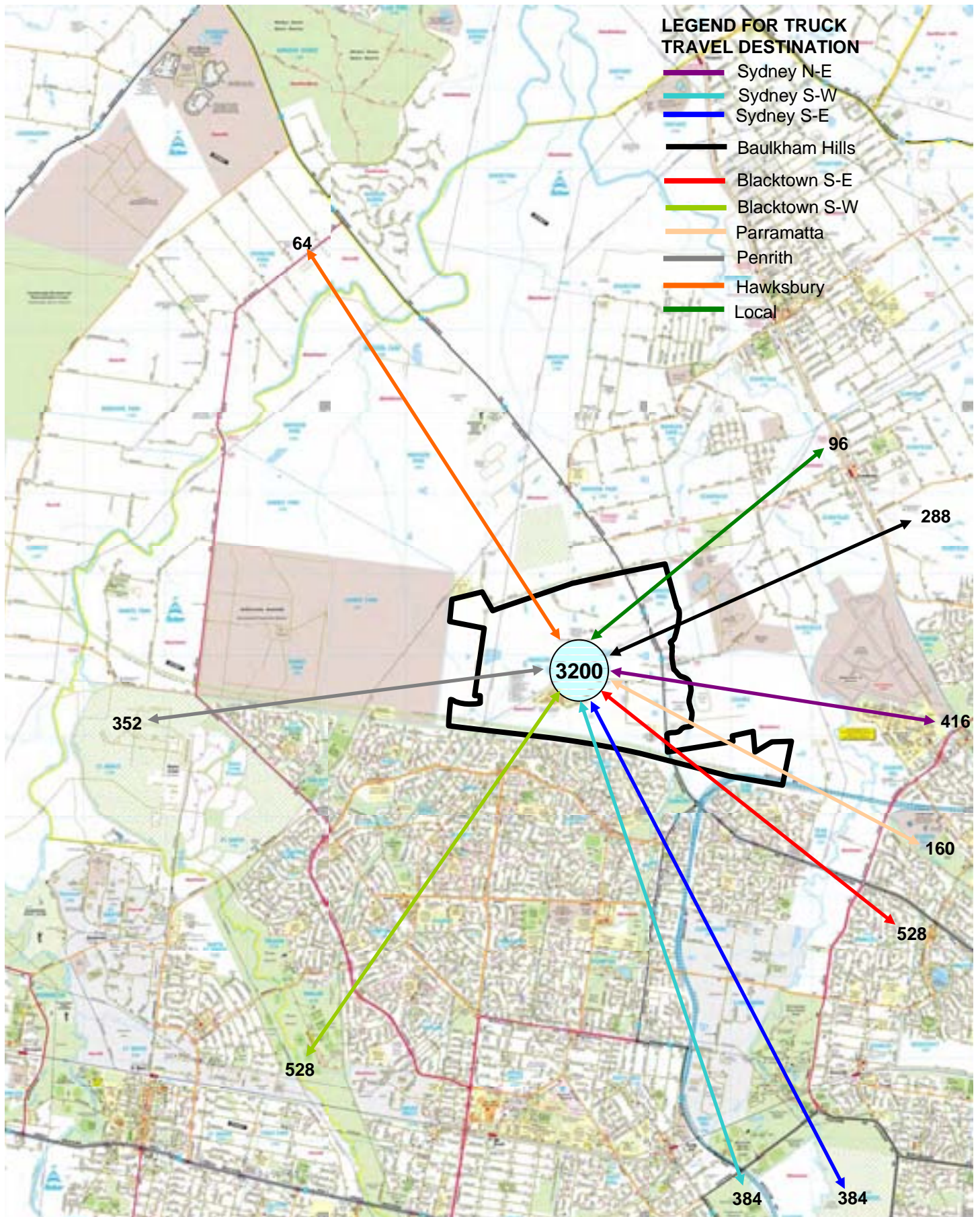
The primary implications of this future heavy vehicle traffic movement are illustrated by the map of the future traffic desire lines, which is shown by **Figure 2e** of this report.

Internally within the precinct, a minimum left turn “turnout” radius of approximately 25 metres will need to be provided at most intersections in order to permit future turning movements by large trucks, up to and including B-Triple road train trucks, as and when these vehicles are permitted to operate within the Sydney Metropolitan Region. The corners within the precinct where this design criterion should be applied are illustrated by the attached **Map 6**.

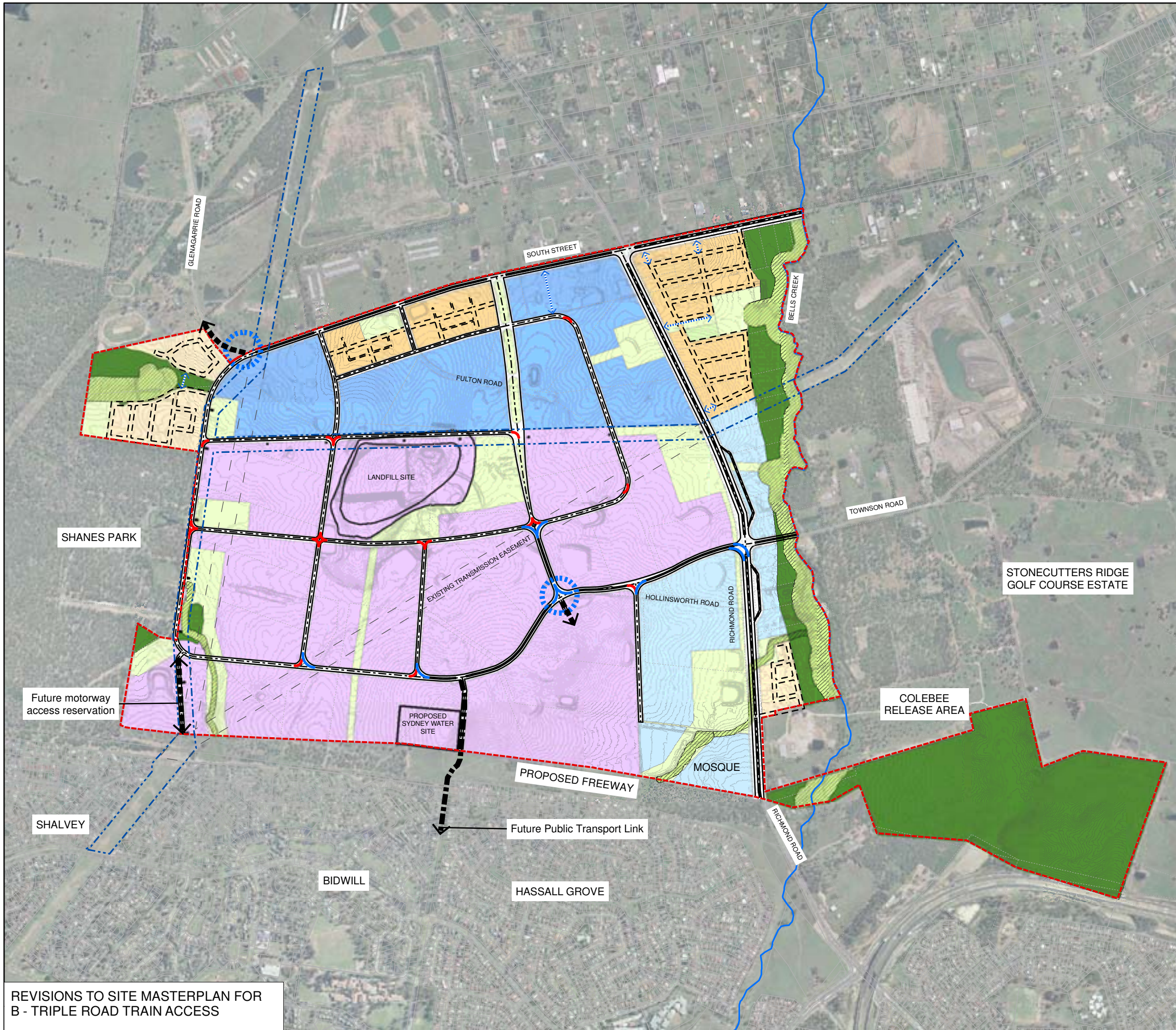
Additionally at some of the more heavily trafficked corners an even larger “turnout” radius of at least 30 metres should be provided. With this larger turnout radius it will also be potentially feasible to provide left turn pedestrian refuge islands at the affected corners to help ensure pedestrian safety in combination with providing the turning facility for large trucks.

On Richmond Road, there is already a high existing proportion of heavy vehicles in the traffic flow which is at least ten percent, based on the results of classified intersection traffic counts undertaken in the year 2007 at the Garfield Road and Richmond Road intersection.

In the future with the relatively high levels of employment generating industrial and commercial development which are proposed at Marsden Park and elsewhere in the NW Growth Centre, this high proportion of heavy vehicles in the traffic flow on Richmond Road is anticipated to continue.



MARSDEN PARK INDUSTRIAL – TRANSPORT & ACOUSTIC ASSESSMENT



Legend

- Intersection Radius
- 25 m left turn (with no ped island)
 - 30 m left turn (minimum)
 - Proposed Transmission Easement
 - Proposed Transmission Easement
 - Precinct Boundary
 - Bells Creek
 - Road centreline
 - Preferred Location for Neighbourhood Services

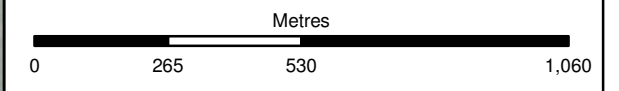
Landuse

- Business Park
- Business Zones
- Drainage and Infrastructure
- Light Industrial
- Low Density Residential
- Medium Density Residential
- Conservation Areas
- Recreation Area
- Riparian Corridor

P1	22-06-09	DD	TB	TB
Issue	Date	By	Chkd	Appd



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Client
Marsden Park Development

Job Title
**Marsden Park Industrial
 (Employment) Precinct Study**

Drawing Title
**Guide to B - Triple Road
 Train Accessible Intersections**

Scale at A3
1:15,000

Job No
205773-00

Coordinate System
GDA94 MGA Zone 56

Figure No
MAP 006

REVISIONS TO SITE MASTERPLAN FOR
 B - TRIPLE ROAD TRAIN ACCESS

J:\205773 Marsden Park EP Traffic-Transport\GIS\Projects

Also with respect to the future potential development of any road connection between the Marsden Park Industrial (Employment) Precinct and Luxford Road to the south, the potential daily heavy vehicle traffic movements which could be generated in this direction by the employment precinct would be approximately 530 truck movements daily.

Because the areas surrounding Luxford Road are primarily residential in nature, any future road connection from the Precinct to Luxford Road should be a bus only link with provision for pedestrians and cyclists.

9 Future Section 94 Roadworks Plan

The future precinct Section 94 Contributions Plan for roadworks and traffic management will be prepared by the Blacktown City Council based on an agreed schedule of items.

Minor roads such as local industrial roads and local residential roads will not generally be included in the Section 94 Roadworks Plan. The future alignment and construction of these roads will be in accordance with the alignments to be specified in the precinct DCP (and the ILP Masterplan) but will be subject to the discretion of the individual affected landowners where these roads are not specifically required for access to future development sites.

In accordance with current Blacktown City Council practice for Section 94 contributions plans it is likely that the total future contribution costs will be calculated for separately for all future industrial (employment) zoned land and all future residentially zoned land on uniform "per hectare" rates for all developable land areas of the type of development proposed.

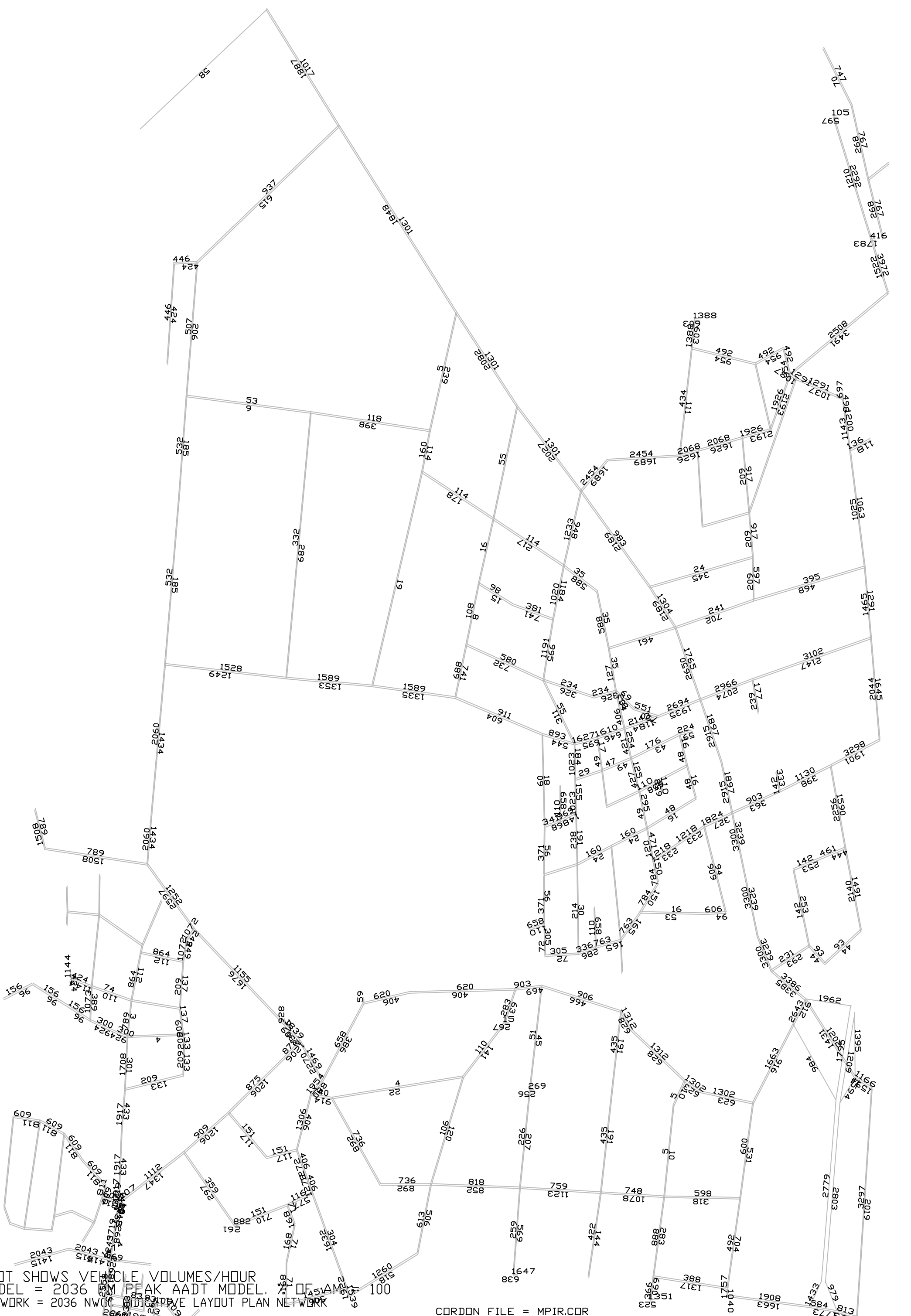
Appendix A

**Year 2036 Network
Traffic Model Volume
Plots**



PLOT SHOWS VEHICLE VOLUMES/HOUR
 MODEL = ANNUALAADT MODEL
 NETWORK = 2036 NWCC DIVERGENT LAYOUT PLAN NETWORK
 Model Run Date = 6/7/05 17:07. Model = 3636AD1. Ver = 2008
 X Scale Factor = 1. Y Scale Factor = 1. Plot File = 3636AD1.X01.

CORDON FILE = MPIR.CDR
 Network = 2036ILP. D/D = 36AM85.



PLOT SHOWS VEHICLE VOLUMES/HOUR
 MODEL = 2036 AM PEAK AADT MODEL. OF AM 100
 NETWORK = 2036 NWCD BIDDING LAYOUT PLAN NETWORK

CORDON FILE = MPIR.CDR

Model Run Date = 6/09/16:08. Model = 36PM85. Ver = 2008
 X Scale Factor = 1. Y Scale Factor = 1. Plot File = 36PM85.X01. Network = 2036ILP. D/D = 36PM85.