Traffic and Transport Assessment

Glenmore Park Town Centre

CG140307

Prepared for
Village Fair Glenmore Park Pty Ltd

29 May 2014

Cardno
Shaping the Future

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1 Introduction

Cardno was retained by Village Fair Glenmore Park Pty Ltd to undertake a traffic and transport assessment of the proposed expansion to Glenmore Park Shopping Centre.

An Planning Approval exists for the site (Planning Permit DA10/1305 issued 29th March 2012 by Penrith City Council on behalf of the Joint Regional Planning Panel) approving the redevelopment the majority of the land north of the existing centre buildings and bound by Glenmore Parkway and Luttrell Street (including the existing at-grade car park and vacant lot) for the purposes of an extension of the existing town centre to provide a total of some 16,413 additional square metres of commercial/retail floor area and an additional 690 on-site car parking spaces.

This application is for a revised scheme of a significantly smaller scale than that previously approved which is to be contained entirely within the vacant site to the north of the existing at-grade car park which serves the existing shopping centre. It is to include a total of 8,653 square metres of retail/commercial floor area, inclusive of Coles and Aldi Supermarkets and two new levels of on-site undercroft parking.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development prepared by Benier Francis Architects have been examined, and all relevant traffic and parking data collected and analysed.

The following additional documents have been reviewed:

> 2012 Approved Plans

> GTA Consultants Draft Report for the Previously Approved Application

> 2014 Proposed Plans (prepared by BF Architects)

> Penrith City Council Planning Guidelines and Controls Documents

2 Background and Existing Conditions

2.1 Location and Land Use

The subject site is the northern portion of vacant land to the north of the existing Glenmore Park Shopping Centre, bordered by Glenmore Parkway to the north and an existing at grade car park at the south, as shown in Figure 2-1.

Figure 2-1 Site Location

2.2 Existing Glenmore Park Shopping Centre

The existing Glenmore Park Shopping Centre is located within an irregular parcel of land bound by Glenmore Parkway, Luttrell Street and at-grade car park in Glenmore Park.

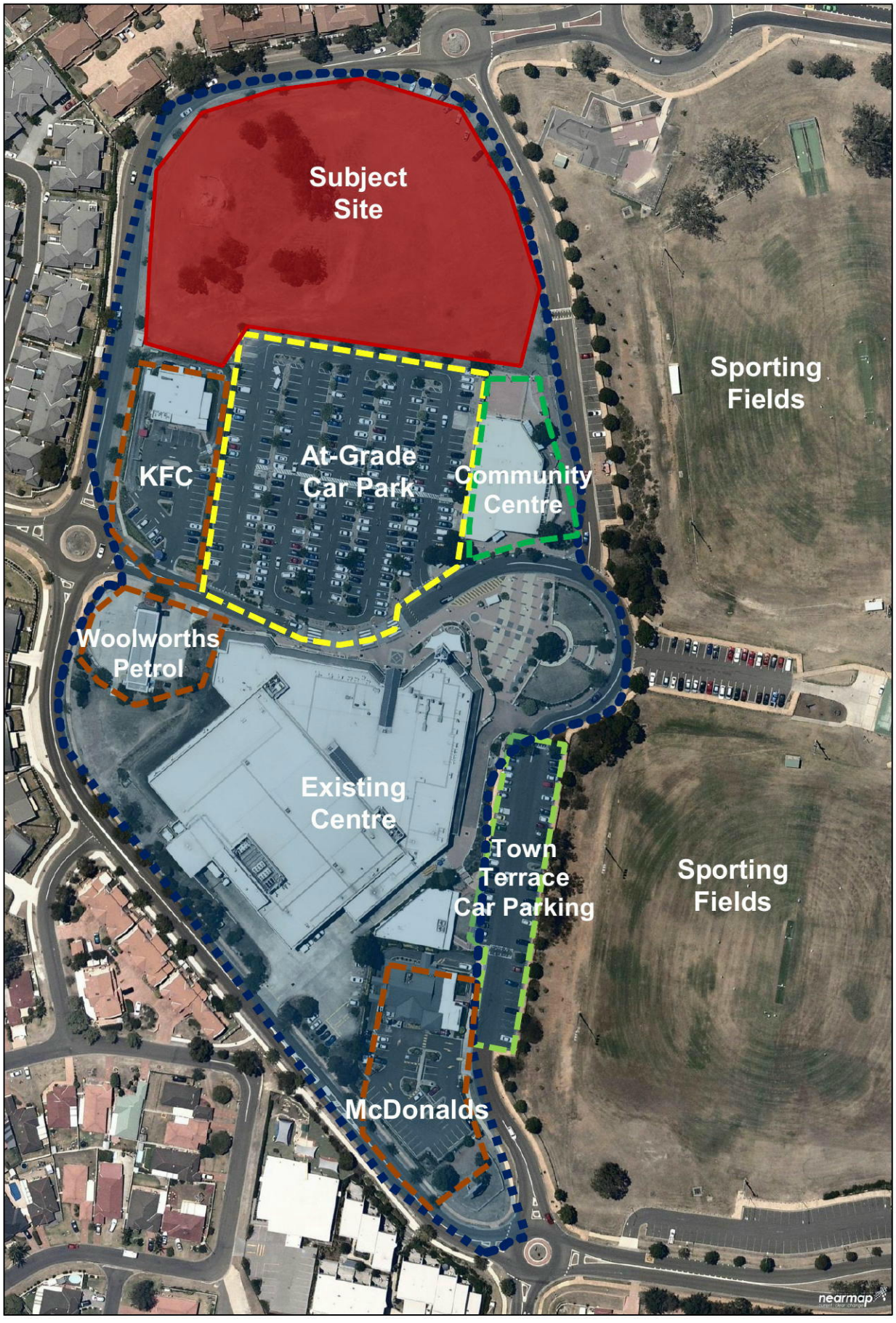
The existing shopping centre has a total floor area of 7,074 m^2, comprised of a 4,282 square metre Woolworths Supermarket (2,754 square metres of net floor area), 2,792 square metres of specialty retail and kiosks and is serviced by a 283 space at-grade car park north of the centre and a 68 space car park on Town Terrace to the east.

The centre also includes three PAD sites, being a McDonalds at the southern end of the site, a KFC west of the main existing at-grade car park and a petrol station.

Located adjacent to the centre is a Community Centre with an unused basketball court and the sporting ovals on the east side of Luttrell Street served by additional on-street spaces.

An aerial of the site and surrounds is provided at Figure 2-2.

Figure 2-2 Aerial Photograph of Site and Surrounds



2.3 Penrith Development Control Plan 2006 – Glenmore Park Town Centre

This Development Control Plan is the overarching document for the development of the Town Centre.

It defines controls for the development of the Shopping Centre site, the sporting fields and community facilities and set-outs the proposed function of the road network.

The majority of the area identified within the Glenmore Park Development Control Plan has been constructed and is operating, with the exception of the subject site, which remains vacant.

2.4 Road Network

2.4.1 Glenmore Parkway

Glenmore Parkway is a local road running along the western boundary of the Glenmore Park Town Centre site. It provides through connections to the surrounding residential estate, as well as through to Mulgoa Road and Western Motorway to the north and The Northern Road to the east.

In the vicinity of the site, Glenmore Parkway accommodates a single lane of traffic in each direction as shown in Figure 2-3.

Figure 2-3 Glenmore Parkway, looking north toward the subject site

2.4.2 Town Terrace (Luttrell Street)

Town Terrace, also known as Luttrell Street is a local road running north-south between the shopping centre and sporting fields.

East of Stage 1 of the Centre, it provides for a lane of traffic in each direction, with 90 degree angled parking on both sides of the road, used by the Shopping Centre and adjacent sporting fields.

North of the existing Centre, it provides a lane of traffic in each direction, with a section of indented 90 degree angled parking on the eastern side. A small portion of indented parallel parking is currently provided adjacent the Community Centre. The western kerb, abutting the subject site, is No Stopping restricted as shown in Figure 2-4.

Figure 2-4 Town Terrace (Luttrell Street), looking north towards the subject site

The Glenmore Park Development Control Plan indicates that Luttrell Street should provide:

- *Angle parking for much of its length should serve spectators as well as Town Centre visitors.*
- *The street should have a reservation width of twenty (20) metres to accommodate a footpath of around 3.5m along its western edge, parallel parking on its western side and 90 degree parking on its eastern side. A 8 to 9 metre carriageway will allow for bus movement and parking.*

2.4.3 Town Terrace (Camellia Avenue)

Town Terrace is the extension of Camellia Avenue through the centre of the Town Centre site. It provides access to the at-grade car park associated with the existing shopping centre as well as the Woolworths Petrol and KFC sites.

It accommodates separate two-way traffic, and the section linking the existing shopping centre and the at-grade car park is currently signed as a Shared Pedestrian and Vehicle Zone, as shown in Figure 2-5.

It's kerbs are No Stopping restricted, with the exception of an indented pick-up/drop-off bay to the east of the shopping centre entrance adjacent the existing plaza.

Figure 2-5 Town Terrace (Camellia Avenue), looking east at the existing shopping centre

2.5 Public Transport

The Public Transport NSW map for the City of Penrith in the vicinity of the site is shown in Figure 2-6 showing that Bus Routes 794, 797, and 799 operate past the site, along Glenmore Parkway west of the site.

Bus stops are located on Glenmore Parkway adjacent the KFC PAD site, servicing the subject site.

Figure 2-6 NSW Public Transport Map – Western Sydney Region 1

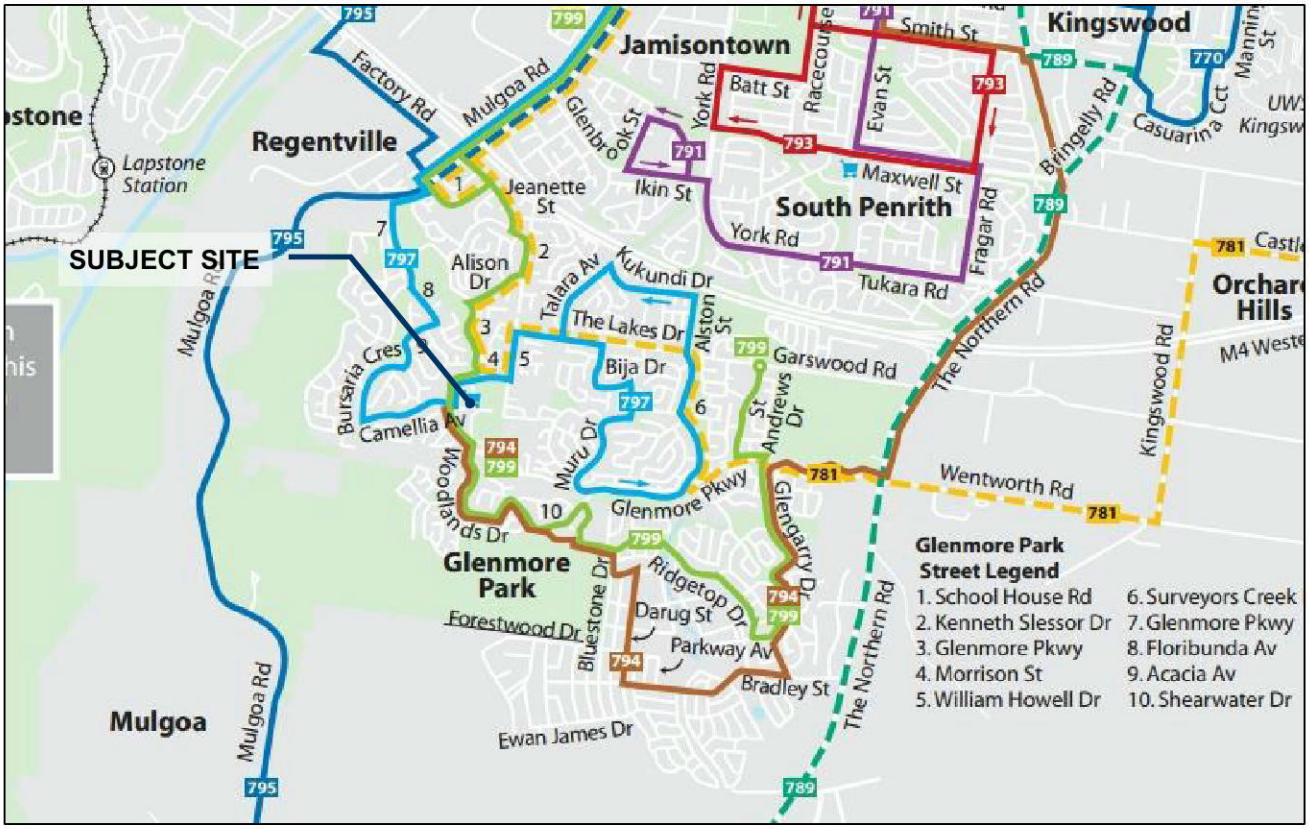


Table 2-1 Existing Bus Services

Route Number	Description
794	Penrith to Glenmore Park via South Penrith
797	Penrith to Glenmore Park via Mulgoa Road
799	Penrith to Glenmore Park and Blue Hills Estate

3 Previously Approved Development

3.1 General

In 2012, a Planning Permit was issued for the development of the land north of the existing centre buildings and bound by Glenmore Parkway and Luttrell Street (including the existing at-grade car park and vacant lot) for the purposes of an extension of the existing town centre to provide a total of some 16,413 additional square metres of commercial/retail floor area and an additional 690 on-site car parking spaces.

A breakdown of the approved proposal is shown in Table 3-1.

Table 3-1 Previously Approved Development Schedule

Component	Description	Total
Retail	Supermarket	1,642 m^2
	Specialty	4,837 m^2
	Restaurant	1,100 m^2
	Commercial	1,396 m^2
	DDS	7,332 m^2
	Kiosks	106 m^2
	Total	16,413 m^2

3.2 Car Parking

The redeveloped site was to provide 953 on-site car parking spaces, which included the replacement of the existing 283 at-grade parking spaces which service the existing shopping centre, therefore resulting in a total of 690 additional spaces.

Parking was proposed within a number of levels of parking accessed with a number of accesses from the surrounding road network and included new on-street perpendicular parking on Luttrell Street along the site's abuttal.

3.3 Access

Access to the site was proposed as follows:

> Two-way car parking access to Luttrell Street

> Two-way access with an internal roundabout providing separate access to the upper and lower car parking levels from Town Terrace (eastern extension of Camellia Avenue);

> Two-way loading access to Glenmore Parkway, at the northern boundary; and

> A second two-way loading access to Glenmore Parkway, at the western boundary of the site

It is understood that all loading areas were to be linked, with vehicles able to enter the loading areas from the northern access and circulate in a one-way direction southbound. An exit from the retail loading areas was provided at the internal car park roundabout to exit onto Town Terrace (eastern extension of Camellia Avenue).

It is understood that the proposal included a number of external works as follows:

> 3 No. Zebra Pedestrian Crossings on Luttrell Street linking the development and the Sporting Fields;

> 1 No. Zebra Crossing on the eastern leg of the Glenmore Parkway/Luttrell Street intersection.

The proposal also included the relocation of the existing bus stop on Glenmore Parkway at the west of the site.

4 Proposed Development

4.1 General

Similar to the current approval, it is proposed to expand the existing shopping centre within the northern portion of the site. However, based on the provided plans, the proposed scheme is of a significantly smaller scale than that previously proposed and is to be contained entirely within the vacant site to the north of the existing at-grade car park.

It is to include a total of 8,653 square metres of additional retail/commercial floor area, inclusive of Coles and Aldi Supermarkets and specialty retail uses.

A breakdown of the revised proposal is shown in Table 4-1.

Table 4-1 Currently Proposed Development Schedule

Component	Description	No/Area
Retail	Coles Supermarket	Net 2,800m^2 (Gross 4,297 m^2)
	ALDI Supermarket	Net 1,046m^2 (Gross 1,543 m^2)
	Supermarket Sub-Total	**Net 3,846 m^2 (Gross 5,840 m^2)**
	Specialty*	Gross 3,176 m^2
	Kiosks	54 m^2

**Includes "Commercial" Floor area, assumed to be associated with general retail uses*

4.2 Car & Bicycle Parking

The proposal includes the provision of two new car parking levels on the northern site, accessed from Glenmore Parkway and Luttrell Street.

Links are proposed to be provided between the existing at-grade car park to the south, and the new car parking levels. Modifications to the existing at-grade car park are proposed to accommodate these new links and improve circulation through the car parking area.

A total of 388 car parking spaces are proposed within the new two-level car park, with the new links to the existing at-grade car park proposed to reconfigure the existing car park to retain the same number of spaces in this area. A total of 11 accessible spaces are proposed.

Works on Luttrell Street are also proposed to introduce 25 new angled parking bays on the eastern side and seven (7) parallel spaces on the western side, adjacent the sports fields to service the Town Centre and Community Uses as a whole.

Across the whole of the Town Centre, the proposal will increase parking by a total of 420 spaces.

A further eight (8) courier and service vehicle spaces are proposed within the Coles Loading Dock.

A total of 15 double sided bicycle racks are provided on the site, located conveniently adjacent the new main entry to the shopping centre expansion, and accommodating a total of 30 bicycles.

4.3 Access

Access to the site is proposed as follows:

> A new two-way car parking access to Luttrell Street which will service the lower level of the new car park;

> A new two-way car parking access to Glenmore Parkway, at the northern boundary, which will service the upper level of the new car park;

> A new two-way loading access to Glenmore Parkway, east of the car park access at the northern boundary and west of the roundabout intersection with Luttrell Street servicing the ALDI and Specialty Retail Loading Dock;

> Separate inbound and outbound driveways to Glenmore Parkway, on the western boundary of the site, servicing the Coles Loading Dock.

> A new two-way car park access, to the south of the Coles Loading Dock, which will link to the existing at-grade car parking via the rear of the KFC PAD site; and

> Two internal access linkages to the existing at-grade car park (one ramped up to the upper parking level and the other ramped down to the lower car parking level)

Consistent with the approved development, additional works are proposed as follows:

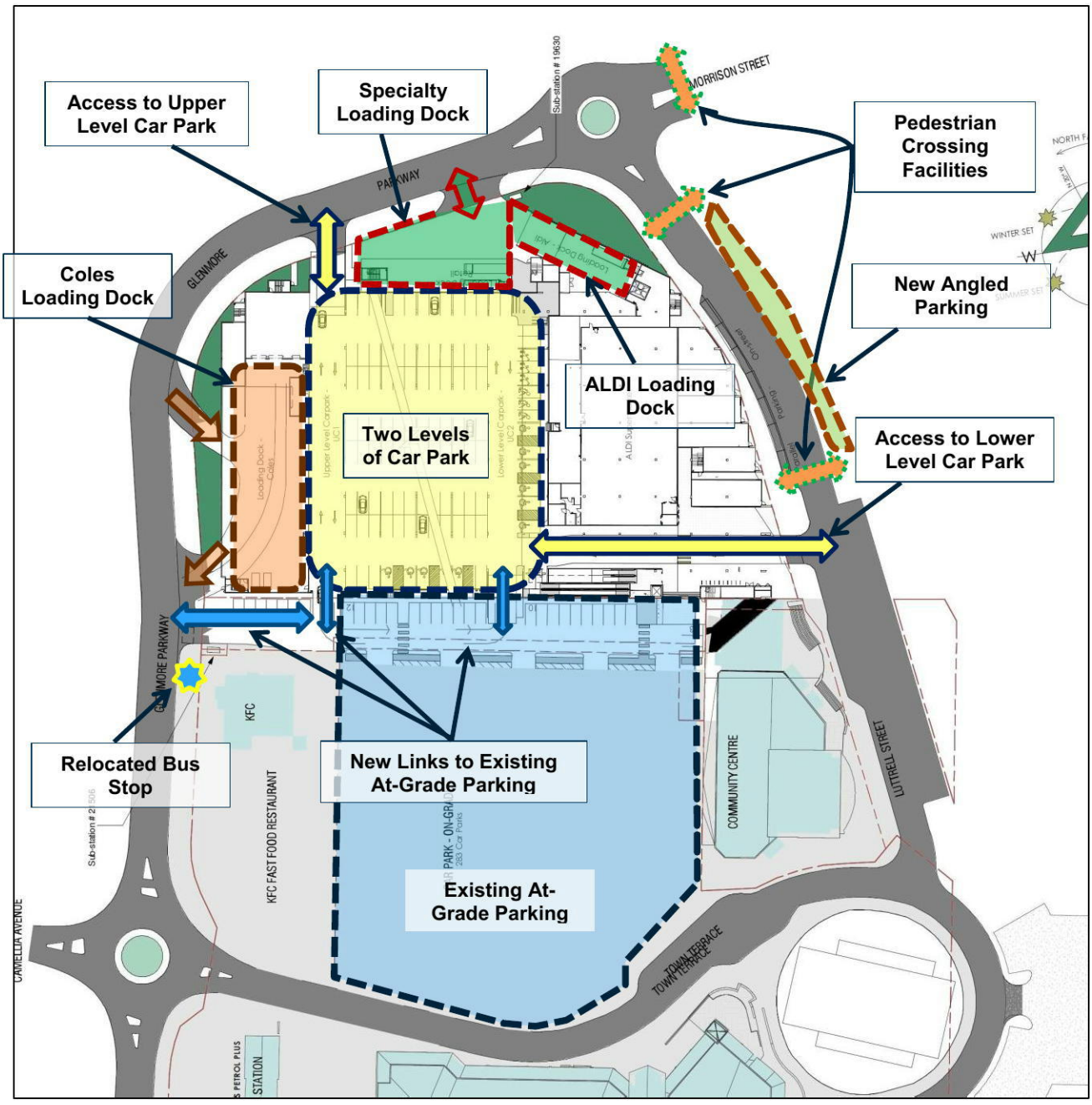
> 2 No. Zebra Pedestrian Crossings on Luttrell Street linking the development and the Sporting Fields;

> 1 No. Zebra Crossing on the eastern leg of the Glenmore Parkway/Luttrell Street intersection.

The proposal also included the relocation of the existing bus stop on Glenmore Parkway at the west of the site.

The access arrangements are depicted in Figure 4-1.

Figure 4-1 Proposed Vehicle Access Arrangements



5 Car Parking Considerations

5.1 Penrith Development Control Plan 2006 – Glenmore Park Town Centre

The Penrith Development Control Plan 2006 specifies the car parking provisions which are prescribed for the development of the site.

The table at Part B of this document indicates that the following parking provision requirements are applicable to retail premises in suburban areas:

> 1 space to each 10 square metres of net floor area for supermarkets

> 1 space to each 26 square metres of net floor area for other retailing activities.

Table 5-1 provides an application of these rates to the proposed development floor areas.

Table 5-1 Penrith Development Control Plan Parking Requirements

Component	Description	Total	Rate	Parking Requirement
Retail	Supermarket	3,846 m^2	1 space per 10 m^2	385 spaces
	Specialty	3,176 m^2	1 space per 26 m^2	122 spaces
	Kiosks	54 m^2		2 spaces
	Total			509 spaces

Having regard to the above, the Penrith Development Control Plan indicates a requirement to provide a total of 509 spaces.

Notwithstanding, the Control Plan indicates that:

> *Council has the discretion to waive or reduce the minimum number of car spaces required for a particular site if the reduced provision can be justified in a Traffic Impact Statement, in terms of:*
>
> *i) Proximity to public transport nodes;*
>
> *ii) Opportunity to share parking with another use; or*
>
> *iii) An empirical assessment of car parking.*

The provision of an additional 388 on-site spaces for the proposed expansion, plus the additional 32 on-street spaces, is less than the prescribed requirements when adopting the rates at the Penrith Development Control Plan 2006.

The following is provided with regard to an assessment of the adequacy of the proposed parking provisions, particularly considering:

> An assessment of the empirical and likely demands generated by the expansion of the Shopping Centre and the surrounding Community Uses based on case study data and existing surveyed demands; and

> An assessment of the opportunities for the site and surrounding uses to share parking during peak periods.

5.2 Approved Development Parking

It is noted that the approved development included a total provision of 973 parking spaces on the development site. This included the replacement of the existing 283 at-grade parking spaces which service the main shopping centre, therefore resulting in a total of 690 additional spaces.

Across the additional floor areas, the provision of 690 spaces for the 16,413 square metres of commercial/retail floor area equated to an average provision of 1 car space to each 24 square metres of floor area.

Application of this rate to the proposed 9,070 m^2 of additional floor area would indicate a requirement for an additional 378 car parking spaces to be provided by the proposal.

The provision of 380 on-site car parking spaces, plus the additional 32 on-street parking spaces, would meet this requirement.

5.3 Empirical Assessment of Parking Demands

5.3.1 Existing Supplies

The surveyed parking included the parking surrounding the existing Town Centre, adjacent the shopping centre.

This area is currently serviced by approximately 506 car parking spaces, with the majority of these located within the Main Shopping Centre Car Park, and the remainder provided on-street on Luttrell Street and Town Terrace, in the Ched Towns Reserve car park and the KFC and MCDonald's sites.

The existing subject site has been observed to be utilised as an overflow car parking area during days when the sporting fields are in use.

A summary of the existing provisions is provided in Table 5-2 and the surveyed car parking areas are shown in Figure 5-1.

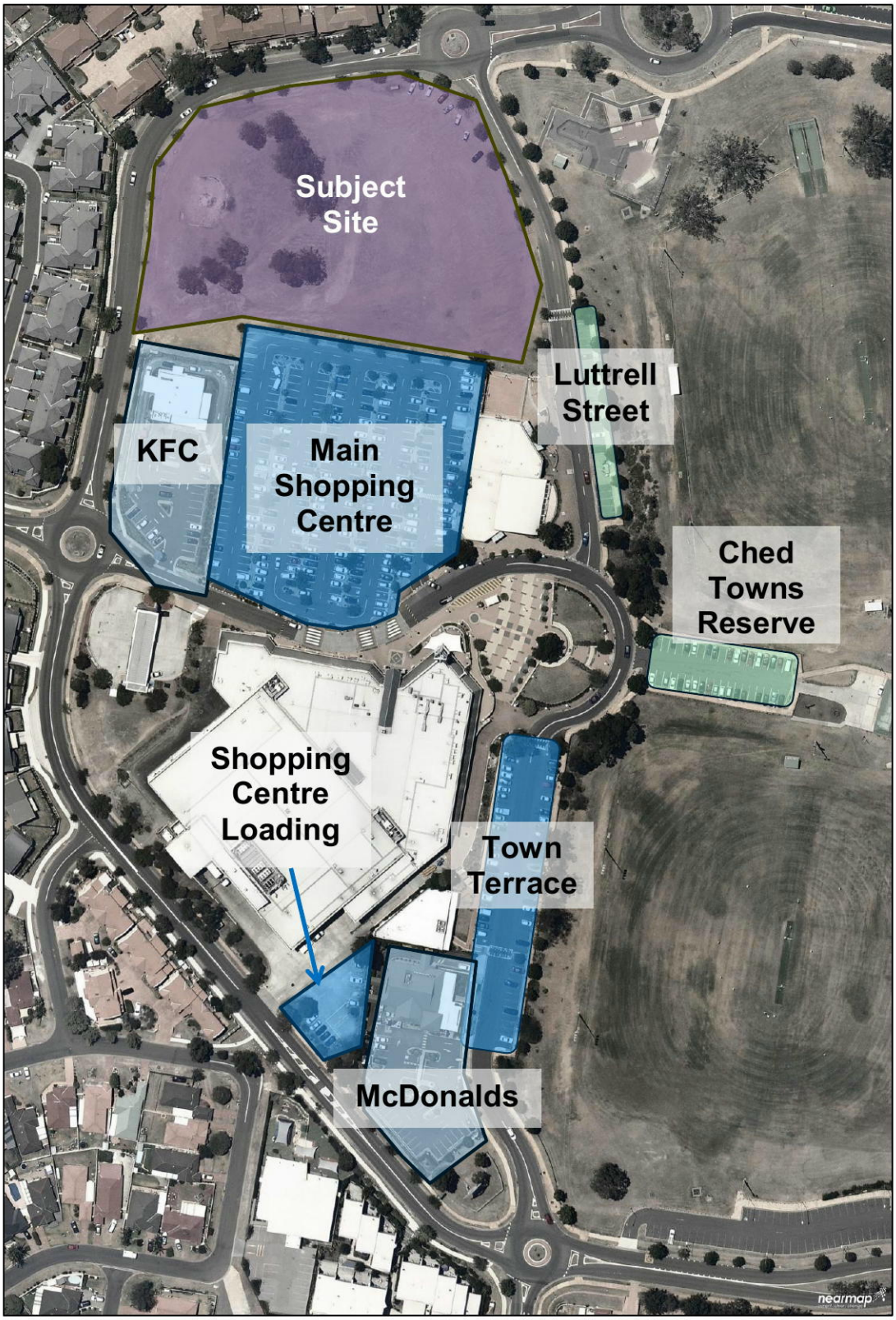
Table 5-2 Existing Town Centre Parking Survey Supplies

Parking Location	Supply
Main Shopping Centre	284
Town Terrace	68
Shopping Centre Loading	20
KFC	29
McDonalds	34
Luttrell Street	31
Ched Towns Reserve	40
Subject Site	*Overflow*
Total	**506**

Having regard to the site layout, the location of the existing Shopping Centre entries, and the likelihood of some community uses taking place on the Saturday, it is assumed that parking associated with the existing shopping centre would be contained to be within the Main Shopping Centre Car Park, the Shopping Centre Loading area, Town Terrace and Luttrell Street.

These areas provide a total of 403 car parking spaces.

Figure 5-1 Parking Survey Locations



5.3.2 Parking Surveys

In order to understand the parking characteristics and existing demands generated by the existing uses at Glenmore Park Town Centre, car parking surveys undertaken by GTA Consultants for the approved development are referenced.

The GTA surveys were undertaken in 2010-2011 on a Thursday between 4pm-6pm and on a Saturday between 9am-5pm. At the time of the surveys, the sporting fields were not being used.

In addition to these surveys, Cardno commissioned follow-up car parking surveys on a Thursday and Saturday between 9am-5pm. At the time of the Cardno surveys on the Saturday, it is understood that the sporting fields were in high use, with 13 junior soccer matches and 7 junior rugby matches scheduled for the day.

5.3.3 GTA Surveys – Limited Sporting Demands

The GTA surveys were undertaken in 2010-2011 and on the Thursday, spot surveys of only the main at-grade car park were recorded between 4pm-6pm.

On the Saturday, full surveys of the car parking shown in Figure 5-1 were undertaken between 9am-5pm.

The summaries of the results are shown in the table below.

Table 5-3 GTA Thursday Spot Surveys

Parking Location	Supply	4:00 PM	5:00 PM	6:00 PM
Main Shopping Centre	284	180	188	147

The above surveys indicated peak demands on the Thursday equal to 188 spaces within the Main Shopping Centre at 5:00pm.

Table 5-4 GTA Saturday Car Parking Surveys

Parking Location	Supply	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
Main Shopping Centre	284	141	158	197	205	217	232	206	176	155
Town Terrace	68	51	56	55	57	61	56	61	50	41
Shopping Centre Loading	20	20*	20*	20*	20*	20*	20*	20*	20*	20*
KFC	29	6	6	10	12	15	10	12	10	8
McDonalds	34	5	4	13	15	16	10	12	8	4
Luttrell Street	31	2	2	1	2	1	1	2	2	3
Ched Towns Reserve	40	1	3	8	10	7	6	8	4	5
Total	**506**	**226**	**249**	**304**	**321**	**337**	**335**	**321**	**270**	**236**

**Area not surveyed – assumed to be at 100% occupancy.*

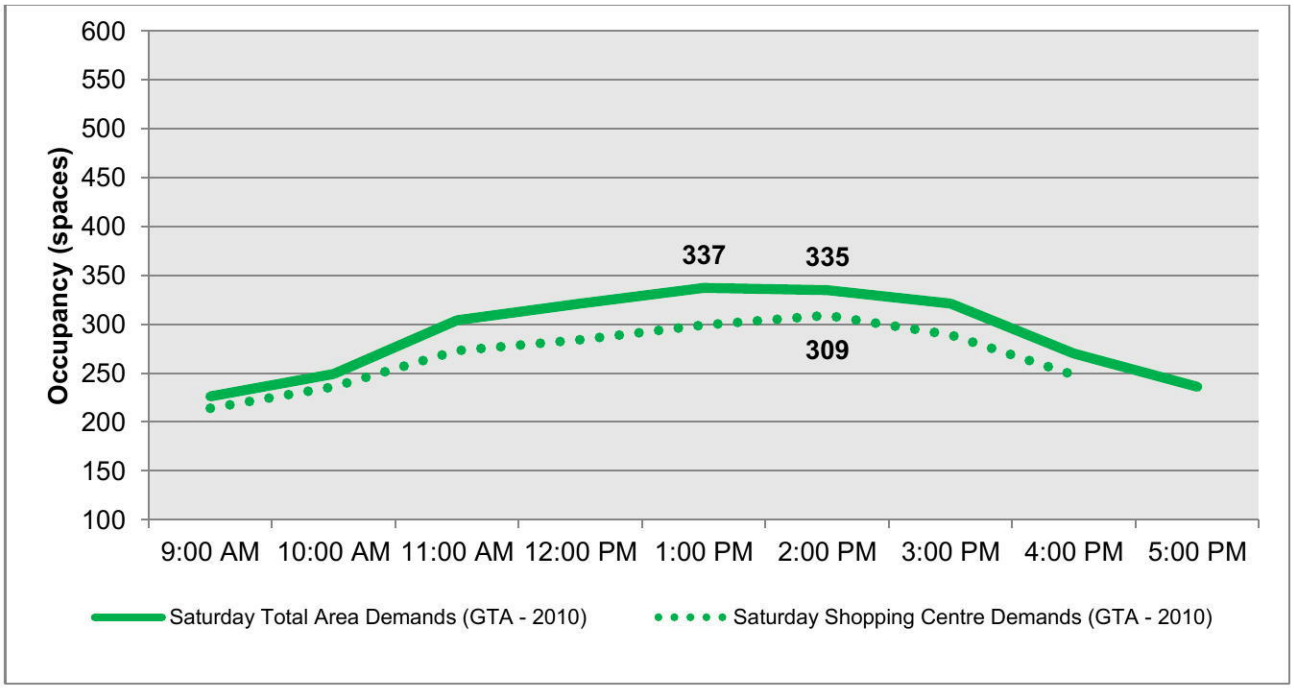
On the Saturday, the peak demands were observed at 1:00pm, when a total of 337 spaces were occupied in the survey areas, leaving 169 spaces available. It is noted that the parking within Shopping Centre loading area was not surveyed as part of these surveys, and therefore these spaces have been conservatively assumed to be completely occupied.

As noted previously, it is assumed that parking associated with the existing shopping centre would be contained to be within the Main Shopping Centre Car Park, the Shopping Centre Loading area, Town Terrace and Luttrell Street.

It is noted that whilst the whole Town Centre area peaked at 1:00pm, parking within these **Shopping Centre associated parking areas in fact peaked at 2:00pm on the Saturday, when 309 spaces were occupied**. At this time, 94 car parking spaces remained available in these areas.

Figure 5-2 shows the variable demands surveyed by GTA on the Saturday.

Figure 5-2 GTA Surveyed Saturday Parking Demands



5.3.4 Cardno Surveys – Weekday and Sporting Demands

Because the GTA surveys for the Thursday were limited in their time frame and did not include the surrounding parking areas, and the surveys on the Saturday were on a day which did not include sporting demands, Cardno undertook further detailed surveys to determine the peak demands generated during a weekday.

The surveys were collected of the various parking areas within the shopping centre area on Thursday 8th May 2014 and Saturday 10th May 2014. For both of the days surveyed the surveyed periods were 9:00am until 5:00pm, with demands collected hourly.

On the Thursday, the peak parking demand in the area was observed to occur at 12:00pm, when a total of 330 spaces were occupied, leaving 176 formal parking spaces available in the area.

Within the Shopping Centre Associated Car Parking Areas (Main Shopping Centre Car Park, the Shopping Centre Loading area, Town Terrace and Luttrell Street) the **peak Thursday demands occurred at 12:00pm and 5:00pm, when a total of 258 spaces were occupied**, leaving 145 car parking spaces available.

On the Saturday, the peak parking demand in the area was observed to occur at 11:00am, when there were a total of 561 formal car parking spaces occupied in the area. An additional 115 cars were parked informally on the subject site presumably associated with the activity on the sporting fields.

Within the Shopping Centre Associated Car Parking Areas (Main Shopping Centre Car Park, the Shopping Centre Loading area, Town Terrace and Luttrell Street**) the peak Saturday demands also occurred at 11:00am, when a total of 372 spaces were occupied**, leaving 49 car parking spaces available. It is noted that because of the high levels of activity occurring at the sporting fields, it is considered that a proportion of this parking would include demands which are not associated with the existing shopping centre use.

Table 5-5 and Table 5-6 provide a summary of the results from the Thursday and Saturday surveys whilst Figure 5-3 shows the variable demand on the Thursday and Figure 5-4 shows a comparison of the variable demands on the Saturday between the GTA and Cardno surveys.

Table 5-5 Cardno Thursday Surveyed Car Parking Demands

Parking Location	Supply	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
Main Shopping Centre	284	131	150	134	183	155	156	174	185	190
Town Terrace	68	43	56	53	53	56	59	44	46	47
Shopping Centre Loading	20	18	17	19	18	16	19	18	16	14
KFC	29	3	7	10	13	13	12	15	14	12
McDonalds	34	9	11	9	16	15	8	9	10	9
Luttrell Street	31	3	3	2	4	22	15	8	8	7
Ched Towns Reserve	40	15	16	15	40	40	36	14	16	15
Total	**506**	**226**	**262**	**244**	**330**	**320**	**307**	**285**	**299**	**298**

Figure 5-3 Cardno Surveyed Thursday Demands

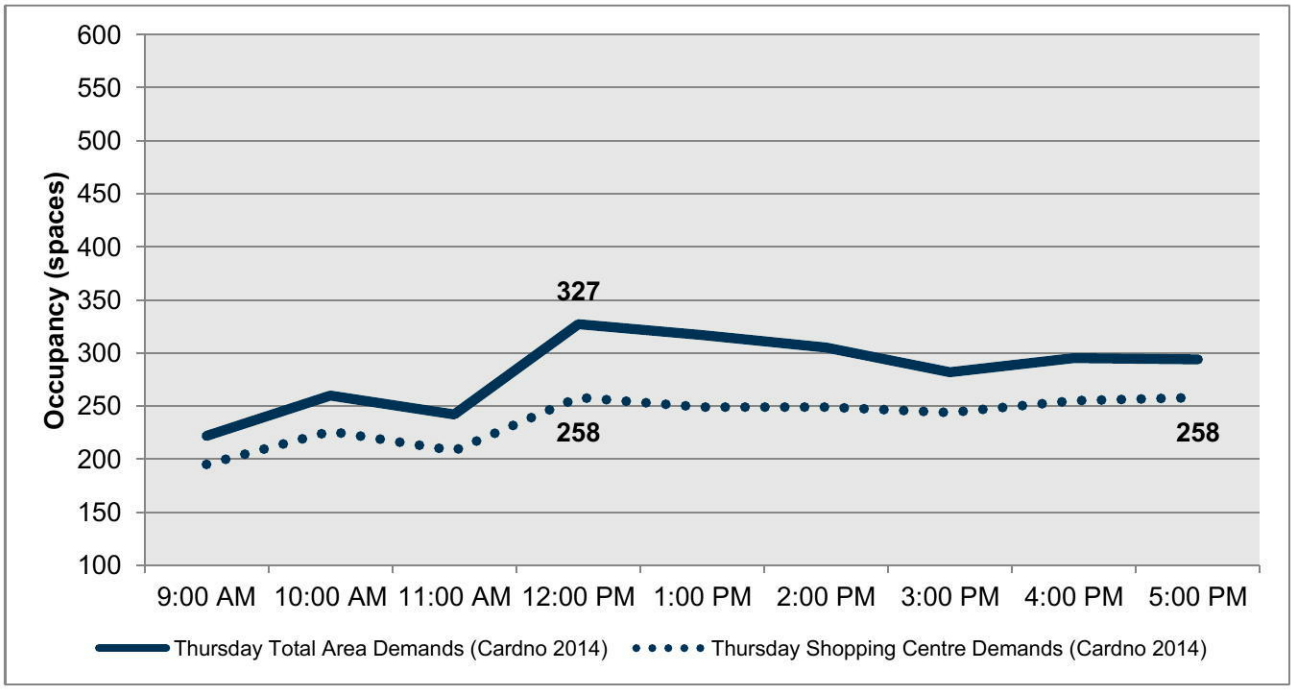
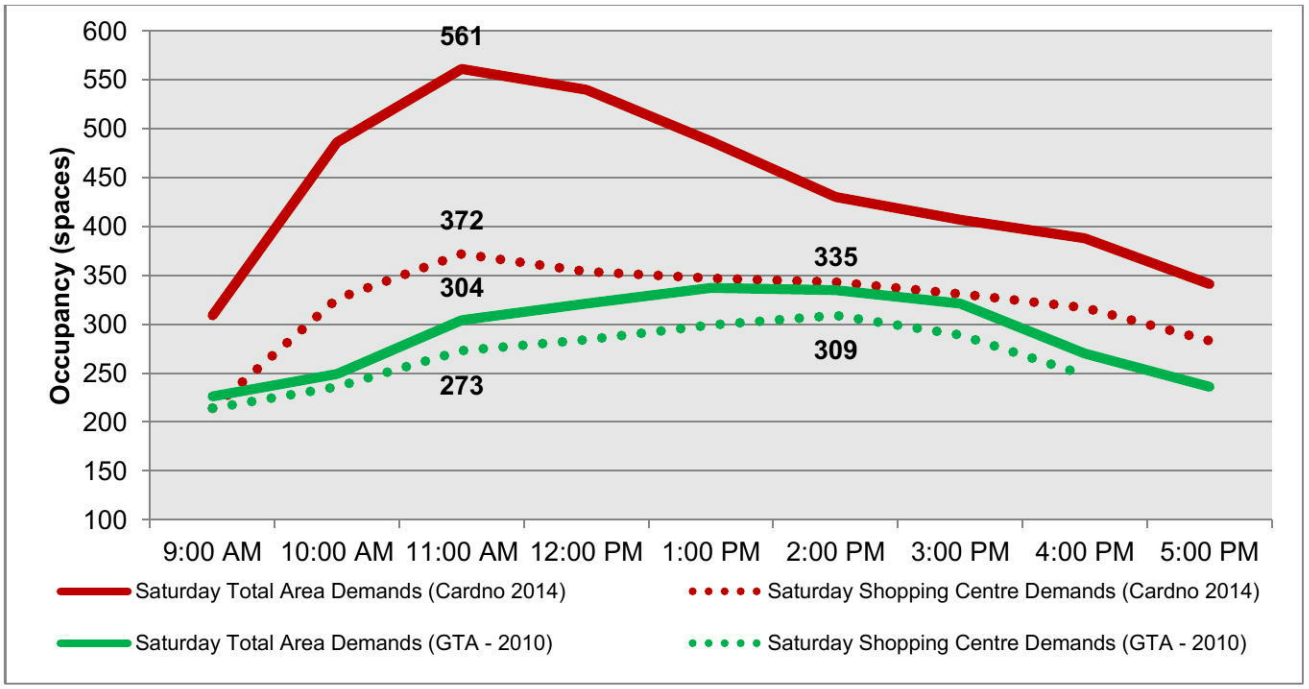


Table 5-6 Cardno Saturday Surveyed Car Parking Demands

Parking Location	Supply	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
Main Shopping Centre	284	100	210	259	237	238	242	236	226	205
Town Terrace	68	68	67	63	66	67	66	62	58	53
Shopping Centre Loading	20	16	18	20	20	19	19	19	18	16
KFC	29	3	7	11	15	16	15	13	14	12
McDonalds	34	11	33	23	27	21	18	15	17	20
Luttrell Street	31	30	31	30	31	23	16	14	15	9
Ched Towns Reserve	40	40	40	40	40	38	36	34	30	20
Total	**506**	**309**	**486**	**561**	**540**	**487**	**430**	**407**	**388**	**341**
Subject Site (Overflow)		41	80	115	104	65	18	14	10	6

Figure 5-4 Comparison of Cardno & GTA Surveyed Thursday Demands



It is noted that the peak activity during the sporting Saturday occurs at 11:00am, coinciding with the scheduling of the soccer and rugby matches at the sporting fields.

On the GTA non-sporting Saturday, the shopping centre car parking demands at 11:00am were some 12% lower than the total peak, which occurred at 2:00pm in the afternoon.

At this time, a peak demand for 273 shopping centre associated car parking spaces was recorded.

5.3.5 Summary of Existing Parking Demands and Rates

Based on the preceding analysis of the GTA and Cardno surveys it is clear that the existing shopping centre use generates varying demands across the day on a Thursday and Saturday.

The existing car parking surveys indicate that the absolute peak activity for the Town Centre and existing shopping centre occurs on a Saturday.

On a sporting day, the peak demands in the area occurred at 11:00am, when a total of 561 vehicles were parked in the survey area, inclusive of some 115 spaces in the vacant lot which is the subject site.

It is noted that the shopping centre demands recorded on the Cardno surveyed Saturday were observed to include demands associated with the sporting fields to the east of Luttrell Street.

Contrastingly, the GTA Surveyed demands on the Saturday included only limited external use within the car park and the peak of the shopping centre demands occurred at 2:00pm, with demands of some 12% lower at 11:00am.

In order to identify the existing demands associated entirely with the existing shopping centre use, the GTA surveyed peak demands for the Shopping Centre associated car parking have been adopted to calculate a rate for the existing car parking demand generated by the retail uses only.

When related to the existing floor area of 7,074 m^2 the variable peak demand rates are summarised in Table 5-7

Table 5-7 Existing Shopping Centre Only Variable Parking Demand Rates

	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
Peak Shopping Centre Demand (spaces)	214	236	273	284	299	309	289	248	219
Equivalent Parking Rate (per m2 of retail)	33	30	26	25	24	23	24	29	32

5.3.6 Future Parking Demands

Comprehensive surveys of the existing Shopping Centre and surrounding uses indicates that the on a sporting day, there is a significant amount of car parking demand generated to the Glenmore Park Town Centre as a result of multiple games occurring on the sporting fields east of Luttrell Street.

Whilst not necessarily the responsibility of the applicant or the proposed shopping centre expansion, it is considered that a holistic view and assessment of the future parking demands in the area would be warranted to ensure that the proposed parking provisions will adequately cater for the demands associated with the existing shopping centre, the expansion to the shopping centre, and also the existing use of the sporting and community uses in the area.

Furthermore, a comparison of the survey data from a sporting day and a non-sporting day indicate that the shopping centre peak activity generally occurs in the afternoon around 2:00pm, whilst the peak demands associated with the sporting fields occurs in the morning around 11:00am.

Having regard to the preceding, and in order to determine the future parking demands, an assessment of the variable parking demands has been undertaken adopting:

> The Existing High Peak Saturday Demands from Cardno's 2014 Saturday Surveys (which included a highly attended game day);

> Additional demands for the expanded retail based on the GTA Saturday Surveyed Demands and variable rates calculated in Table 5-7; and

> A future total provision of 926 parking spaces for the Town Centre, inclusive of the existing 506 spaces and additional 420 spaces proposed by the expansion.

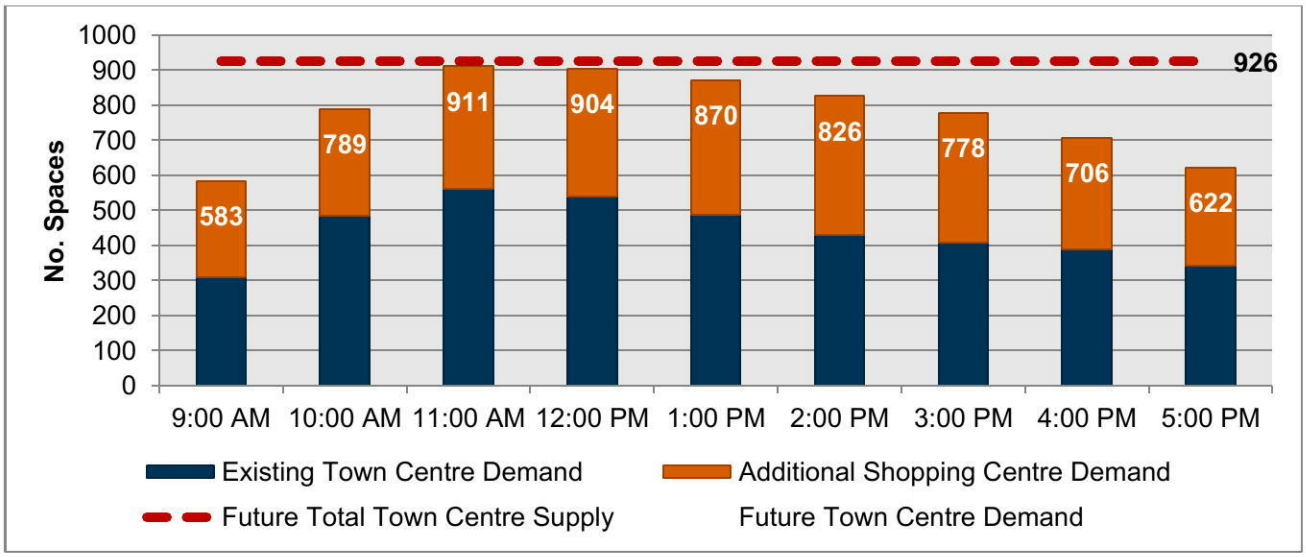
Table 5-8 and Figure 5-5 indicate that **the future supply of 926 spaces for the Town Centre will cater for the absolute peak demand on a sporting Saturday for 911 spaces at 11:00am**.

Table 5-8 Future Parking Demands and Adequacy of Supply

	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
Existing Town Centre Demand (2014 Surveys)*	274	303	350	364	383	396	371	318	281
Additional Shopping Centre Demand^	309	486	561	540	487	430	407	388	341
Future Town Centre Demand	**583**	**789**	**911**	**904**	**870**	**826**	**778**	**706**	**622**
Future Total Town Centre Supply	926	926	926	926	926	926	926	926	926

** Existing Town Centre Demand includes shopping centre and sporting field demands from a Peak Sporting Day*
^Variable Additional Demand Calculated based on GTA surveyed demands and rates in Table 5-7.

Figure 5-5 Future Parking Demands and Adequacy of Supply



5.4 Adequacy of Parking Supply

Having consideration of the existing approval on the site, the provision of 388 on-site spaces solely associated with the Shopping Centre would meet the 378 spaces which would be required if the approved rates were adopted. An additional 32 on-street spaces are also provided.

The preceding empirical analysis, whilst it clearly shows that the future supply to the Town Centre will cater for the high peak demands generated by both the shopping centre and the community and sporting fields when they are in heavy use, it is considered to be highly conservative.

That is, it allows for accommodation of all of the demands which are generated by the high utilisation of the sporting fields which is (a) not considered to be a necessary responsibility of the applicant or the shopping centre, and (b) would be expected to be high given the unconstrained use of the subject site as overflow parking as it is currently vacant.

It also assumes that on the day of the GTA surveys, there was limited or no community uses parking in the Luttrell Street and Town Terrace Parking and that parking in these areas was solely associated with the Shopping Centre. In reality, and regardless of whether there would be scheduled sporting matches, the use of this parking on a standard Saturday would no doubt include additional community and neighbourhood demands and therefore the true shopping centre demands would in fact be less than allowed for.

Furthermore, in our experience, new retail and supermarket uses located within an already established centre generally draw a reduced level of peak trade when compared with standalone facilities associated with a proportion of trade being customers who are already attending the existing centre extending their trips, rather than 100% of all trade being completely new. Similarly, the co-location of the sporting ovals and the shopping centre would result in a significant proportion of combined trips to the Town Centre, with a proportion of those attending a sporting match using the same trip to pick up some groceries or undertake a short shopping trip.

In consideration of the above, the proposed parking provisions are therefore contemplated to be adequate and will cater for all of the parking demands generated by the expansion of the shopping centre.

On a non-sporting day Saturday, there will an oversupply of parking and a significant amount of available in the Town Centre.

On a sporting Saturday, and when considering the sharing of trips to the Town Centre and conservative nature of the empirical assessment, the proposed parking provisions will be more than adequate to cater for the high peak demands generated by the Town Centre.

6 Design Considerations

6.1 On-Site Car Parking Layouts

The car park and access design has been assessed against the requirements of the Australian Standard for off-street car parking (AS/NZS 2890.1).

Typical on-site car parking spaces are provided with minimum dimensions of 2.7m wide and 5.4m long and are accessed from an aisle of 6.6 metres. These dimensions exceed the minimum requirements for User Class 3A for high turnover parking at shopping centres.

Parking bays for seniors, prams and other users are provided in excess of these dimensions.

Columns are located in accordance with the car parking envelope, being within 750mm-1750mm of the open end of the car space.

6.2 Accessible Parking Requirements

The Penrith Council Development Control Plan requires that the:

> *Provision of parking spaces for disabled persons should be in the range of 1-4% of total parking spaces required for that particular use and comply with AS 2890.6 -2009.*

The provision of 11 spaces represents a provision of 2.8% of the total on-site supply of 382 spaces and therefore meets the minimum percentage requirements under the Development Control Plan.

Accessible parking spaces are provided in accordance with AS/NZS2890.6:2009, with central shared areas and appropriate dimensions.

6.3 Luttrell Street and On-Street Car Parking

Parallel parking spaces on Luttrell Street are provided with a width of 2.1 and length of 6.6 metres in accordance with the on-street parking guidelines at AS/NZS2890.5:1993.

Angled parking spaces on the eastern side of Luttrell Street are provided generally consistent with the existing bays which are currently provided to the south on Luttrell Street.

In general accordance with the Glenmore Park Development Control Plan, Luttrell Street is proposed to be provided with a footpath width of generally 3.5m along the site's abuttal, parallel parking on the western side, a carriageway suitable for buses and angled parking on the eastern side. It is noted that a small section of footpath is reduced to 3.0m where Luttrell Street curves to meet Glenmore Parkway at the north which is considered acceptable and adequate.

The layout and proposed cross-section of Luttrell Street is provided attached at Annex A.

6.4 Car Parking Access Ramps

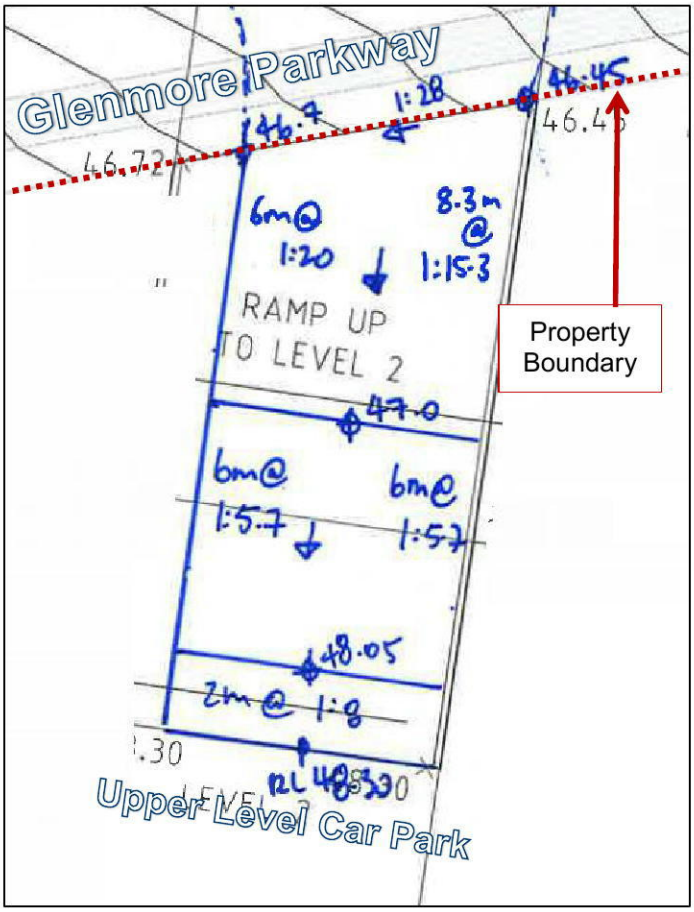
6.4.1 Upper Car Parking Level

Access to the upper car parking level is proposed via a ramp from Glenmore Parkway at the north of the site.

The western side of this ramp is proposed to match into the street boundary at RL 46.72 level whilst the eastern side of the ramp will match in at RL46.45. The proposed grades are shown in Figure 6-1noting that the maximum grade on the exit side of the ramp is proposed with a maximum grade of 1:20 for the first 6.0m of the ramp in accordance with AS/NZS2890.1:2004. A maximum central grade of 1:5.7 and appropriate transitions are provided to meet the requirements of the Standard.

It is noted that the eastern entry side of the ramp will be provided at a grade of 1:15.3 from the property boundary, however as this is the entry side, and is not too far from the 1:20 prescribed by AS/NZS2890.1:2004, this is considered acceptable.

Figure 6-1 Proposed Upper Car Park Ramp Gradients



6.4.2 Lower Car Parking Level

Access to the lower car parking level is via an accessway to and from Luttrell Street at the east of the site. A maximum grade of 1:33 is proposed on this ramp, which is less than the maximums specified within AS/NZS2890.1:2004.

6.4.3 Existing Car Park Links

Links to the existing car park are proposed via separates ramps up to the new upper level car park and down to the lower level car park. The maximum grades on these ramps are expected to be 1:8, which is in accordance with the requirements of AS/NZS2890.1:2004.

The new link to the existing at-grade car park from Glenmore Parkway, via the rear of the KFC will match into the existing road at approximately RL50.5 and at the existing car park at approximately RL48.5. An average grade of approximately 1:25 will be provided along this new access link, allowing parking to be accommodated along this access.

6.5 Pedestrian and Vehicle Sight Lines

The proposed access locations are generally in accordance with those previously approved by the existing permit for the redevelopment of the shopping centre.

The access locations on Glenmore Parkway are considered to meet the minimum SSD distance requirements for 50km/h road speeds as per Figure 3.2 of AS/NZS2890.1:2004.

It is recommended that building lines and landscaping be set-back at the exits from the site car parking to accord with Figure 3.3 of AS/NZS2890.1:2004.

7 Loading Considerations

Two separate loading docks are proposed on-site.

The northern loading dock will serve the ALDI store and specialty retail.

The ALDI loading dock will accommodate one 19.0 metre semi-trailer and one 12.5 metre rigid truck associated with the compactus independently.

The specialty retail dock will accommodate one 12.5 metre rigid truck. The proposed specialty retail compactus will be accessed via a second 12.5 metre rigid truck, however to access the compactus, the 12.5 metre loading dock must be vacant.

The western loading dock will serve the Coles store and accommodate one 19.0 metre semi-trailer and one 12.5 metre rigid truck. A third 12.5 metre rigid truck will serve the Coles compactus independently of the two other docks.

Eight (8) courier parking spaces are proposed within the Coles loading dock to service smaller more frequent vehicles associated with the Coles. The main loading dock can be accessed independently of these spaces, however the vehicle accessing the compactus requires these spaces to be vacant.

All loading vehicles will enter and exit the site in a forwards direction.

Gradients within the proposed loading areas will accord with AS/NZS2890.2:2002 – Off-Street Parking for Commercial Vehicles.

Swept paths demonstrating access for the design vehicles is provided attached to Annex B.

It is considered that the above provisions, which accommodate four (4) independent loading vehicles (including two articulated vehicles), a further three (3) compactor bays and eight (8) service and courier vehicles is considered more than adequate to accommodate the operational requirements of the proposal.

8 Traffic Considerations

8.1 Existing Conditions

8.1.1 External Road Network Traffic Surveys

In our experience, peak activity and traffic generation associated with shopping centre and retail uses generally occurs during the weekday afternoon, when the peak generation of the shopping centre coincides with the afternoon commuter peak hour.

On a Saturday, the peak generally occurs in the mid-late morning when retail traffic generation coincides with peak lunchtime traffic and community use traffic.

Furthermore, traffic generation rates of shopping centres are often more a reflection of the car parking supply and demands related to the turnover of parking spaces during the peak hour, rather than the floor area of a centre.

Accordingly, Cardno commissioned traffic surveys on Thursday 8th May 2014 between 3pm and 6pm and on Saturday 10th May 2014 between 10am and 2pm at the following intersections:

> Glenmore Parkway / Luttrell Street (Town Terrace)

> Glenmore Parkway / Town Terrace (eastern extension of Camellia Avenue).

> Glenmore Parkway / Woodlands Drive

> Town Terrace / Town Terrace (eastern extension of Camellia Avenue)

On the Thursday evening, the road network peak hour was observed to occur between 5pm and 6pm.

On the Saturday, the road network peak hour was observed to occur between 11:15am-12:15pm.

Peak hour traffic summaries are shown in Figure 8-1 and Figure 8-2 for the Thursday PM and Saturday peak hours respectively.

Figure 8-1 Existing Thursday Afternoon Road Network Volumes

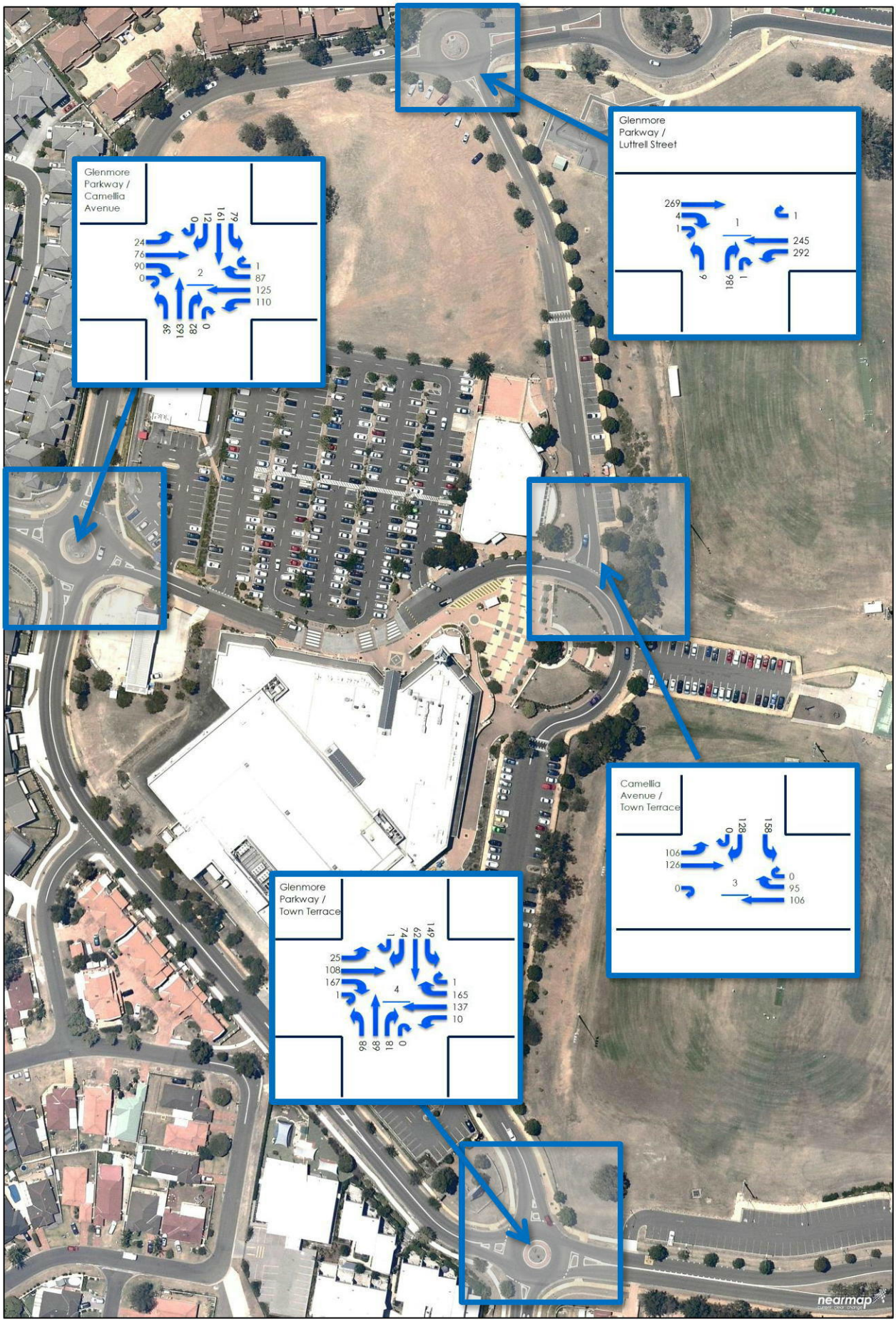
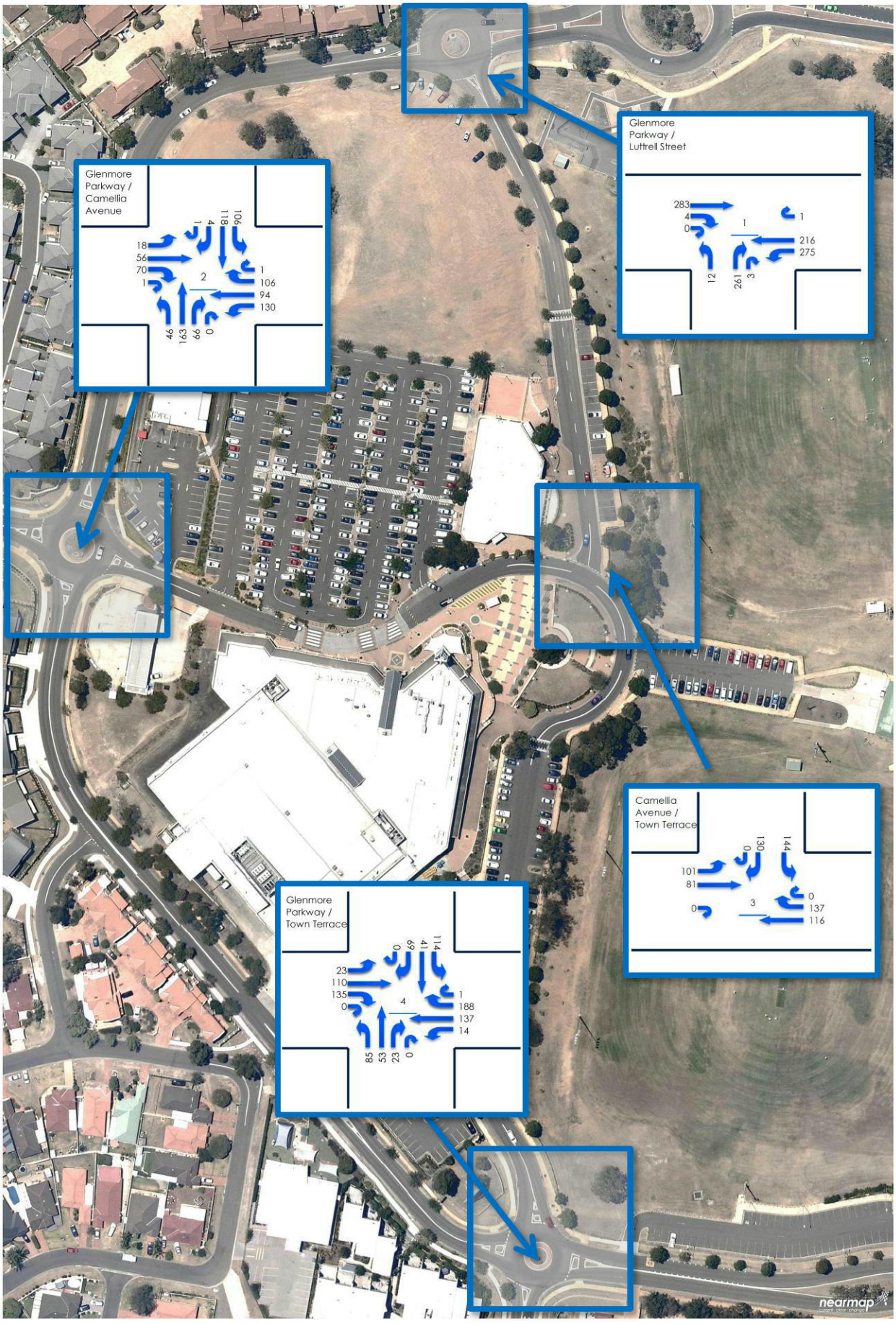


Figure 8-2 Existing Saturday Daytime Road Network Volumes



8.1.2 External Road Network Intersection Analysis

The operation of the above intersections was analysed using SIDRA Intersection. This computer package, originally developed by the Australian Road Research Board, provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Table 8-1.

Table 8-1 Rating of Degrees of Saturation

D.O.S.	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

The ***95th Percentile (95%ile) Queue*** represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour; and

Average Delay is the delay time, in seconds, which can be expected over all vehicles making a particular movement in the peak hour.

The results of the SIDRA Intersection analysis are summarised in Table 8-2 with detailed SIDRA outputs provided at Annex C.

Table 8-2 SIDRA Intersection Analysis Summary

Intersection	Approach	Thursday PM Peak			Saturday Daytime Peak		
		D.O.S	95th%ile Queue	Av. Delay	D.O.S	95th%ile Queue	Av. Delay
Glenmore Parkway / Town Terrace (Luttrell Street)	Glenmore Parkway W	0.253	10.9 m	7.7 sec	0.288	12.6 m	8.2 sec
	Town Terrace (Luttrell Street S)	0.186	7.0 m	12.3 sec	0.259	10.3 m	12.2 sec
	Glenmore Parkway E	0.337	16.7 m	7.0 sec	0.311	14.6 m	7.0 sec
	Intersection	**0.337**	**16.7 m**	**8.2 sec**	**0.311**	**14.6 m**	**8.7 sec**
Glenmore Parkway / Camellia Avenue	Glenmore Parkway N	0.248	10.4 m	8.5 sec	0.214	8.7 m	8.1 sec
	Camellia Avenue W	0.201	8.1 m	10.7 sec	0.153	6.0 m	10.7 sec
	Glenmore Parkway S	0.275	12.1 m	9.3 sec	0.260	11.2 m	9.0 sec
	Camellia Avenue E	0.320	14.1 m	9.7 sec	0.302	13.1 m	9.5 sec
	Intersection	0.320	14.1 m	9.5 sec	0.302	13.1 m	9.2 sec
Glenmore Parkway / Town Terrace/Woodlands Drive	Town Terrace N	0.296	13.1 m	10.0 sec	0.226	9.5 m	9.9 sec
	Glenmore Parkway W	0.297	12.9 m	10.7 sec	0.268	11.4 m	10.5 sec
	Woodlands Drive S	0.204	8.5 m	9.6 sec	0.181	7.4 m	9.9 sec
	Glenmore Parkway E	0.322	14.1 m	10.9 sec	0.329	14.6 m	10.7 sec
	Intersection	0.322	14.1 m	10.4 sec	0.329	14.6 m	10.3 sec
Camellia Avenue/ Town Terrace (Luttrell Street)	Camellia Avenue N	0.325	10.3 m	10.0 sec	0.308	9.7 m	9.9 sec
	Camellia Avenue W	0.130	0.0 m	3.8 sec	0.102	0.0 m	4.6 sec
	Town Terrace E	0.147	5.8 m	5.2 sec	0.184	7.2 m	5.5 sec
	Intersection	**0.325**	**10.3 m**	**6.7 sec**	**0.308**	**9.7 m**	**7.0 sec**

The preceding analysis confirms that the existing intersections all operate under “excellent” operating conditions during the Thursday evening and Saturday daytime peak hours, with significant spare capacity available.

8.2 Traffic Generation

8.2.1 Existing Shopping Centre Traffic Generation

In order to understand the existing traffic generation of the shopping centre and its car parking, additional traffic generation surveys of the existing at-grade car park were also commissioned by Cardno on the above survey days.

The surveys indicated that the existing at-grade car park, which provides 284 car parking spaces, generated a peak of 802 vehicle movements during the Thursday evening period between 4:45pm-5:45pm. When related to the parking supply, this traffic generation equates to a peak hour traffic generation rate of 2.82 vehicle movements per space.

On the Saturday, a similar level of peak hour traffic was observed to be generated to and from this car park, with 748 vehicle movements generated between 11:15am-12:15pm, equating to a traffic generation rate of 2.63 vehicle movements per space.

A summary of the hourly vehicle movements generated in and out of the existing at grade car park is provided in Table 8-3.

Table 8-3 Car Parking Hourly Traffic Generation and Per Space Rate

Survey Day	Peak Hour Start	In	Out	Total	286
Thursday	3:00 PM	336	297	633	2.23
	3:15 PM	345	316	661	2.33
	3:30 PM	351	325	676	2.38
	3:45 PM	341	347	688	2.42
	4:00 PM	358	367	725	2.55
	4:15 PM	350	380	730	2.57
	4:30 PM	353	405	758	2.67
	4:45 PM	**386**	**416**	**802**	**2.82**
	5:00 PM	376	408	784	2.76
Saturday	10:00 AM	329	299	628	2.21
	10:15 AM	347	322	669	2.36
	10:30 AM	353	352	705	2.48
	10:45 AM	358	359	717	2.52
	11:00 AM	359	369	728	2.56
	11:15 AM	358	375	733	2.58
	11:30 AM	376	367	743	2.62
	11:45 AM	**386**	**362**	**748**	**2.63**
	12:00 PM	385	358	743	2.62
	12:15 PM	375	354	729	2.57
	12:30 PM	348	360	708	2.49
	12:45 PM	331	360	691	2.43
	1:00 PM	330	359	689	2.43

Application of this rate to the additional 388 spaces which are proposed to be provided within the on-site car park equates to an additional traffic generation of 1,094 vehicle movements during the Thursday PM peak hour and 1,020 vehicle movements during the Saturday daytime peak.

8.2.2 RTA Rates

For the purposes of comparison the "Guide to Traffic Generating Developments" produced by the NSW RTA suggests traffic generation rates for the PM peak period as shown in Table 8-4

Table 8-4 NSW RTA Traffic Generation Rates

Use	Traffic Generation Rate Total Trips/100sq.m GLFA
Supermarket	13.8
Specialty Shops	4.6

Application of these rates to the 5,840 m^2 of GLFA supermarket and 3,230 m^2 of GLFA specialty retail indicates a peak traffic generation of 955 vehicle movements during the peak hour, inclusive of 806 supermarket vehicle movements and 149 specialty retail vehicle movements.

8.2.3 Adopted Traffic Generation

For the purposes of a conservative analysis, it is assumed that the existing traffic generation per space rate will be adopted, and that total generation will coincide with the existing road network peaks.

Based on the split of existing traffic generation, it is also assumed that traffic will be distributed evenly between inbound and outbound movements.

Considering the traffic generation rates and distributions detailed above, the expected traffic volumes generated by the proposed development are indicated in Table 8-5.

Table 8-5 Peak Hour Traffic Generation – Vehicle Trips Per Hour

Peak Period	Total	Outbound	Inbound
Thursday PM Peak Hour	1,094	547	547
Saturday Peak Hour	1,020	510	510

With regard to the distribution to the surrounding road network, the following splits are assumed:

> New vehicle trips will be split evenly between the Luttrell Street and Glenmore Parkway accesses;

> External destination distributions are expected to be:

- 40% to Glenmore Parkway north-east;
- 40% to Glenmore Parkway south-east;
- 10% to Camellia Avenue west; and
- 10% to Woodlands Drive south.

8.3 Traffic Volumes

The generated traffic volumes during the Thursday afternoon and Saturday peak hours are shown within Figure 8-3 and Figure 8-4.

These volumes have then been superimposed on the existing traffic volumes, and the future road network volumes are presented in Figure 8-5 and Figure 8-6.

Figure 8-3 Generated Thursday Afternoon Traffic Volumes

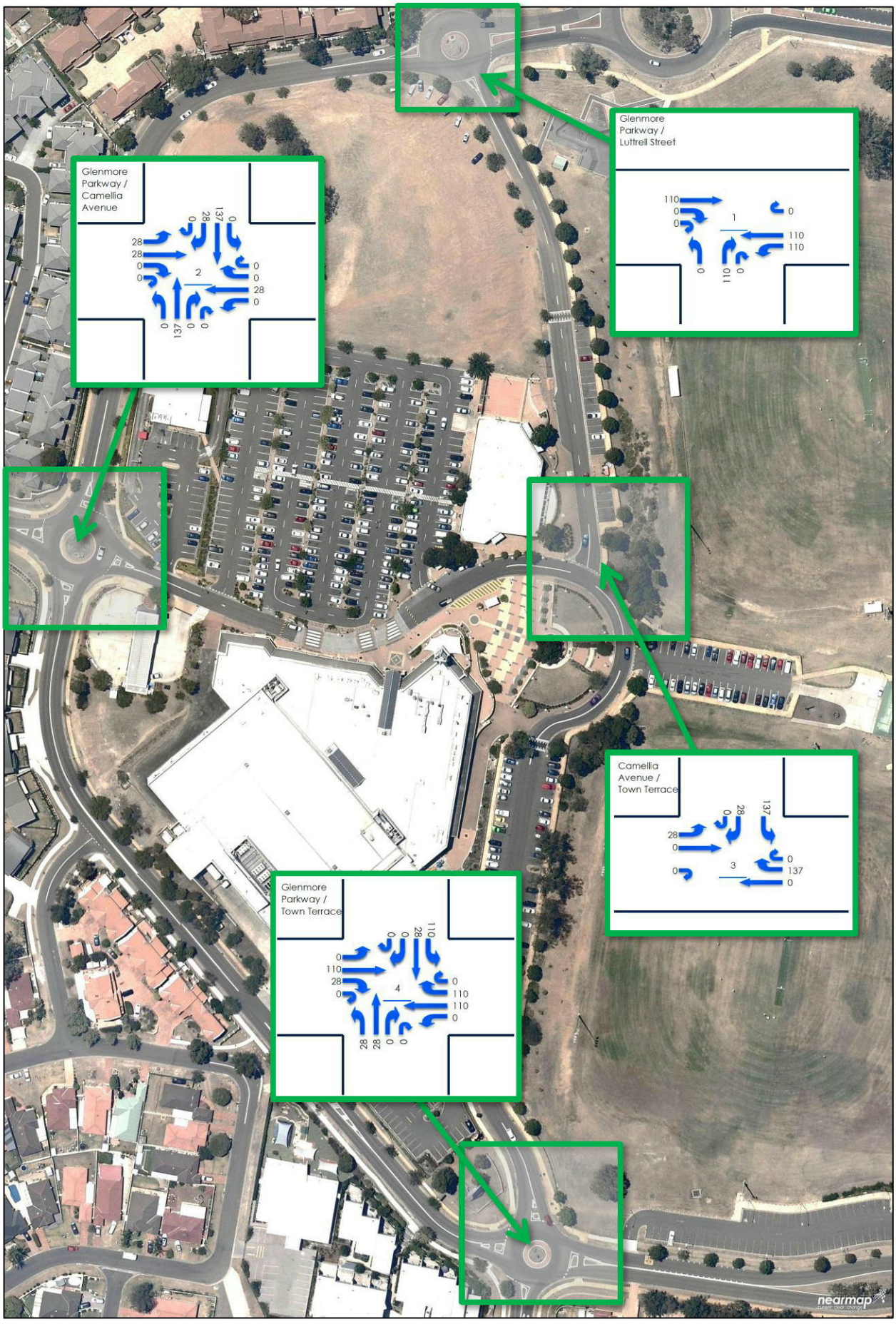


Figure 8-4 Generated Saturday Daytime Traffic Volumes

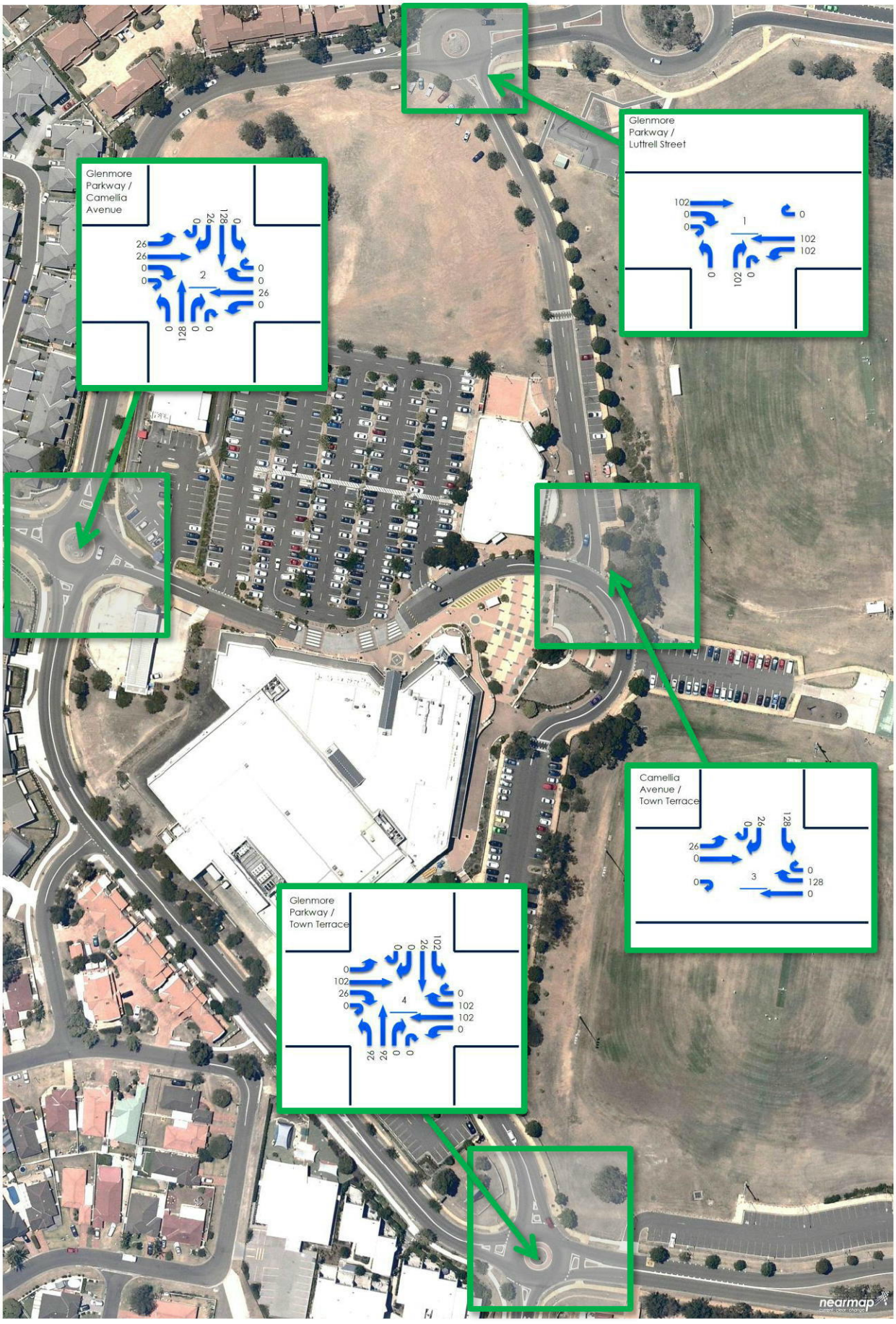


Figure 8-5 Future Thursday Afternoon Road Network Volumes

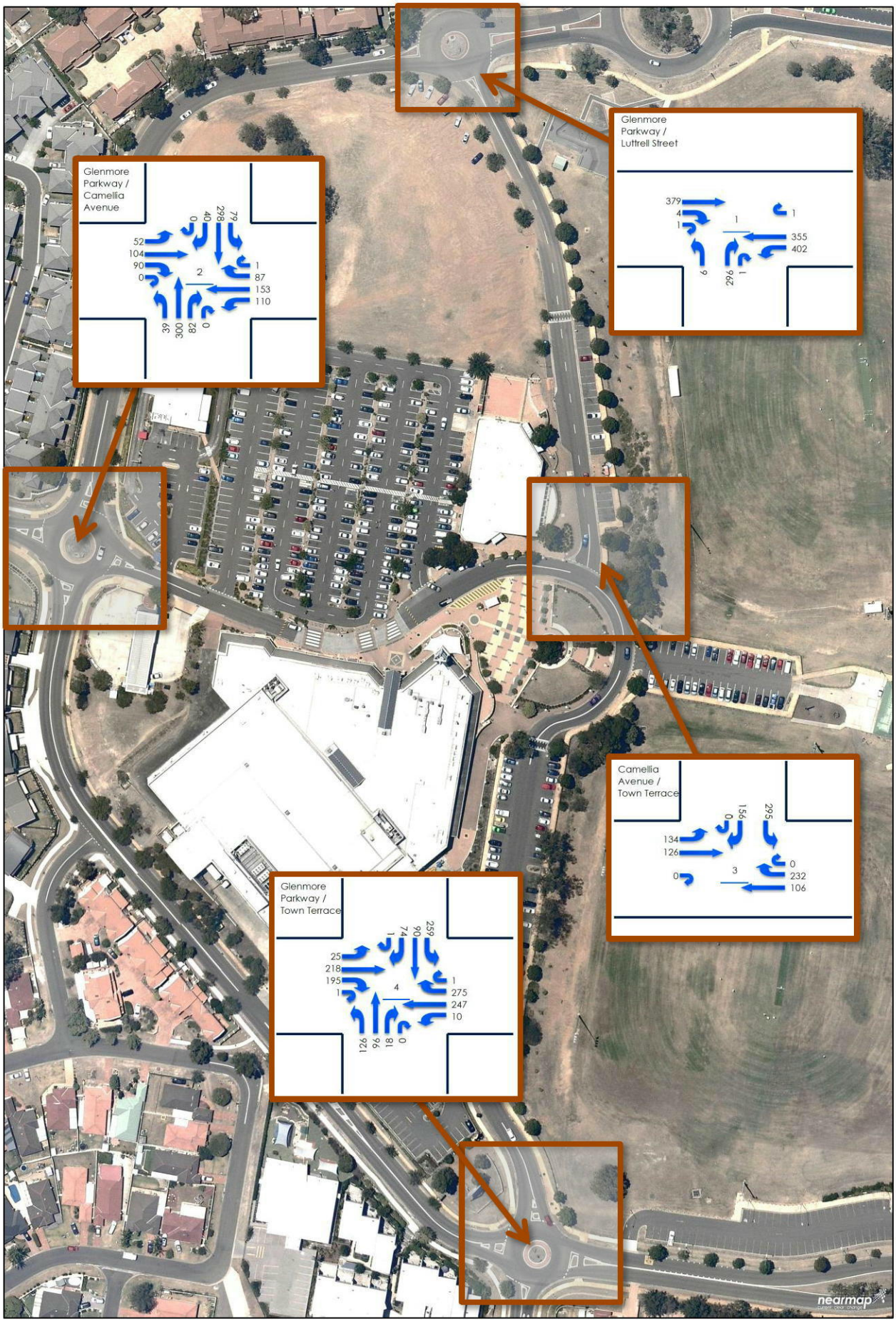
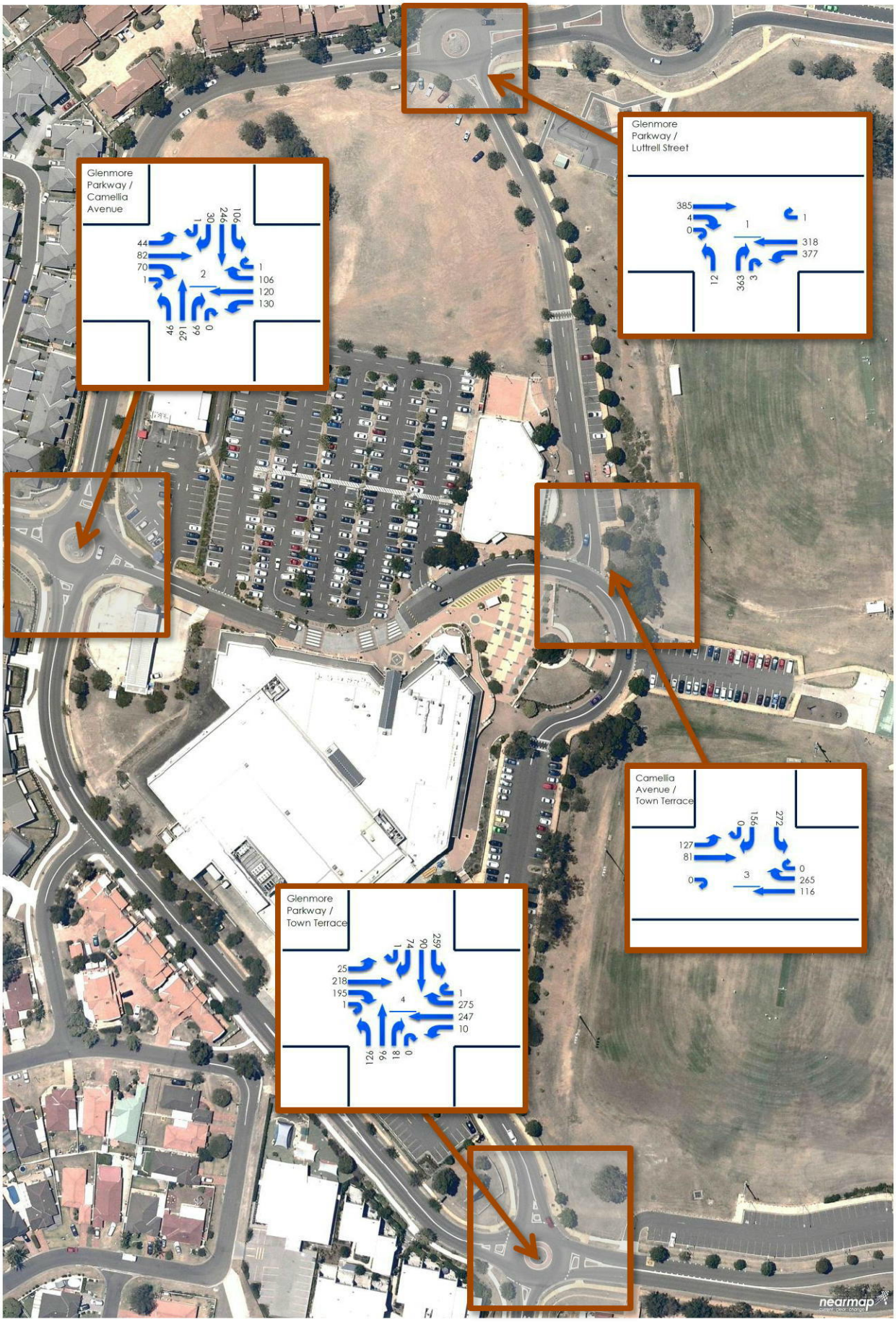


Figure 8-6 Future Saturday Daytime Road Network Volumes



8.4 Intersection Analysis

SIDRA Intersection analysis of the future network volumes provided in Figure 8-5 and Figure 8-6 has been undertaken and is provided at Table 8-6 and Table 8-7 respectively.

The comparison with the existing conditions indicates that the additional traffic generated by the proposal will have no significant impact on the operation of the surrounding road network, with all intersections continuing to operate under “excellent” operating conditions, with degrees of saturation of less than 0.6 at all intersections during both peak hours.

It is considered that queues and delays on all approaches are minimal and will be manageable, particularly when bearing in mind that the adopted traffic generation is highly conservative as the Saturday generation includes traffic generation from a high peak sporting Saturday, and the analyses assumes that the peak hour traffic generation of the shopping centre coincides with the road network peak hours.

It is therefore considered that the proposal can be accommodated within the existing road network which surrounds the site.

The detailed output summaries are provided at Annex D.

Table 8-6 SIDRA Intersection Analysis Summary - Thursday PM Peak

Intersection	Approach	Existing			Future		
		D.O.S	95th%ile Queue	Av. Delay	D.O.S	95th%ile Queue	Av. Delay
Glenmore Parkway / Town Terrace (Luttrell Street)	Glenmore Parkway W	0.253	10.9 m	7.7 sec	0.394	19.3 m	8.6 sec
	Town Terrace (Luttrell Street S)	0.186	7.0 m	12.3 sec	0.315	13.2 m	13.3 sec
	Glenmore Parkway E	0.337	16.7 m	7.0 sec	0.468	29.1 m	6.9 sec
	Intersection	0.337	16.7 m	8.2 sec	0.468	29.1 m	8.7 sec
Glenmore Parkway / Camellia Avenue	Glenmore Parkway N	0.248	10.4 m	8.5 sec	0.414	20.4 m	9.1 sec
	Camellia Avenue W	0.201	8.1 m	10.7 sec	0.296	13.3 m	11.4 sec
	Glenmore Parkway S	0.275	12.1 m	9.3 sec	0.424	21.5 m	9.5 sec
	Camellia Avenue E	0.320	14.1 m	9.7 sec	0.406	19.6 m	10.9 sec
	Intersection	0.320	14.1 m	9.5 sec	0.424	21.5 m	10.0 sec
Glenmore Parkway / Town Terrace/Woodlands Drive	Town Terrace N	0.296	13.1 m	10.0 sec	0.503	28.6 m	11.6 sec
	Glenmore Parkway W	0.297	12.9 m	10.7 sec	0.490	26.1 m	11.7 sec
	Woodlands Drive S	0.204	8.5 m	9.6 sec	0.337	16.3 m	11.4 sec
	Glenmore Parkway E	0.322	14.1 m	10.9 sec	0.566	34.5 m	12.5 sec
	Intersection	0.322	14.1 m	10.4 sec	0.566	34.5 m	11.9 sec
Camellia Avenue/ Town Terrace (Luttrell Street)	Camellia Avenue N	0.325	10.3 m	10.0 sec	0.536	30.2 m	12.0 sec
	Camellia Avenue W	0.130	0.0 m	3.8 sec	0.145	0.0 m	4.2 sec
	Town Terrace E	0.147	5.8 m	5.2 sec	0.278	11.1 m	7.4 sec
	Intersection	0.325	10.3 m	6.7 sec	0.536	30.2 m	8.6 sec

Table 8-7 SIDRA Intersection Analysis Summary – Saturday Peak Hour

Intersection	Approach	Existing			Future		
		D.O.S	95th%ile Queue	Av. Delay	D.O.S	95th%ile Queue	Av. Delay
Glenmore Parkway / Town Terrace (Luttrell Street)	Glenmore Parkway W	0.288	12.6 m	8.2 sec	0.430	21.5 m	9.2 sec
	Town Terrace (Luttrell Street S)	0.259	10.3 m	12.2 sec	0.383	17.0 m	13.2 sec
	Glenmore Parkway E	0.311	14.6 m	7.0 sec	0.433	24.6 m	7.0 sec
	Intersection	0.311	14.6 m	8.7 sec	0.433	24.6 m	9.2 sec
Glenmore Parkway / Camellia Avenue	Glenmore Parkway N	0.214	8.7 m	8.1 sec	0.357	16.8 m	8.5 sec
	Camellia Avenue W	0.153	6.0 m	10.7 sec	0.233	10.0 m	11.2 sec
	Glenmore Parkway S	0.260	11.2 m	9.0 sec	0.395	19.5 m	9.1 sec
	Camellia Avenue E	0.302	13.1 m	9.5 sec	0.382	17.9 m	10.6 sec
	Intersection	0.302	13.1 m	9.2 sec	0.395	19.5 m	9.7 sec
Glenmore Parkway / Town Terrace/Woodlands Drive	Town Terrace N	0.226	9.5 m	9.9 sec	0.402	19.9 m	10.7 sec
	Glenmore Parkway W	0.268	11.4 m	10.5 sec	0.443	22.1 m	11.3 sec
	Woodlands Drive S	0.181	7.4 m	9.9 sec	0.296	13.9 m	11.5 sec
	Glenmore Parkway E	0.329	14.6 m	10.7 sec	0.540	29.9 m	11.4 sec
	Intersection	0.329	14.6 m	10.3 sec	0.540	29.9 m	11.2 sec
Camellia Avenue/ Town Terrace (Luttrell Street)	Camellia Avenue N	0.308	9.7 m	9.9 sec	0.497	25.6 m	11.4 sec
	Camellia Avenue W	0.102	0.0 m	4.6 sec	0.117	0.0 m	5.0 sec
	Town Terrace E	0.184	7.2 m	5.5 sec	0.301	12.3 m	7.2 sec
	Intersection	0.308	9.7 m	7.0 sec	0.497	25.6 m	8.5 sec

9 Conclusions

Based on the foregoing analysis it is concluded that;

> An Planning Approval exists for the site (Planning Permit DA10/1305) approving the redevelopment of the majority of the land north of the existing centre buildings and bound by Glenmore Parkway and Luttrell Street (including the existing at-grade car park and vacant lot) for the purposes of an extension of the existing town centre to provide a total of some 16,413 additional square metres of commercial/retail floor area;

> The currently proposed scheme is of a significantly smaller scale than that previously proposed and is to be contained entirely within the vacant site to the north of the existing at-grade car park;

> It is considered that a parking reduction is justified under the Penrith Development Control Plan 2006 having regard to an assessment of the empirical and likely demands generated by the expansion of the Shopping Centre and the surrounding Community Uses, and Councils adoption of the then RTA parking requirements;

> If the parking rate approved by the current permit was adopted, a requirement for an additional 378 car parking spaces would be indicated for the current proposal;

> The provision of 388 on-site car parking spaces, plus the additional 32 on-street parking spaces, would meet this requirement;

> Based on a conservative analysis of the high peak demands of the shopping centre and surrounding community and sporting uses, a high peak demand for 911 spaces is expected on a sporting Saturday;

> Based on a future supply of 926 spaces for the Town Centre, inclusive of the new on-site car parking and changes to on-street parking, the future high peak demand will be accommodated; and

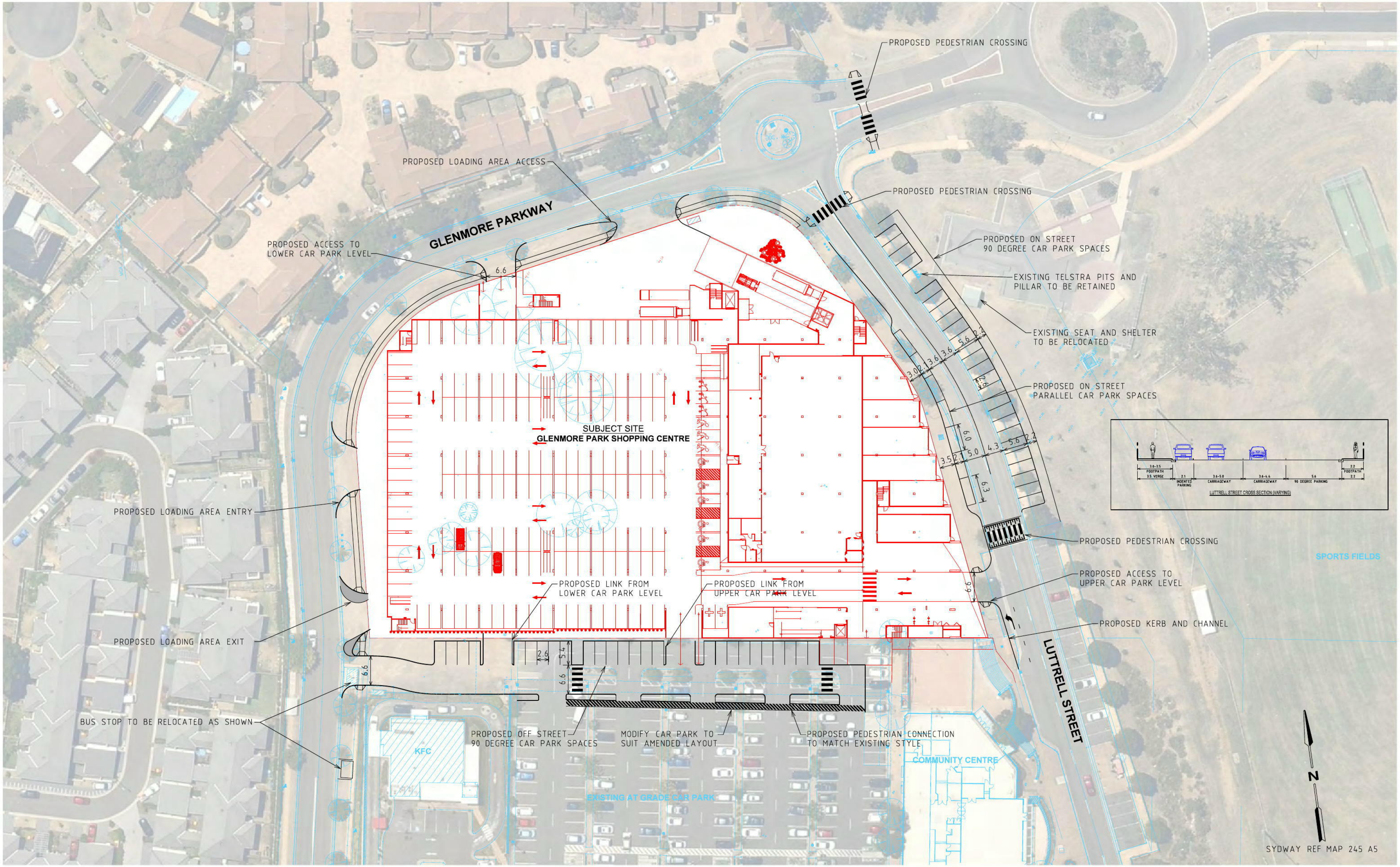
> The comparison with the existing conditions indicates that the additional traffic generated by the proposal will have no significant impact on the operation of the surrounding road network, with all intersections continuing to operate under “excellent” operating conditions, with degrees of saturation of less than 0.6 at all intersections during both peak hours.

Glenmore Park Town Centre

APPENDIX A

EXTERNAL ROADWORKS PLAN

Cardno
Shaping the Future



DATE PLOTTED: 29/05/2014 2:37:31 PM BY: kevin shao

CAD FILE: O:\DRATRAFF\2014\CG140307\Drawings\CG140307T01.dgn

Rev	Date	Description	Drawn	Appr.
P1	28.05.14	ISSUED FOR INFORMATION	KS	TCW

0 4.0 8.0 16.0
1:400 @ A1

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES SHOWN ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE.

1. BASE INFORMATION FROM NEARMAP AERIAL PHOTO AND SURVEY, REF No. C791-014A.DWG
2. ALL DIMENSIONS TO FACE OF KERB AND CHANNEL U.N.O
3. LOCAL ROAD - GLENMORE PARKWAY (SPEED ZONE 50KM/H)

Cardno
Shaping the Future
ABN: 47 106 610 913
150 Oxford Street, Collingwood, VIC Australia 3066
Phone (+61 3) 8415 7777 Fax (+61 3) 8415 7788
Email: victoria@cardno.com.au Web: www.cardno.com.au/victoria

Drawn: KS
Designed: KS
Checked: TCW
Authorised:

Client: VILLAGE FAIR GLENMORE PARK PTY LTD
Project: GLENMORE PARK SHOPPING CENTRE
GLENMORE PARKWAY
GLENMORE PARK TOWN CENTRE, NSW
Title: CONCEPT LAYOUT PLAN
OVERALL EXTERNAL PLAN

Status: **PRELIMINARY**
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Date	Scale	Size
28.05.14	1:400	A1

Project Number	Sheet Number	Revision
CG140307	T 01	P1

Glenmore Park Town Centre

APPENDIX B

LOADING VEHICLE SWEPT PATHS

Cardno
Shaping the Future

Cardno
Shaping the Future

19.0m SEMI-TRAILER SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

19.0m SEMI-TRAILER SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

GLENMORE PARKWAY

N

SYDWAY REF MAP 245 A5

LUTTRELL STREET

ALDI LOADING DOCK

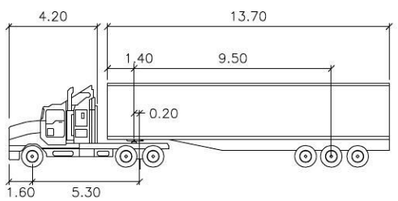
FREEZER

F & V

SUBJECT SITE

GLENMORE PARK SHOPPING CENTRE

DESIGN VEHICLE



S ARTICULATED 19M meters

Tractor Width	: 2.50	Lock to Lock Time	: 6.0
Trailer Width	: 2.50	Steering Angle	: 27.7
Tractor Track	: 2.50	Articulating Angle	: 70.0
Trailer Track	: 2.50		

CG140307SK01 P1 - GLENMORE PARK SHOPPING CENTRE - GLENMORE PARK TOWN CENTRE
19m SEMI-TRAILER SWEPT PATH ANALYSIS - 0.6m CLEARANCE SHOWN

SCALE - 1:250 @ A3 DATE - 28-05-14

DATE PLOTTED29/05/2014 2:38:33 PM

CAD FILE:Q:\DRATRAFF\2014\CG140307\Drawings\CG140307SK01.dgn

Cardno
Shaping the Future

12.5m TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

12.5m TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

GLENMORE PARKWAY

12.5m TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

N

SYDWAY REF MAP 245 A5

LUTTRELL STREET

SPECIALTY DOCK

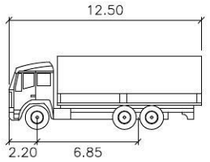
SUBJECT SITE

GLENMORE PARK SHOPPING CENTRE

FREEZER

F & V

DESIGN VEHICLE



SU TRUCK	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

CG140307SK02 P1 - GLENMORE PARK SHOPPING CENTRE - GLENMORE PARK TOWN CENTRE
12.5m TRUCK SWEPT PATH ANALYSIS - 0.6m CLEARANCE SHOWN
SCALE - 1:250 @ A3 DATE - 28-05-14

DATE PLOTTED29/05/2014 2:40:20 PM

CAD FILE:Q:\DRATRAFF\2014\CG140307\Drawings\CG140307SK02.dgn

Cardno
Shaping the Future

12.5m TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

12.5m TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

GLENMORE PARKWAY

N

SYDWAY REF MAP 245 A5

LUTTRELL STREET

ALDI LOADING DOCK

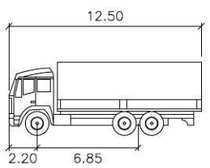
SUBJECT SITE

GLENMORE PARK SHOPPING CENTRE

FREEZER

F & V

DESIGN VEHICLE



SU TRUCK	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

CG140307SK03 P1 - GLENMORE PARK SHOPPING CENTRE - GLENMORE PARK TOWN CENTRE
12.5m TRUCK SWEPT PATH ANALYSIS - 0.6m CLEARANCE SHOWN
SCALE - 1:250 @ A3 DATE - 28-05-14

DATE PLOTTED29/05/2014 2:40:51 PM
CAD FILE:Q:\DRATRAFF\2014\CG140307\Drawings\CG140307SK03.dgn

Cardno
Shaping the Future

SYDWAY REF MAP 245 A5

19.0m SEMI-TRAILER SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

19.0m SEMI-TRAILER SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

GLENMORE PARKWAY

19.0m SEMI-TRAILER SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

SEMI MOUNTABLE AREA

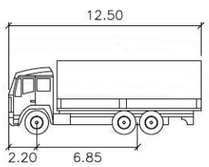
SUBJECT SITE

GLENMORE PARK SHOPPING CENTRE

COLES LOADING

COMPACTOR

DESIGN VEHICLE



SU TRUCK	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

CG140307SK04 P1 - GLENMORE PARK SHOPPING CENTRE - GLENMORE PARK TOWN CENTRE
19m SEMI-TRAILER SWEPT PATH ANALYSIS - 0.6m CLEARANCE SHOWN
SCALE - 1:250 @ A3 DATE - 28-05-14

DATE PLOTTED29/05/2014 2:41:46 PM

CAD FILE:Q:\DRATRAFF\2014\CG140307\Drawings\CG140307SK04.dgn

Cardno
Shaping the Future

N

12.5m SU TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

12.5m SU TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

12.5m SU TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (INGRESS)

12.5m SU TRUCK SWEPT PATH
0.6m CLEARANCE SHOWN (EGRESS)

GLENMORE PARKWAY

SEMI MOUNTABLE AREA

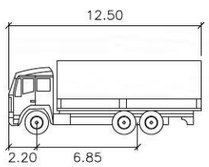
SUBJECT SITE

GLENMORE PARK SHOPPING CENTRE

COMPACTOR

COLES LOADING

DESIGN VEHICLE



SU TRUCK	meters
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

CG140307SK05 P1 - GLENMORE PARK SHOPPING CENTRE - GLENMORE PARK TOWN CENTRE
12.5m TRUCK SWEPT PATH ANALYSIS - 0.6m CLEARANCE SHOWN
SCALE - 1:250 @ A3 DATE - 28-05-14

DATE PLOTTED29/05/2014 2:42:26 PM

CAD FILE:Q:\DRATRAFF\2014\CG140307\Drawings\CG140307SK05.dgn

Glenmore Park Town Centre

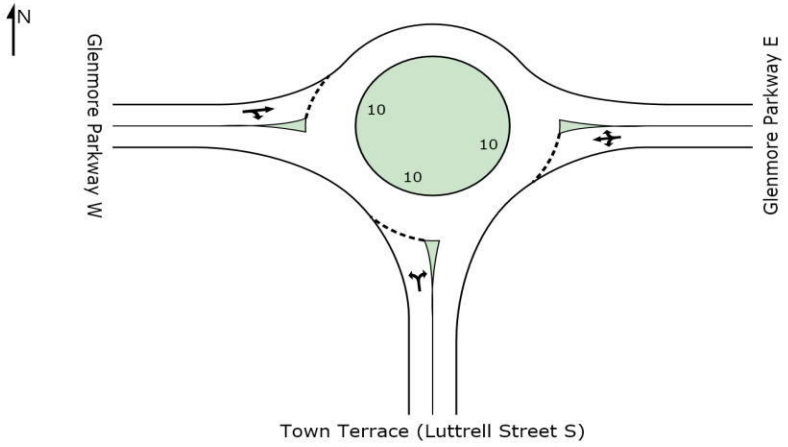
APPENDIX C

SIDRA DETAILED OUTPUTS – EXISTING CONDITIONS

Glenmore Parkway / Town Terrace (Luttrell Street) - Existing Thursday PM

Roundabout

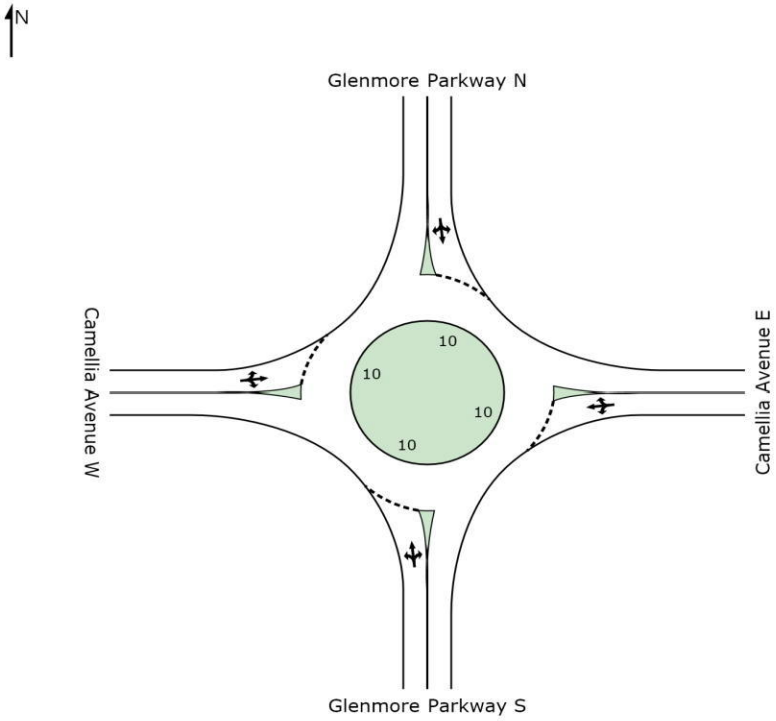
N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GILuTHE1]



						App	R	T	L						
						0	0	0	0						
						0	0	0	0						
						0.000	0.000	0.000	0.000						
						0	0	0	0						
						0	0	0	0						
						0	0	0	0						
Glenmore Parkway W															**Glenmore Parkway E**
L	0	0	0.000	0	0	0				555	11	566	0.337	16.7	7	***App***
T	7.6	10.9	0.253	283	6	277				1	0	1	0.337	16.7	12.7	**R**
R	12.5	10.9	0.253	5	0	5				253	5	258	0.337	16.7	6.5	**T**
App	*7.7*	*10.9*	*0.253*	*288*	*6*	*282*				301	6	307	0.337	16.7	7.3	**L**
					1036	6	0	193	199	**LV***						
					21	0	0	4	4	**HV***						
					1057	6	0	197	203	**Total Vol***						***Output Volumes**
					0.337	0.186	0.000	0.186	0.186	**DoS**						
					16.7	7	0	7	7	**95th %ile Back of Queue (m)**						
					8.2	8.7	0	12.4	12.3	**Average Delay (sec)**						
					Intersection	**L**	**T**	**R**	***App***							

Town Terrace (Luttrell Street S)

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlCaTHE1]



Glenmore Parkway N

	App	R	T	L
	8.5	12.5	8	8.8
	10.4	10.4	10.4	10.4
	0.248	0.248	0.248	0.248
	264	12	169	83
	5	0	3	2
	259	12	166	81

Camellia Avenue W

L	9.2	8.1	0.201	26	1	25	333	7	340	0.320	*14.1*	*9.7*	***App***
T	8.5	8.1	0.201	80	2	78	91	2	93	0.320	14.1	12.8	**R**
R	13	8.1	0.201	95	2	93	129	3	132	0.320	14.1	8.2	**T**
App	*10.7*	*8.1*	*0.201*	*201*	*5*	*196*	113	2	115	0.320	14.1	9	**L**

Camellia Avenue E

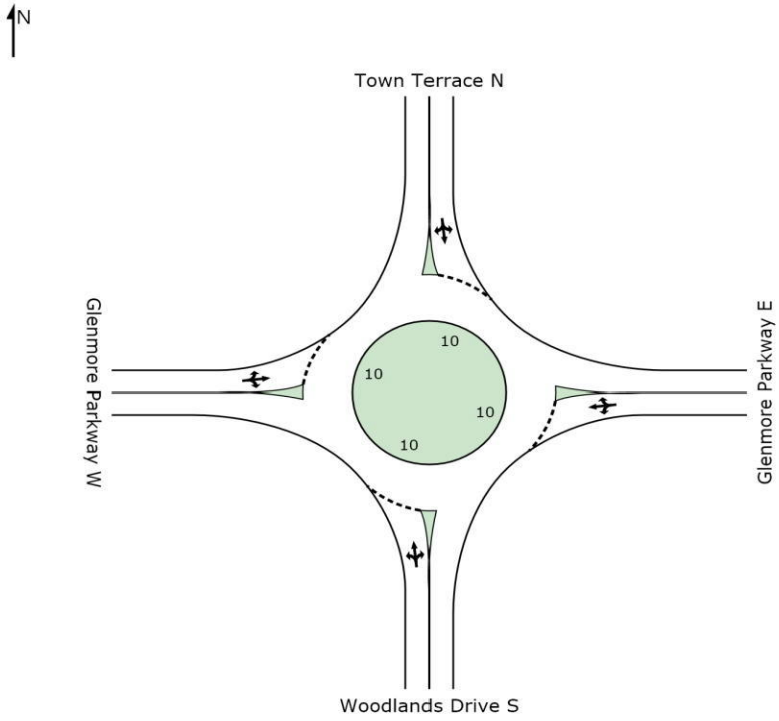
1081	40	168	85	293
23	1	3	2	6
1104	41	171	87	*299*
0.320	0.275	0.275	0.275	*0.275*
14.1	12.1	12.1	12.1	*12.1*
9.5	8.7	7.9	12.4	9.3
Intersection	**L**	**T**	**R**	***App***

LV*
HV*
Total Vol*
DoS
95th %ile Back of Queue (m)
Average Delay (sec)

***Output Volumes**

Glenmore Parkway S

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlToTHE1]



Town Terrace N

	App	R	T	L									
	10	12.9	8.4	9.2									
	13.1	13.1	13.1	13.1									
	0.296	0.296	0.296	0.296									
	301	79	65	157									
	6	2	1	3									
	295	77	64	154									

Glenmore Parkway W

L	8.9	12.9	0.297	27	1	26	322	6	328	0.322	*14.1*	*10.9*	***App***
T	8.1	12.9	0.297	113	2	111	171	3	174	0.322	14.1	13	**R**
R	12.6	12.9	0.297	177	4	173	141	3	144	0.322	14.1	8.5	**T**
App	*10.7*	12.9	*0.297*	*317*	*7*	*310*	10	0	10	0.322	14.1	9.3	**L**

Glenmore Parkway E

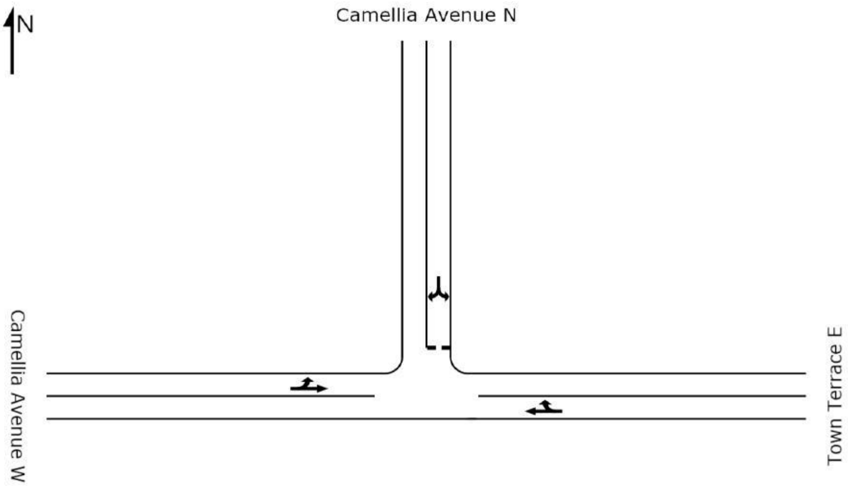
1117	101	70	19	*190*	**LV***
22	2	1	0	*3*	**HV***
1139	103	71	19	*193*	**Total Vol***
0.322	0.204	0.204	0.204	*0.204*	**DoS**
14.1	8.5	8.5	8.5	*8.5*	**95th %ile Back of Queue (m)**
10.4	9.5	8.8	13.3	9.6	**Average Delay (sec)**
Intersection	**L**	**T**	**R**	***App***	

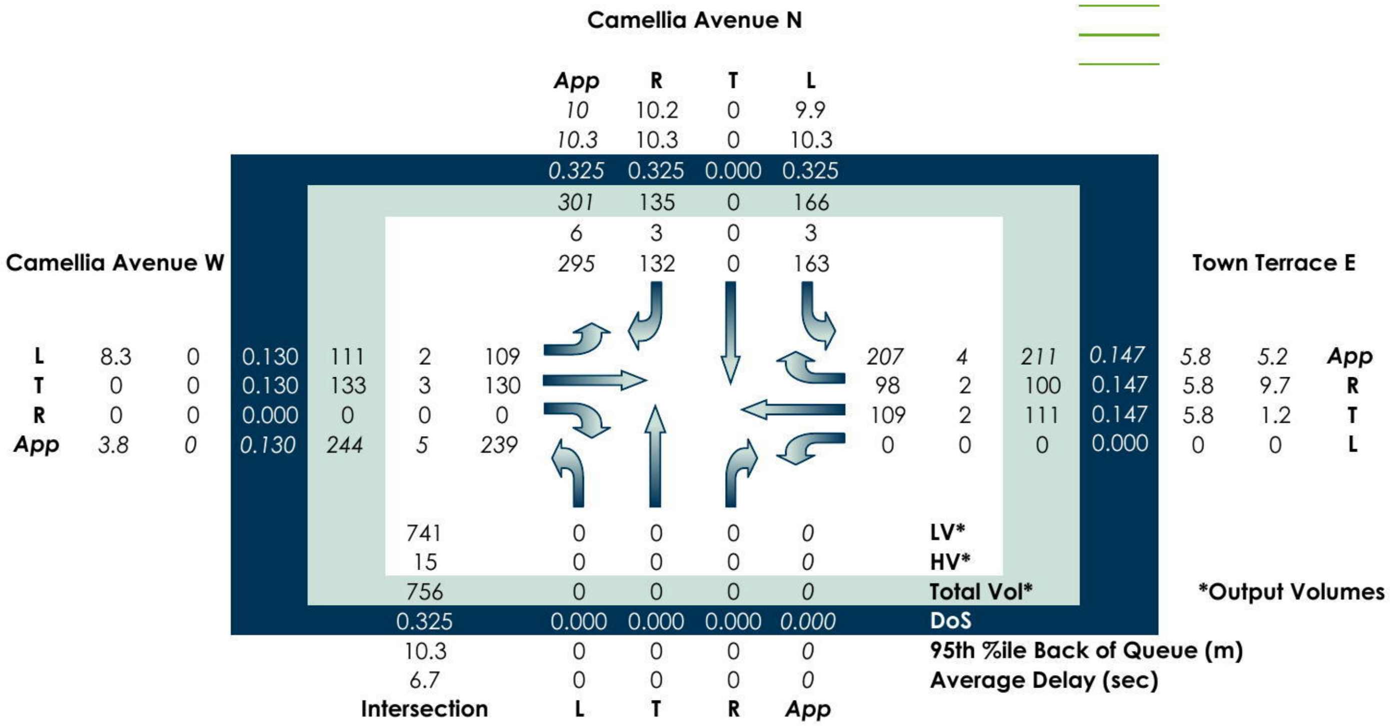
***Output Volumes**

Woodlands Drive S

Camellia Avenue / Town Terrace - Existing Thursday PM

Give-Way/Yield N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[CaToTHE1]

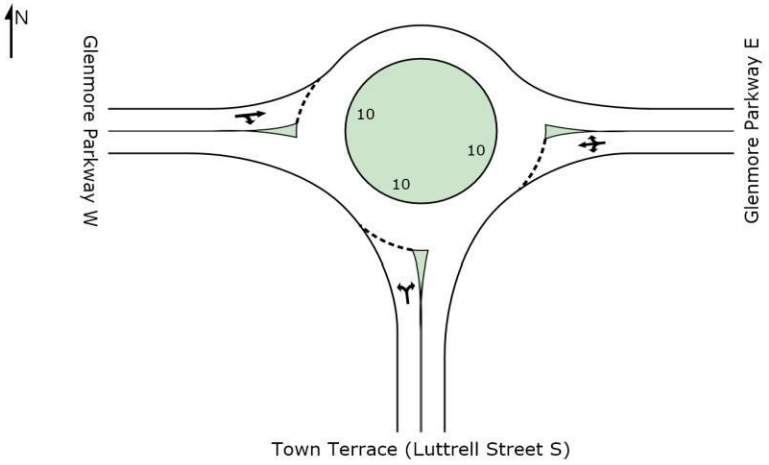



Camellia Avenue N
App R T L
10 10.2 0 9.9
10.3 10.3 0 10.3
0.325 0.325 0.000 0.325
301 135 0 166
6 3 0 3
295 132 0 163
Camellia Avenue W
L 8.3 0 0.130 111 2 109
T 0 0 0.130 133 3 130
R 0 0 0.000 0 0 0
App 3.8 0 0.130 244 5 239
Town Terrace E
207 4 211 0.147 5.8 5.2 App
98 2 100 0.147 5.8 9.7 R
109 2 111 0.147 5.8 1.2 T
0 0 0 0.000 0 0 L
741 0 0 0 0 LV*
15 0 0 0 0 HV*
756 0 0 0 0 Total Vol*
*Output Volumes
0.325 0.000 0.000 0.000 0.000 DoS
10.3 0 0 0 0 95th %ile Back of Queue (m)
6.7 0 0 0 0 Average Delay (sec)
Intersection L T R App

Glenmore Parkway / Town Terrace (Luttrell Street) - Existing Saturday Peak

Roundabout

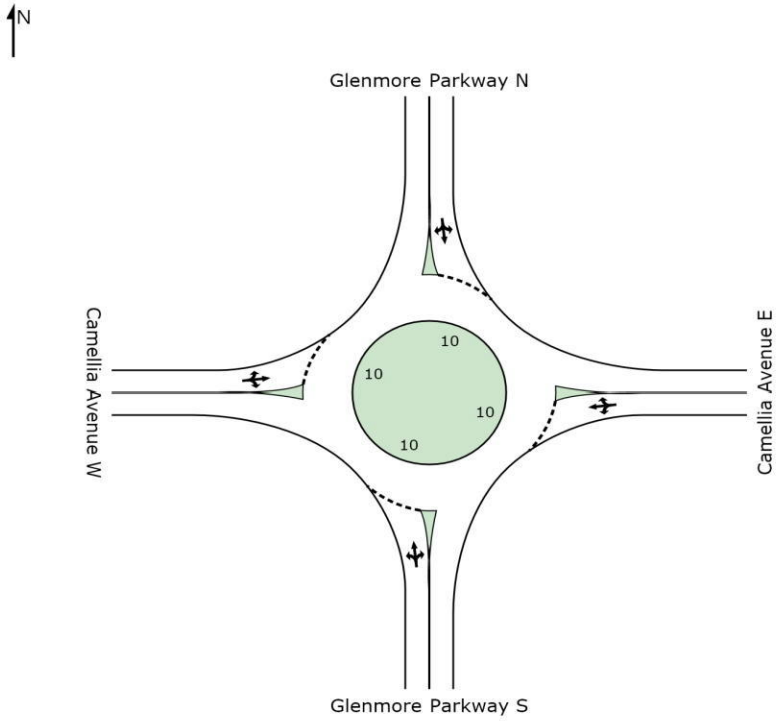
N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlLuSAE1]



							App	R	T	L					
							0	0	0	0					
							0	0	0	0					
							0.000	0.000	0.000	0.000					
							0	0	0	0					
							0	0	0	0					
							0	0	0	0					
Glenmore Parkway W															**Glenmore Parkway E**
L	0	0	0.000	0	0	0					*508*	*11*	*519*	*0.311*	*14.6*	*7*	***App***
T	8.2	12.6	0.288	298	6	292					1	0	1	0.311	14.6	12.7	**R**
R	12.6	12.6	0.288	4	0	4					223	5	228	0.311	14.6	6.5	**T**
App	*8.2*	*12.6*	*0.288*	*302*	6	296					284	6	290	0.311	14.6	7.3	**L**
					1088		12	0	272	*284*		**LV***					
					23		0	0	6	6		**HV***					
					1111		12	0	278	*290*		**Total Vol***					***Output Volumes**
					0.311		0.259	0.000	0.259	*0.259*		**DoS**					
					14.6		10.3	0	10.3	*10.3*		**95th %ile Back of Queue (m)**					
					8.7		8.6	0	12.4	*12.2*		**Average Delay (sec)**					
					Intersection		**L**	**T**	**R**	***App***							

Town Terrace (Luttrell Street S)

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlCaSAE1]



Glenmore Parkway N

	App	R	T	L
	8.1	12.5	7.6	8.4
	8.7	8.7	8.7	8.7
	0.214	0.214	0.214	0.214
	240	5	124	111
	4	0	2	2
	236	5	122	109

Camellia Avenue W

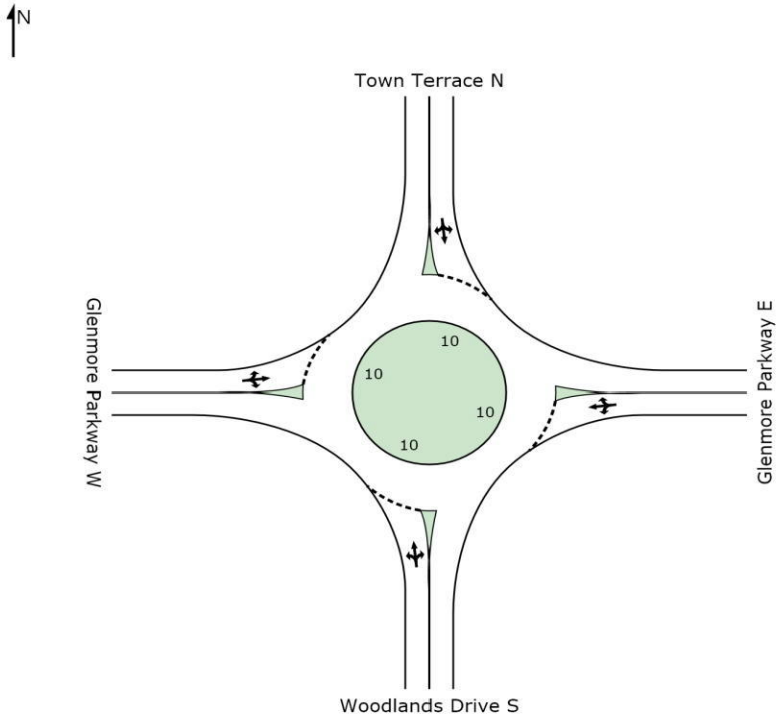
L	9.2	6	0.153	19	0	19			341	7	348	0.302	*13.1*	*9.5*	***App***
T	8.4	6	0.153	59	1	58			110	2	112	0.302	13.1	12.2	**R**
R	12.9	6	0.153	74	1	73			97	2	99	0.302	13.1	7.7	**T**
App	*10.7*	6	*0.153*	*152*	2	*150*			134	3	137	0.302	13.1	8.5	**L**

Camellia Avenue E

1010	47	168	68	*283*	**LV***	
18	1	3	1	*5*	**HV***	
1028	48	171	69	*288*	**Total Vol***	***Output Volumes**
0.302	0.260	0.260	0.260	*0.260*	**DoS**	
13.1	11.2	11.2	11.2	*11.2*	**95th %ile Back of Queue (m)**	
9.2	8.6	7.8	12.3	9	**Average Delay (sec)**	
Intersection	**L**	**T**	**R**	***App***		

Glenmore Parkway S

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlToSAE1]



Town Terrace N

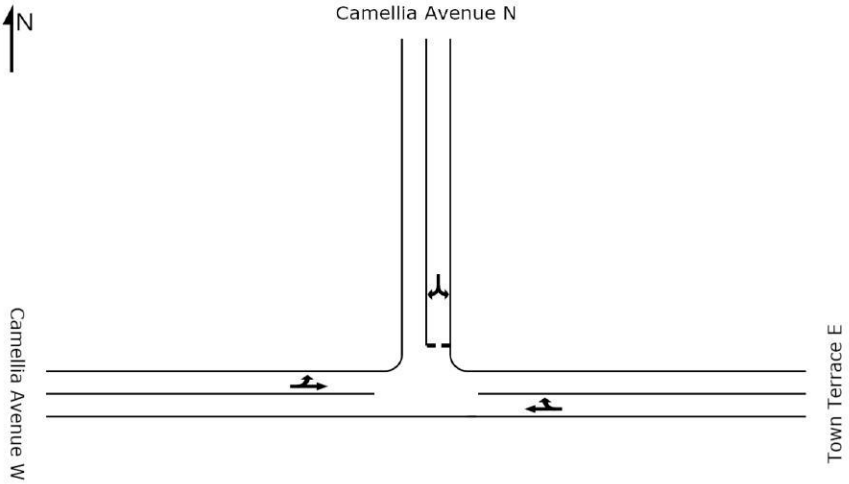
						App	**R**	**T**	**L**						
						9.9	12.6	8.1	8.9						
						9.5	9.5	9.5	9.5						
						0.226	*0.226*	*0.226*	*0.226*						
						235	*72*	*43*	*120*						
						4	*1*	*1*	*2*						
						231	*71*	*42*	*118*						
Glenmore Parkway W														**Glenmore Parkway E**	
L	8.9	11.4	0.268	24	0	24				*350*	*7*	*357*	*0.329*	*14.6*	*10.7*	***App***
T	8.2	11.4	0.268	115	2	113				195	4	199	0.329	14.6	12.6	**R**
R	12.7	11.4	0.268	142	3	139				141	3	144	0.329	14.6	8.1	**T**
App	*10.5*	*11.4*	*0.268*	*281*	*5*	*276*				14	0	14	0.329	14.6	8.9	**L**
					1024		88	55	24	*167*		**LV***				
					19		2	1	0	*3*		**HV***				
					1043		90	56	24	*170*		**Total Vol***				
					0.329		0.181	0.181	0.181	*0.181*		**DoS**				
					14.6		7.4	7.4	7.4	*7.4*		**95th %ile Back of Queue (m)**				
					10.3		9.6	8.8	13.3	9.9		**Average Delay (sec)**				
					Intersection		**L**	**T**	**R**	***App***						

***Output Volumes**

Woodlands Drive S

Camellia Avenue / Town Terrace - Existing Saturday Peak

Give-Way/Yield N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[CaToSAE1]



Camellia Avenue N

								App	R	T	L								
								9.9	10.1	0	9.8								
								9.7	9.7	0	9.7								
								0.308	0.308	0.000	0.308								
								289	137	0	152								
								6	3	0	3								
Camellia Avenue W								*283*	134	0	149							**Town Terrace E**	
L	8.3	0	0.102	106	2	104						261	*5*	266	*0.184*	*7.2*	*5.5*	***App***	
T	0	0	0.102	86	2	84						141	3	144	0.184	7.2	9.5	**R**	
R	0	0	0.000	0	0	0						120	2	122	0.184	7.2	0.9	**T**	
App	*4.6*	*0*	*0.102*	*192*	*4*	*188*						0	0	0	0.000	0	0	**L**	
					732			0	0	0	*0*	**LV***							
					15			0	0	0	*0*	**HV***							
					747			0	0	0	*0*	**Total Vol***						***Output Volumes**	
					0.308			0.000	0.000	0.000	*0.000*	**DoS**							
					9.7			0	0	0	0	**95th %ile Back of Queue (m)**							
					7			0	0	0	0	**Average Delay (sec)**							
					Intersection			**L**	**T**	**R**	***App***								

Glenmore Park Town Centre

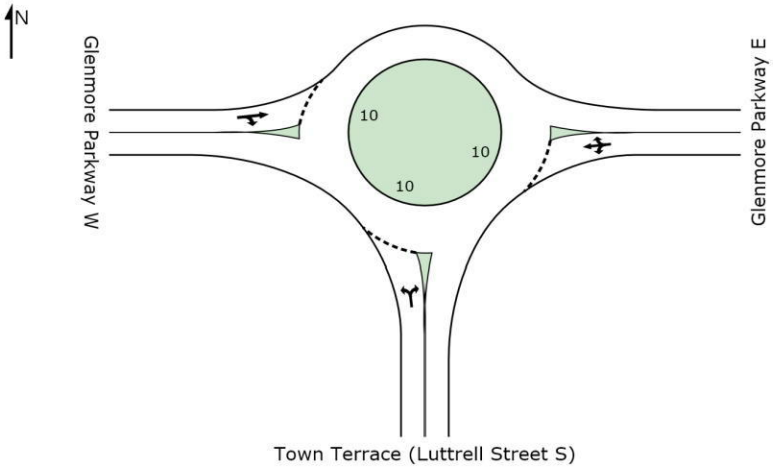
APPENDIX D

SIDRA DETAILED OUTPUTS – FUTURE CONDITIONS

Cardno
Shaping the Future

Glenmore Parkway / Town Terrace (Luttrell Street) - Future Thursday PM

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GILuTHF1]

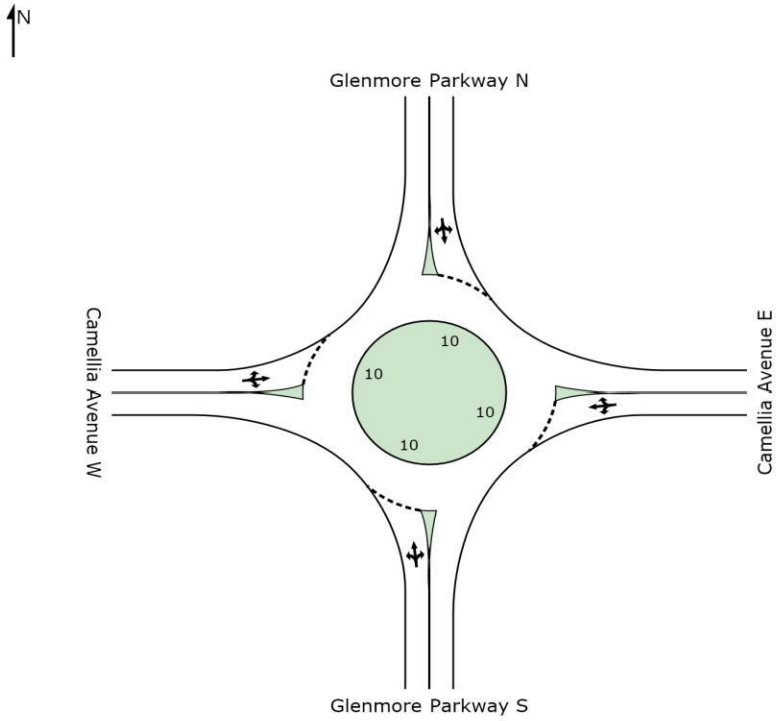


						App	R	T	L						
						0	0	0	0						
						0	0	0	0						
						0.000	0.000	0.000	0.000						
						0	0	0	0						
						0	0	0	0						
						0	0	0	0						
Glenmore Parkway W														**Glenmore Parkway E**	
L	0	0	0.000	0	0	0				776	*15*	*791*	*0.468*	*29.1*	6.9	***App***
T	8.6	19.3	0.394	396	8	388				1	0	1	0.468	29.1	12.7	**R**
R	13.4	19.3	0.394	5	0	5				363	7	370	0.468	29.1	6.5	**T**
App	8.6	*19.3*	*0.394*	*401*	*8*	*393*				412	8	420	0.468	29.1	7.3	**L**
					1478	6	0	303	*309*		**LV***					
					29	0	0	6	6		**HV***					
					1507	6	0	309	*315*		**Total Vol***					
					0.468	0.315	0.000	0.315	*0.315*		**DoS**					
					29.1	13.2	0	13.2	*13.2*		**95th %ile Back of Queue (m)**					
					8.7	9.6	0	13.4	*13.3*		**Average Delay (sec)**					
					Intersection	**L**	**T**	**R**	***App***							

***Output Volumes**

Town Terrace (Luttrell Street S)

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlCaTHF1]



Glenmore Parkway N

	App	R	T	L
	9.1	13	8.5	9.3
	20.4	20.4	20.4	20.4
	0.414	0.414	0.414	0.414
	434	41	310	83
	9	1	6	2
	425	40	304	81

Camellia Avenue W

L	10.4	13.3	0.296	54	1	53	*361*	7	368	0.406	*19.6*	*10.9*	**App**
T	9.6	13.3	0.296	108	2	106	91	2	93	0.406	19.6	14.1	**R**
R	14.1	13.3	0.296	95	2	93	157	3	160	0.406	19.6	9.6	**T**
App	*11.4*	*13.3*	*0.296*	*257*	*5*	*252*	113	2	115	0.406	19.6	10.4	**L**

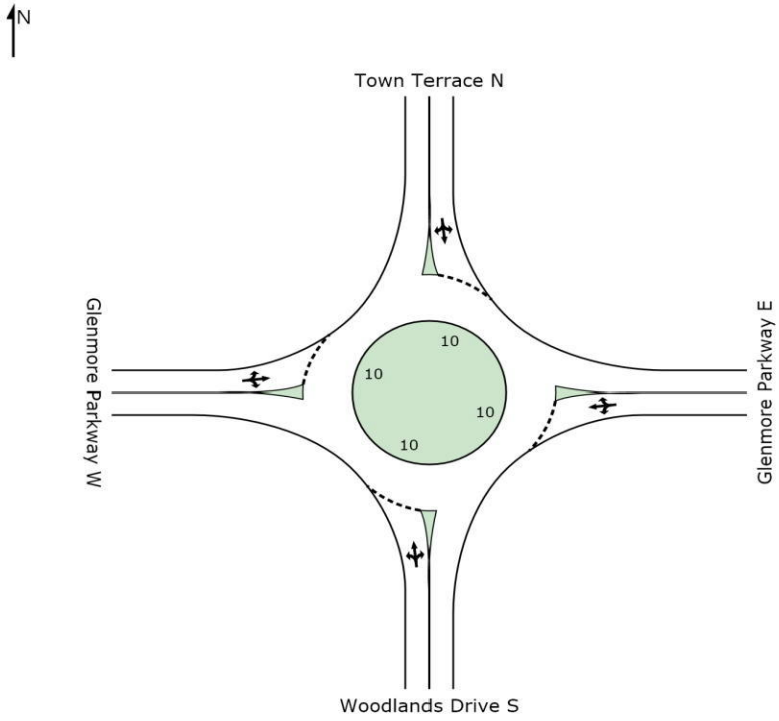
Camellia Avenue E

1469	40	306	85	*431*	**LV***
30	1	6	2	9	**HV***
1499	41	312	87	*440*	**Total Vol***
0.424	0.424	0.424	0.424	*0.424*	**DoS**
21.5	21.5	21.5	21.5	*21.5*	**95th %ile Back of Queue (m)**
10	9.3	8.5	13	*9.5*	**Average Delay (sec)**
Intersection	**L**	**T**	**R**	***App***	

***Output Volumes**

Glenmore Parkway S

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlToTHF1]



Town Terrace N

	App	R	T	L
	11.6	14.8	10.3	11.1
	28.6	28.6	28.6	28.6
	0.503	0.503	0.503	0.503
	442	79	94	269
	9	2	2	5
	433	77	92	264

L	10.5	26.1	0.490	27	1	26	*544*	*11*	*555*	0.566	*34.5*	*12.5*	***App***
T	9.7	26.1	0.490	227	5	222	282	6	288	0.566	34.5	14.7	**R**
R	14.2	26.1	0.490	205	4	201	252	5	257	0.566	34.5	10.2	**T**
App	*11.7*	*26.1*	*0.490*	*459*	*10*	*449*	10	0	10	0.566	34.5	11	**L**

Glenmore Parkway W **Glenmore Parkway E**

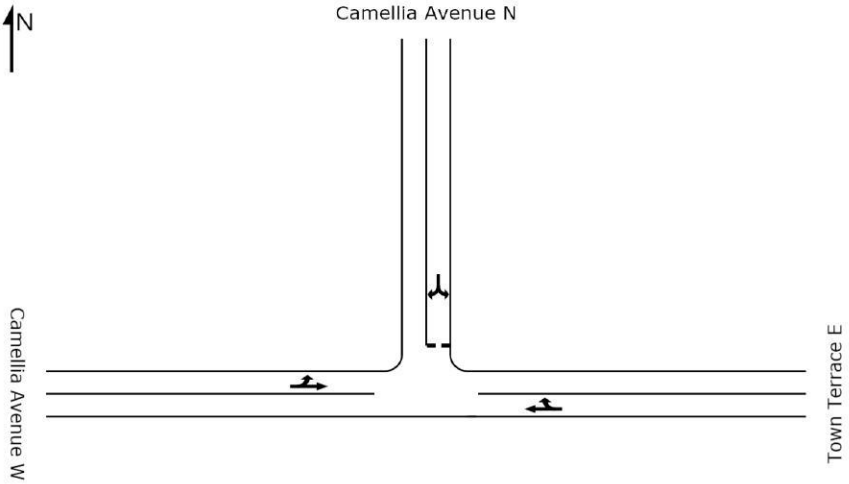
1672	129	98	19	*246*
35	3	2	0	*5*
1707	132	100	19	*251*
0.566	0.337	0.337	0.337	*0.337*
34.5	16.3	16.3	16.3	*16.3*
11.9	11.5	10.7	15.2	*11.4*
Intersection	**L**	**T**	**R**	***App***

LV*
HV*
Total Vol*
DoS
95th %ile Back of Queue (m)
Average Delay (sec)

***Output Volumes**

Woodlands Drive S

Give-Way/Yield N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[CaToTHF1]



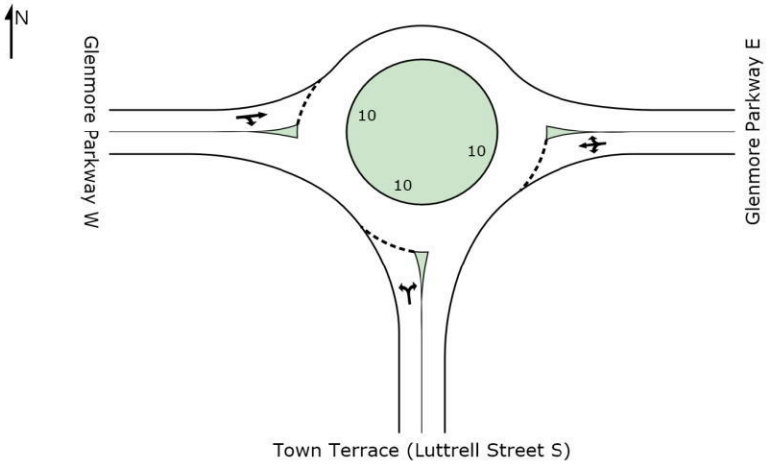
Camellia Avenue N

							App	**R**	**T**	**L**					
							12	12.2	0	11.9					
							30.2	30.2	0	30.2					
							0.536	0.536	0.000	0.536					
							470	163	0	307					
							9	3	0	6					
Camellia Avenue W							*461*	160	0	301					**Town Terrace E**
L	8.3	0	0.145	140	3	137					*345*	*7*	*352*	*0.278*	*11.1*	*7.4*	***App***
T	0	0	0.145	133	3	130					236	5	241	0.278	11.1	10.1	**R**
R	0	0	0.000	0	0	0					109	2	111	0.278	11.1	1.6	**T**
App	*4.2*	*0*	*0.145*	*273*	6	267					0	0	0	0.000	0	0	**L**
					1073		0	0	0	*0*	**LV***						
					22		0	0	0	*0*	**HV***						
					1095		0	0	0	*0*	**Total Vol***						***Output Volumes**
					0.536		0.000	0.000	0.000	*0.000*	**DoS**						
					30.2		0	0	0	*0*	**95th %ile Back of Queue (m)**						
					8.6		0	0	0	*0*	**Average Delay (sec)**						
					Intersection		**L**	**T**	**R**	***App***							

Glenmore Parkway / Town Terrace (Luttrell Street) - Future Saturday Peak

Roundabout

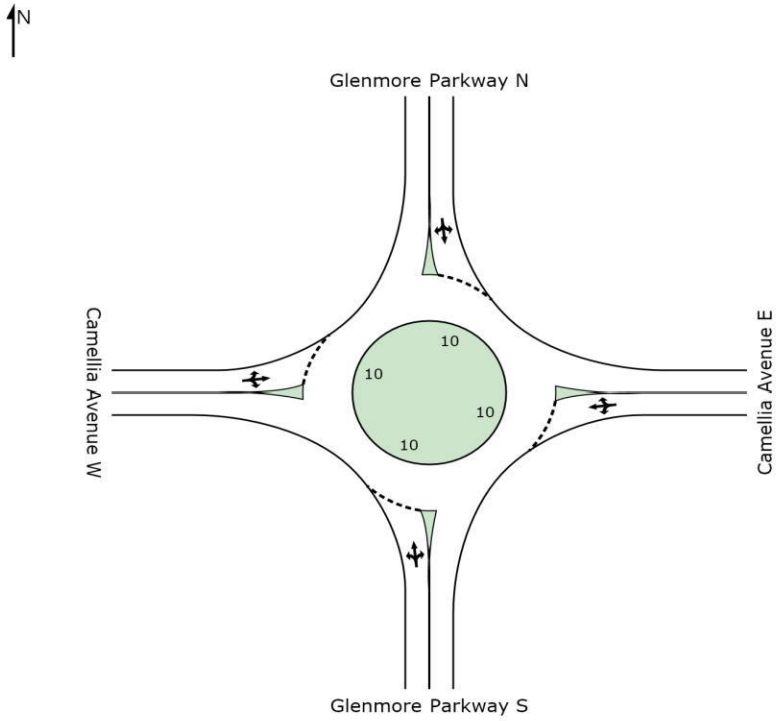
N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlLuSAF1]



							App	R	T	L					
							0	0	0	0					
							0	0	0	0					
							0.000	0.000	0.000	0.000					
							0	0	0	0					
							0	0	0	0					
							0	0	0	0					
Glenmore Parkway W															**Glenmore Parkway E**
L	0	0	0.000	0	0	0					*714*	*15*	*729*	*0.433*	24.6	*7*	***App***
T	9.2	21.5	0.430	403	8	395					1	0	1	0.433	24.6	12.7	**R**
R	13.6	21.5	0.430	4	0	4					326	7	333	0.433	24.6	6.5	**T**
App	9.2	*21.5*	*0.430*	*407*	*8*	*399*					387	8	395	0.433	24.6	7.3	**L**
					1500		12	0	375	*387*		**LV***					
					31		0	0	8	*8*		**HV***					
					1531		12	0	383	*395*		**Total Vol***					***Output Volumes**
					0.433		0.383	0.000	0.383	*0.383*		**DoS**					
					24.6		17	0	17	*17*		**95th %ile Back of Queue (m)**					
					9.2		9.5	0	13.3	*13.2*		**Average Delay (sec)**					
					Intersection		**L**	**T**	**R**	***App***							

Town Terrace (Luttrell Street S)

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlCaSAF1]

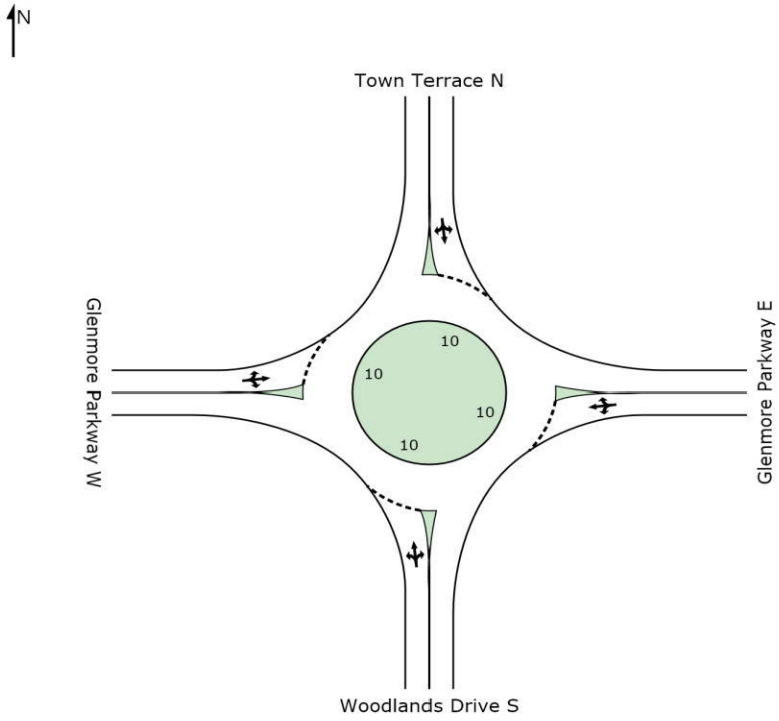


Glenmore Parkway N

							App	**R**	**T**	**L**						
							8.5	12.5	8	8.8						
							16.8	16.8	16.8	16.8						
							0.357	0.357	0.357	0.357						
							399	32	256	111						
							8	1	5	2						
Camellia Avenue W							*391*	31	251	109					**Camellia Avenue E**	
L	10.2	10	0.233	45	1	44					367	8	375	0.382	17.9	10.6	***App***
T	9.4	10	0.233	86	2	84					110	2	112	0.382	17.9	13.4	**R**
R	13.9	10	0.233	74	1	73					123	3	126	0.382	17.9	8.9	**T**
App	*11.2*	*10*	*0.233*	*205*	*4*	*201*					134	3	137	0.382	17.9	9.7	**L**
					1371		47	297	68	*412*			**LV***				
					28		1	6	1	*8*			**HV***				
					1399		48	303	69	*420*			**Total Vol***				***Output Volumes**
					0.395		0.395	0.395	0.395	*0.395*			**DoS**				
					19.5		19.5	19.5	19.5	*19.5*			**95th %ile Back of Queue (m)**				
					9.7		9.1	8.3	12.8	*9.1*			**Average Delay (sec)**				
					Intersection		**L**	**T**	**R**	***App***							

Glenmore Parkway S

Roundabout N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[GlToSAF1]



Town Terrace N

							App	**R**	**T**	**L**					
							10.7	13.8	9.3	10.1					
							19.9	19.9	19.9	19.9					
							0.402	0.402	0.402	0.402					
							367	72	69	226					
							7	1	1	5					
Glenmore Parkway W							*360*	71	68	221					**Glenmore Parkway E**
L	10.2	22.1	0.443	24	0	24					556	*11*	*567*	*0.540*	29.9	*11.4*	***App***
T	9.4	22.1	0.443	221	4	217					298	6	304	0.540	29.9	13.5	**R**
R	13.9	22.1	0.443	168	3	165					244	5	249	0.540	29.9	9	**T**
App	*11.3*	*22.1*	*0.443*	*413*	*7*	*406*					14	0	14	0.540	29.9	9.8	**L**
					1539		113	80	24	*217*	**LV***						
					29		2	2	0	*4*	**HV***						
					1568		115	82	24	*221*	**Total Vol***						
					0.540		0.296	0.296	0.296	0.296	**DoS**						
					29.9		13.9	13.9	13.9	*13.9*	**95th %ile Back of Queue (m)**						
					11.2		11.4	10.6	15.1	*11.5*	**Average Delay (sec)**						
					Intersection		**L**	**T**	**R**	***App***							

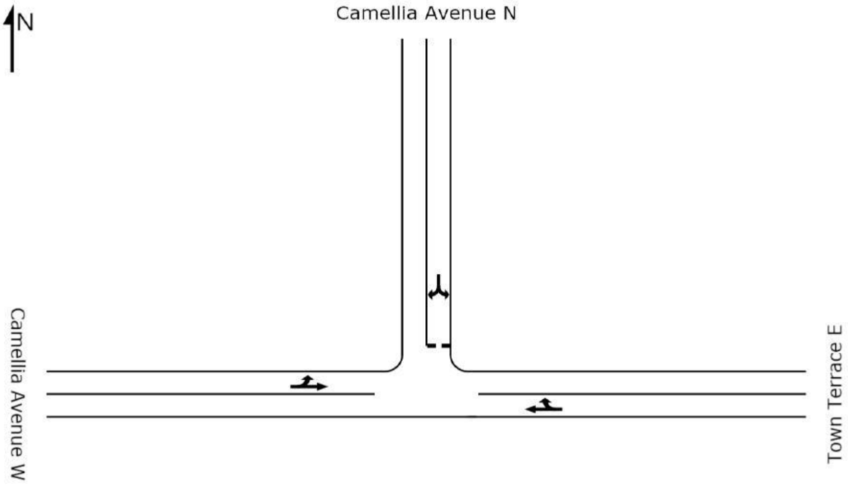
***Output Volumes**

Woodlands Drive S

Camellia Avenue / Town Terrace - Future Saturday Peak

Give-Way/Yield

N:\WINDOWS\2014\CG140307\SIDRA\CG140307SID001.sip[CaToSAF1]



Camellia Avenue N

	App	R	T	L
Average Delay (sec)	*11.4*	11.6	0	11.3
95th %ile Back of Queue (m)	25.6	25.6	0	25.6
DoS	*0.497*	0.497	0.000	0.497
Total Vol*	*446*	163	0	283
HV*	9	3	0	6
LV*	*437*	160	0	277

Camellia Avenue W

	Average Delay (sec)	95th %ile Back of Queue (m)	DoS	Total Vol*	HV*	LV*
L	8.3	0	0.117	133	3	130
T	0	0	0.117	86	2	84
R	0	0	0.000	0	0	0
App	*5*	*0*	*0.117*	*219*	*5*	*214*

Town Terrace E

LV*	HV*	Total Vol*	DoS	95th %ile Back of Queue (m)	Average Delay (sec)	
390	*8*	*398*	*0.301*	*12.3*	*7.2*	***App***
270	6	276	0.301	12.3	9.8	**R**
120	2	122	0.301	12.3	1.2	**T**
0	0	0	0.000	0	0	**L**

Intersection	L	T	R	App	
1041	0	0	0	*0*	**LV***
22	0	0	0	*0*	**HV***
1063	0	0	0	*0*	**Total Vol***
0.497	0.000	0.000	0.000	*0.000*	**DoS**
25.6	0	0	0	*0*	**95th %ile Back of Queue (m)**
8.5	0	0	0	*0*	**Average Delay (sec)**

***Output Volumes**