

APPENDIX 7:
TRANSPORT IMPACT ASSESSMENT

East Wanneroo Precinct 7 - Local Structure Plan

Transport Impact Assessment

Prepared for: Hesperia Project Pty Ltd

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Revision

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A	24 November 2023	Draft	DR/CRG	SGL

For and on behalf of

Stantec Australia Pty Ltd

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Acknowledgment of Country

In the spirit of reconciliation, Stantec acknowledges the Traditional Custodians of country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past and present, and extend that respect to all Aboriginal and Torres Strait Islander peoples.

Limitations

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CONTENTS

TRANSPORT IMPACT ASSESSMENT

East Wanneroo Precinct 7 - Local Structure Plan

1.	Introduction	1
1.1	Background	1
1.2	Site Location	1
1.3	Structure Plan Proposal	2
2.	Existing Situation	3
2.1	Existing Land Uses	3
2.2	Existing Road Network	3
2.3	Existing Traffic Volumes	5
2.4	Existing Public Transport Facilities	5
2.5	Existing Pedestrian/Cycle Network Facilities	6
3.	Proposed Changes to Transport Networks	7
3.1	Road Network	7
3.2	Pedestrian and Cycling Network	11
3.3	Public Transport Network	12
4.	Integration with Surrounding Area	13
4.1	Surrounding Attractors and Generators	13
4.2	Proposed Changes to Surrounding Land Uses	13
5.	Analysis of Transport Network	14
5.1	LSP Traffic Generation	14
5.2	LSP Traffic Distribution	14
5.3	Background Traffic	17
5.4	Daily Traffic Flows	18
5.5	Key Intersection Analysis (2033)	20
5.6	Pedestrian and Cycling Network	33
5.7	Safe Walk and Cycling to School	33
5.8	Public Transport Access	34
6.	Conclusions	35

Appendices

Appendix A.	WAPC Checklist
Appendix B.	Structure Plan
Appendix C.	SIDRA Outputs



1. Introduction

1.1 Background

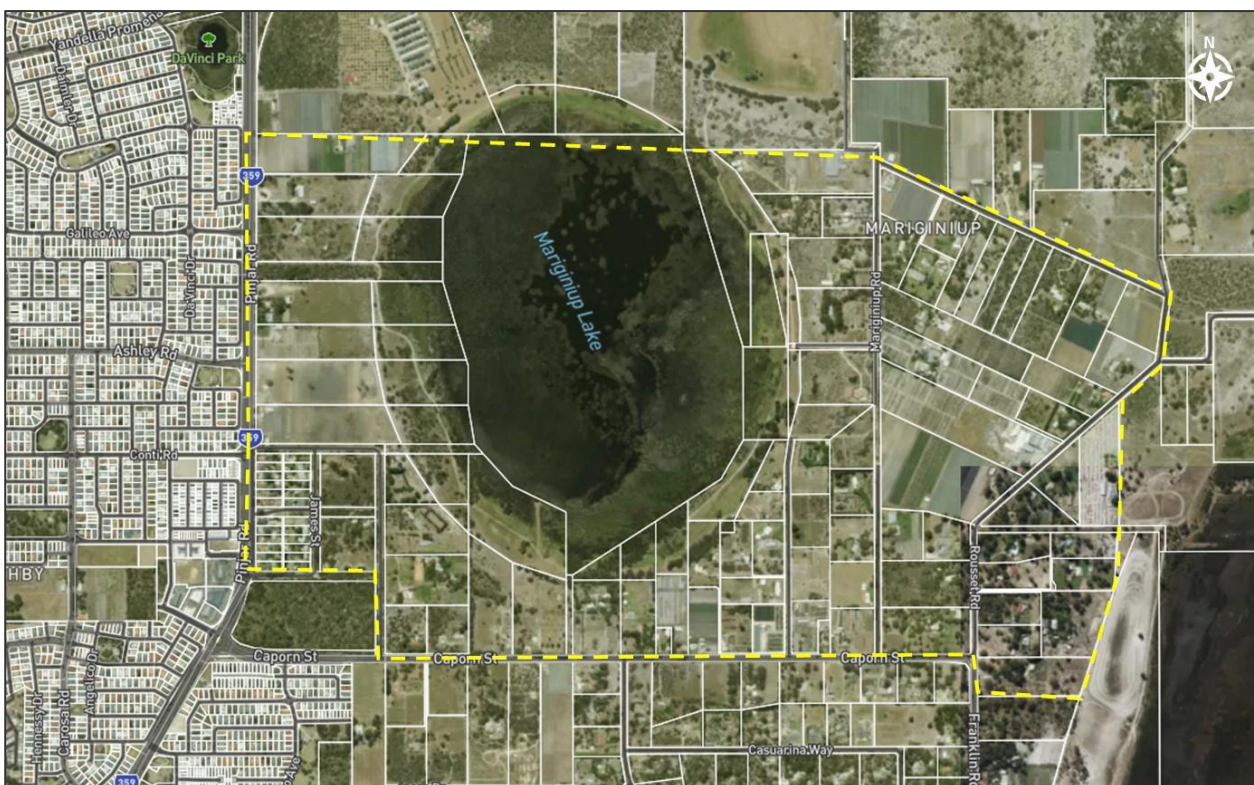
Stantec was commissioned by Hesperia Projects Pty Ltd to prepare a Transport Impact Assessment for the proposed East Wanneroo Precinct 7 – Lake Mariginiup Structure Plan ('the LSP' or 'the Site'). The LSP is located in the suburb of Mariginiup within the City of Wanneroo.

This report has been prepared in accordance with the *Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines Volume 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)* and the checklist is included in **Appendix A**.

1.2 Site Location

The LSP is located in Mariginiup within the City of Wanneroo, as shown in **Figure 1-1**. The Site currently consists of large rural lots, within a rural development area surrounding Mariginiup Lake.

Figure 1-1 Aerial Image of Site

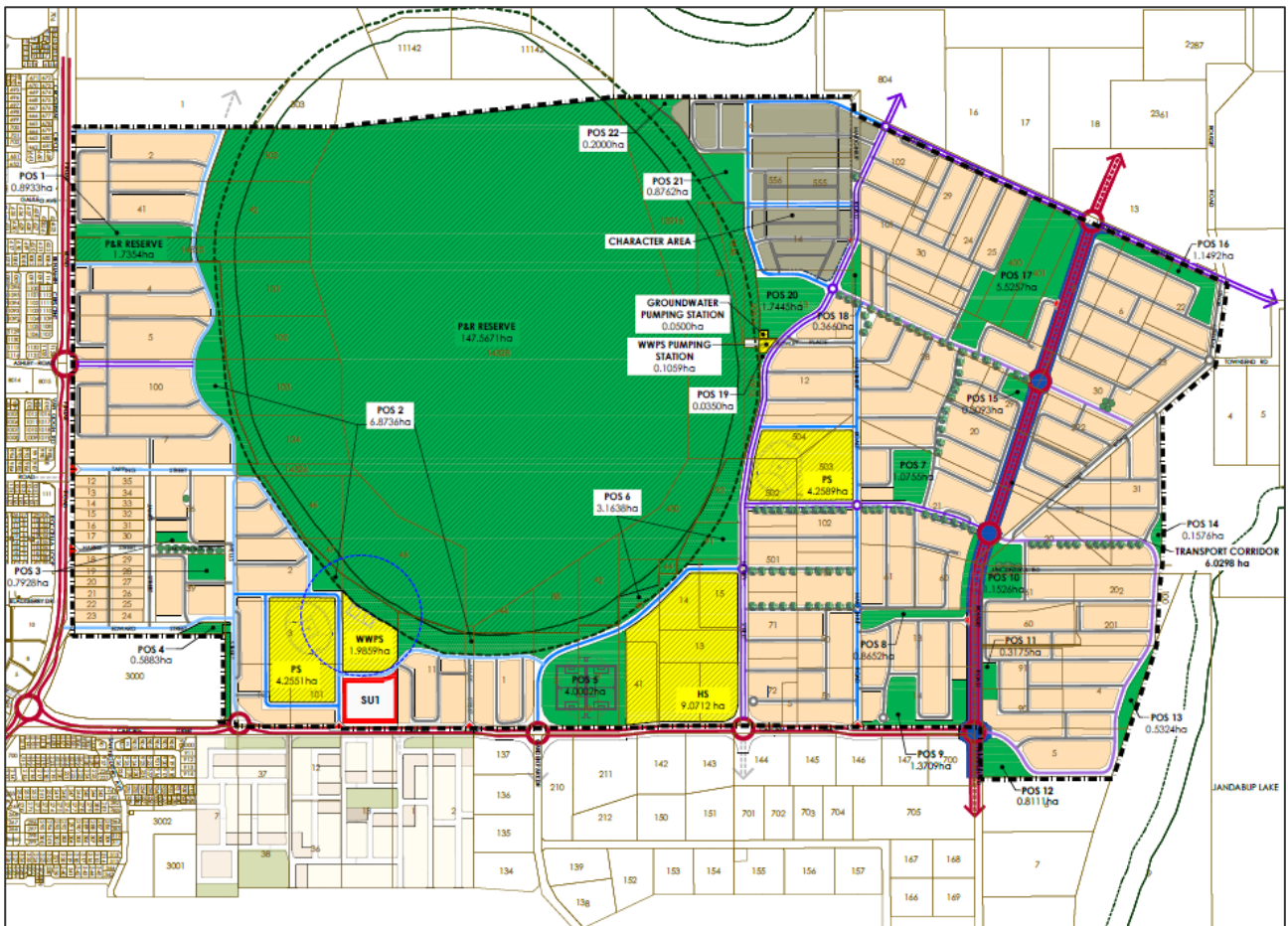


1.3 Structure Plan Proposal

The LSP is proposed to be developed into a mixture of individual residential lots, public open space and public purpose. The layout is shown in **Figure 1-2** and the list of the proposed land uses is presented in **Source:** Burgess Design Group (2023)

Table 1-1.

Figure 1-2 LSP Layout



Source: Burgess Design Group (2023)

Table 1-1 Proposed LSP Land Uses

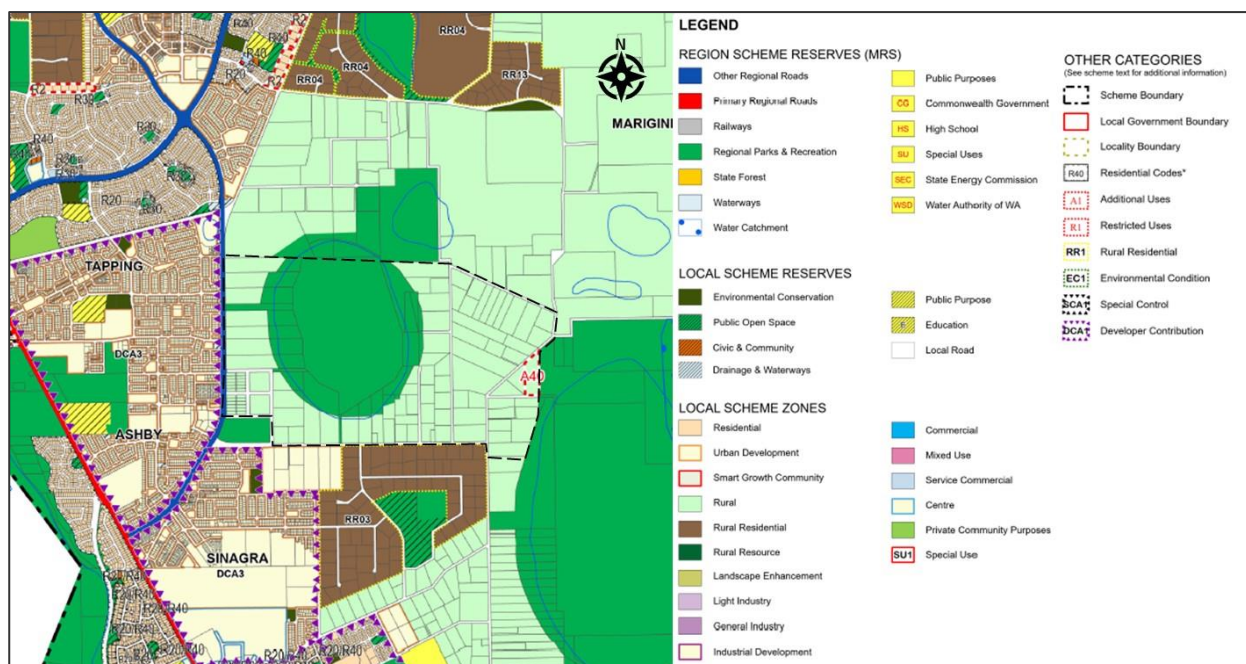
Land Use	Yield
Residential Dwellings	112.49Ha
Public Open Space	32.80Ha
Public Purpose	19.19Ha

2. Existing Situation

2.1 Existing Land Uses

Under the provisions of the *City of Wanneroo District Planning Scheme No. 2*, the Site is zoned 'Rural' and 'Regional Parks and Recreation', as shown in **Figure 2-1**. The Site is surrounded by other 'Rural' and 'Regional Parks and Recreation' land uses to the north and east, 'Rural Residential' and 'Urban Development' to the south and 'Urban Development' to the west.

Figure 2-1 Site Locality within City of Wanneroo Scheme Zoning Map



Source: City of Wanneroo District Planning Scheme No.2 (2023)

2.2 Existing Road Network

Road Classifications are defined in the Main Roads Functional Hierarchy as follows:

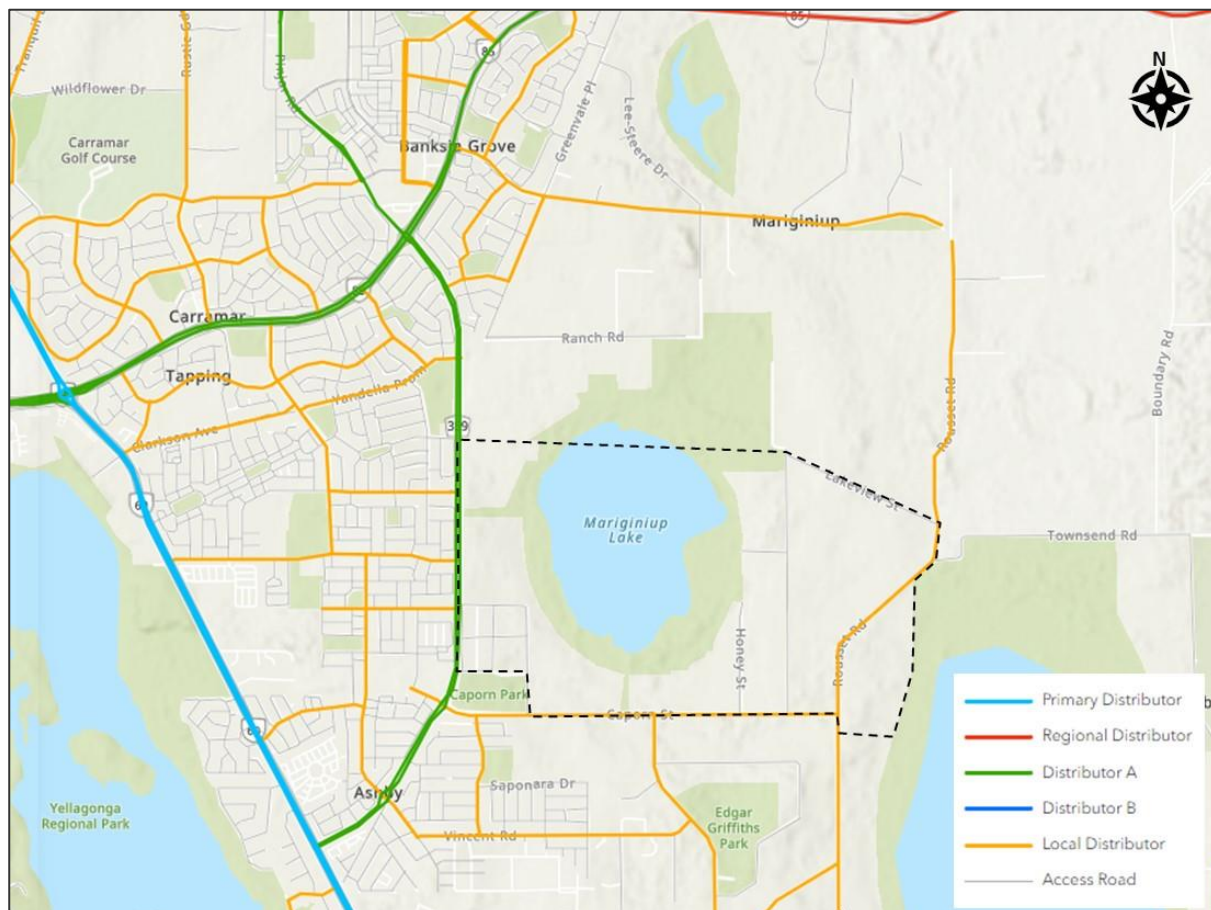
- **Primary Distributors (light blue):** Form the regional and inter-regional grid of MRWA traffic routes and carry large volumes of fast-moving traffic. Some are strategic freight routes, and all are National or State roads. They are managed by Main Roads.
- **District Distributor A (green):** These carry traffic between industrial, commercial and residential areas and connect to Primary Distributors. These are likely to be truck routes and provide only limited access to adjoining property. They are managed by Local Government.
- **Local Distributors (orange):** Carry traffic within a cell and link District Distributors at the boundary to access roads. The route of the Local Distributor discourages through traffic so that the cell formed by the grid of District Distributors only carries traffic belonging to or serving the area. These roads should accommodate buses but discourage trucks. They are managed by Local government.
- **Access Roads (grey):** Provide access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. These roads are bicycle and pedestrian friendly. They are managed by Local government.

The Site is bounded by Pinjar Road to the west, Caporn Street to the south and Rousset Road / Franklin Road to the east. The surrounding road network is further described in **Table 2-1** and **Figure 2-2** shows the hierarchy as per the Main Roads WA Road Information Mapping System.

Table 2-1 Road Network Classification

Road Name	Road Hierarchy	Jurisdiction	No of Lanes	No of Footpaths	Approximate Carriageway Width (m)	Posted Speed Limit (km/h)
Ashley Road	Local Distributor	Local Government	2	-	7.6m	50 km/h
Caporn Street	Local Distributor	Local Government	2	-	7.5m	70 km/h
Franklin Road	Local Distributor	Local Government	2	-	7m	80 km/h
Hollosy Way	Local Distributor	Local Government	2	-	12.5m (inc. 3.8m median)	50 km/h
Honey Street	Access Road	Local Government	2	-	5m	50 km/h
Lakeview Street	Access Road	Local Government	2	-	5.8m	50km/h
Mariginiup Road	Access Road	Local Government	2	-	6m	50 km/h
Pinjar Road	District Distributor A	Local Government	4	1	21m (inc. 4.8m median & 2x1.5m sealed shoulders)	60 / 70 km/h
Rousset Road	Local Distributor	Local Government	2	-	6.7m	80 km/h
Tapping Street	Access Road	Local Government	2	-	6.5m	60 km/h
Wells Street	Access Road	Local Government	2	-	6.7m	60 km/h

Figure 2-2 Existing (2023) Road Hierarchy



Source: Main Roads information Mapping (2023)

2.3 Existing Traffic Volumes

Existing traffic volumes were sourced from the City of Wanneroo and Main Road WA Traffic Map and are summarised in **Table 2-2**.

Table 2-2 Traffic Volumes

Location	Year	AM Peak (two-way)	PM Peak (two-way)	Average Daily Traffic (%HV)	Source
Caporn Street (West of Franklin Road)	2021	826	1,110	11,692 (12%)	City of Wanneroo
Franklin Road (South of Caporn Street)	2021	833	1,119	11,708 (12%)	City of Wanneroo
Garden Park Drive (South of Vincent Road)	2019	213	215	2,348 (4%)	City of Wanneroo
Pinjar Road (North of Conti Road)	2017	1,225	1,592	17,347 (5%)	City of Wanneroo
Pinjar Road (East of Wanneroo Road)	2021/2022	975	1,110	13,513 (5%)	MRWA Traffic Map
Pinjar Road (South of Joondalup Drive)	2020/2021	1,983	1,950	21,101 (11%)	MRWA Traffic Map

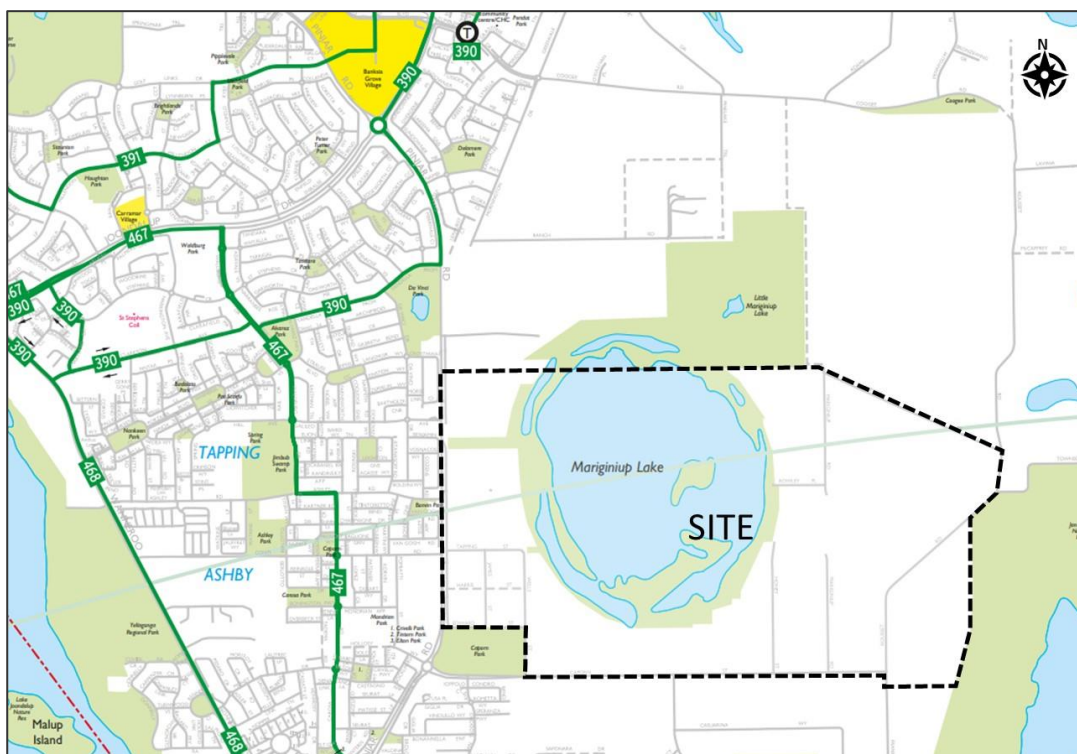
2.4 Existing Public Transport Facilities

The nearest bus stops are located approximately 550-600m from the western edge of the Site, on Yandella Promenade and Carosa Road (refer **Figure 2-3**).

- Bus Route 390 operates along Yandella Promenade between Joondalup Station and Banksia Grove.
- Bus Route 467 operates along Carosa Road between Whitfords Station and Joondalup Station.

The Site itself is generally poorly serviced by public transport, likely as a result of the existing large lot rural land uses which generate very little demand.

Figure 2-3 Bus Routes in the Vicinity of the LSP



Source: Transperth Network Maps (2021)



2.5 Existing Pedestrian/Cycle Network Facilities

A footpath is provided along Pinjar Road. Overall access to the site is presently limited, with no paths or on-road facilities within the Site itself. To the west of the site is a well-established strategic pedestrian/cycling network reflecting earlier residential development.

The latest Department of Transport Cycling Map is shown in **Figure 2-4**. A sealed shoulder or bicycle lane on either side of Pinjar Road is shown in the map which coincides with what is observed from the aerials.

Figure 2-4 Existing Pedestrian / Cycle Networks



Source: Department of Transport (2016)

3. Proposed Changes to Transport Networks

3.1 Road Network

3.1.1 Internal Road Network

- The proposed intersection controls and road hierarchy are shown in **Figure 3-1**.
- The function and characteristics of the road types within the LSP based on *Liveable Neighbourhoods (2009)* are shown in **Table 3-1**.
- Indicative cross sections are provided in **Figure 3-2** to **Figure 3-4**.

Note that medians, on-street parking and/or sealed shoulders may not be needed on every road and therefore lesser road reserve and pavement widths than indicated in *Liveable Neighbourhoods* may be appropriate.

A summary of the key changes to the road network is as follows:

- Caporn Street is proposed to be upgraded to a 4-lane dual carriageway.
- Franklin Road (Other Regional Road) is proposed to be upgraded to a 4-lane dual carriageway and extended to the north with the posted speed limit reduced to 70 km/h.
- Ashley Road is proposed to be extended to the east of Pinjar Road.
- Garden Park Drive is proposed to be extended to the north travelling along the northern boundary of POS 7 and the proposed high school.
- Honey Street is proposed to be a 2-lane dual carriageway that extends to the north beyond Lakeview Street and to the south.
- Mariginiup Road is proposed to be extended to the north.

Significant changes to intersections within the proposed LSP include the following:

- Priority intersections upgraded to roundabouts:
 - Pinjar Road / Ashley Road
 - Caporn Street / Garden Park Drive
 - Caporn Street / Honey Street
 - Franklin Road / Caporn Street

Figure 3-1 LSP Road Network

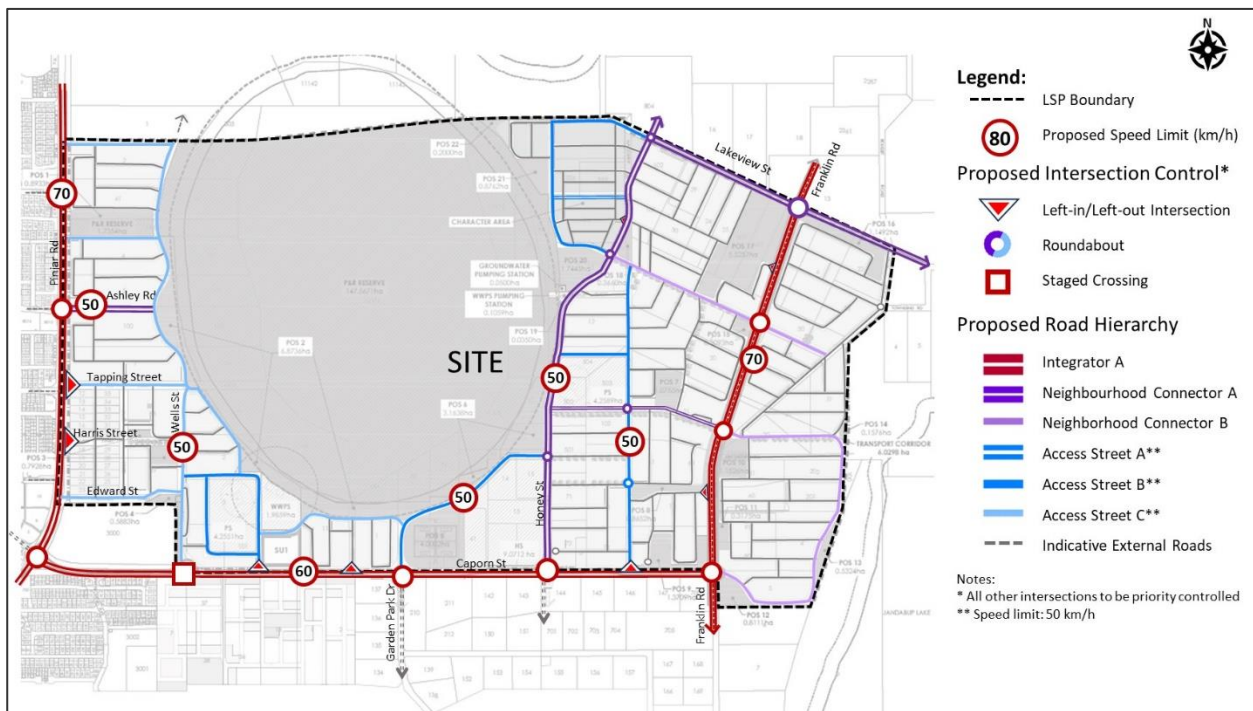


Table 3-1 Road function and characteristics

Road Hierarchy	Max Operating Speed (km/h)	Maximum / Range Volume (vpd)	Indicative Street Reserve Width (m) ¹	Minimum Street Pavement Width (m)
Integrator A (Four lanes, outside centres)	70 or 60	15,000 - 35,000	35 (32.4) ²	2 x 8.2 including bike lane / sealed shoulders
Neighbourhood Connector A (Median)	50	7,000	25 (24.4)	2 x 7.1 including parking, sealed shoulders, median plus shared path on one verge and footpath on the other side.
Neighbourhood Connector B (Minor)	50	3,000	20 (19.4)	11.2 including parking, plus shared path on one verge.
Access Streets				
A (Avenue)	40	3,000	24 (20 – 24)	2 x 3.5 (or 2 x 3.6 under some conditions) plus indented parking
B (Wider street)	40	3,000	17.9 (16.5 – 18)	9.7
C (Yield or give way street)	40	3,000	15 ³ (15.4 – 16)	7.2 (7 - 7.5)

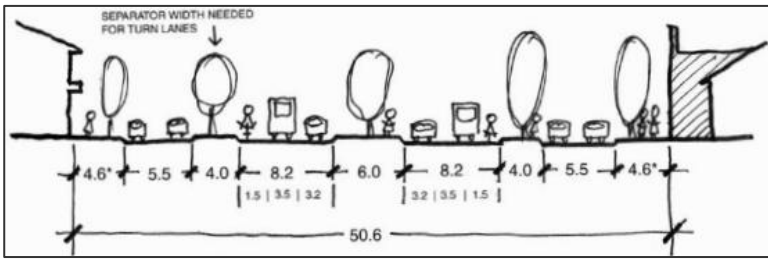
Note:

1 - Values in the parentheses are the indicative street reserve widths from Liveable Neighbourhoods (2009)

2 - Excludes service roads

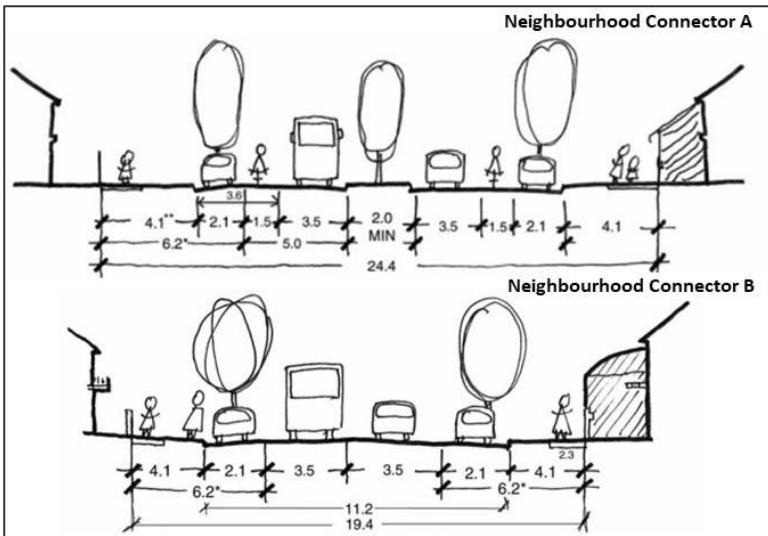
3 - May be reduced to 13m adjacent to public open space (excluding areas identified for conservation purposes) or 10m where used as a controlled access place.

Figure 3-2 Indicative Road Cross-Sections - Integrator A



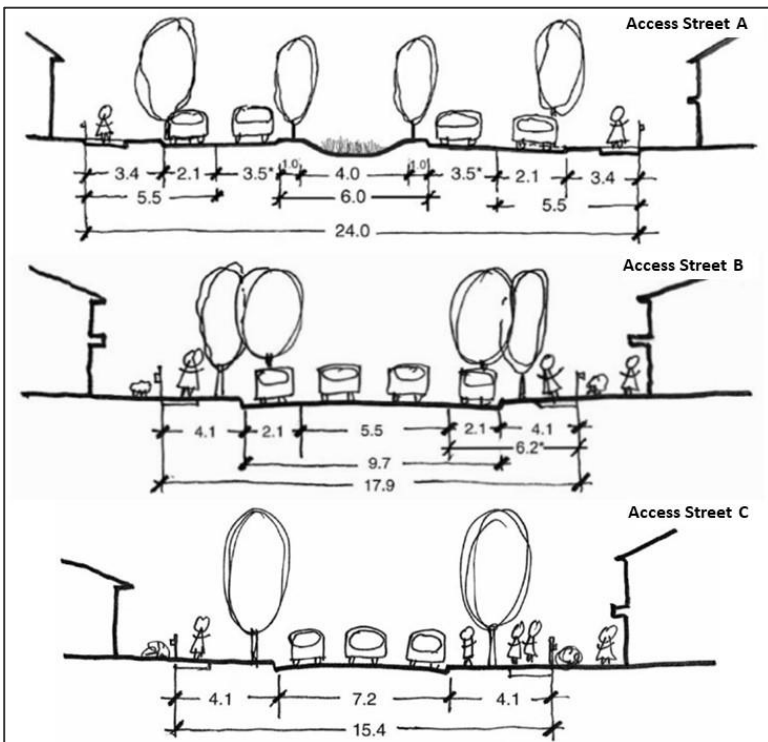
Source: Liveable Neighbourhoods Draft (2009)

Figure 3-3 Indicative Road Cross-Sections – Neighbourhood Connectors



Source: Liveable Neighbourhoods Draft (2009)

Figure 3-4 Indicative Road Cross-Sections – Access Streets



Source: Liveable Neighbourhoods Draft (2009)

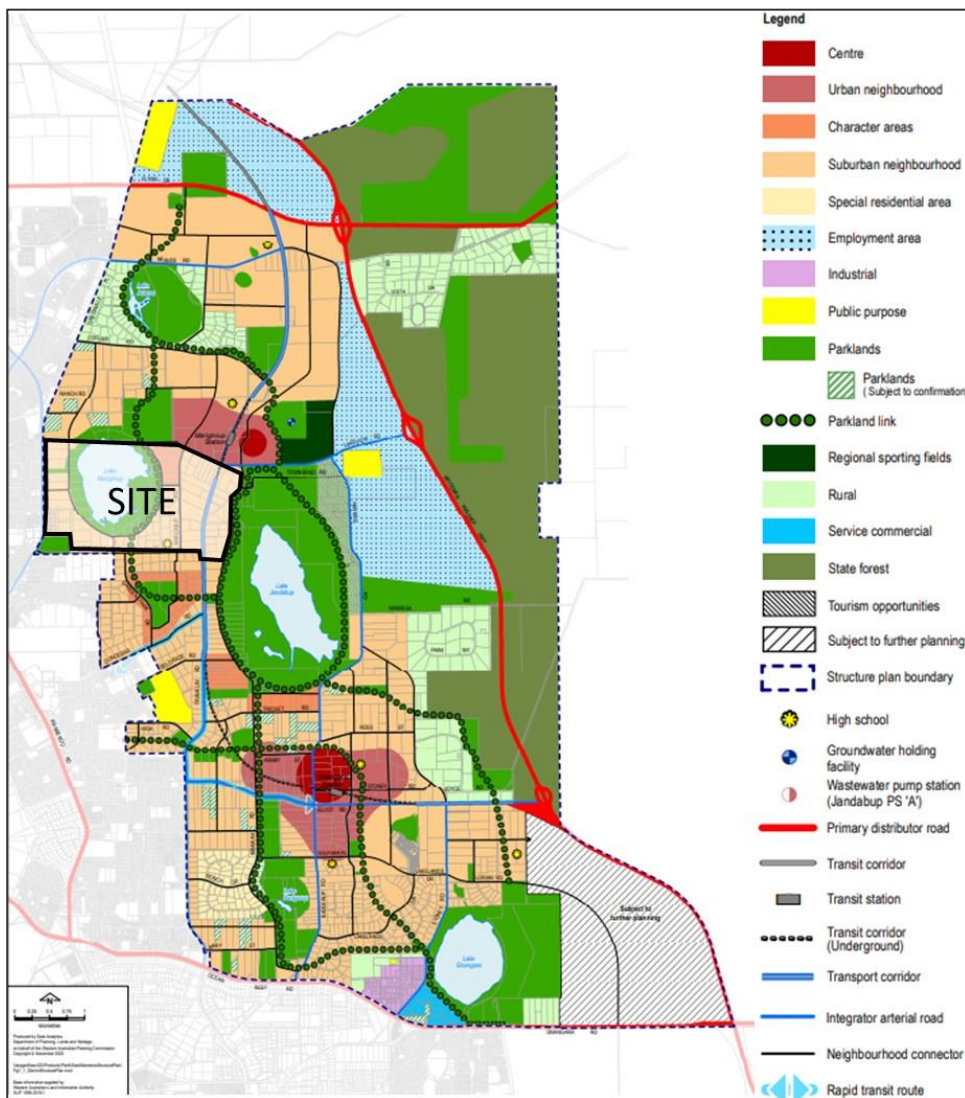
3.1.2 External Road Network

The proposed road network is presented in the *East Wanneroo District Structure Plan (DSP)* as shown in **Figure 3-5**.

The key changes to the external road network have been identified from the DSP and listed below. Additional information was gathered from subsequent planning documents (*Perth and Peel @ 3.5 million* and the *Whiteman Yanchep Highway Project Overview November 2016*).

- **Whiteman Yanchep Highway (WYH):** The Whiteman Yanchep Highway is a new north-south highway meant to function as a primary distributor road for the north-west traffic. It is proposed to intersect with Gnangara Road, Elliot Road, Lakeview Road and Flynn Drive;
- **Franklin Road Extension:** The proposed Franklin Road extent will be from Lenore Road to Flynn Drive (extension);
- **Neaves Road – Flynn Drive:** Flynn Drive is proposed to be extended to intersect with the new WYH and Neaves Road will be realigned to intersect with Flynn Drive and WYH and to be upgraded to be a primary distributor;
- **Lakeview Road Extension:** Lakeview Road is proposed to be extended from Franklin Road (extension) to the new WYH;
- **Elliot Road Extension:** Elliot Road is proposed to be extended to intersection with the new WYH; and
- **Gnangara Road – Ocean Reef Road:** The Gnangara Road – Ocean Reef Road corridor is proposed to be upgraded to a primary distributor.

Figure 3-5 East Wanneroo District Structure Plan



Source: East Wanneroo District Structure Plan (2020)



3.2 Pedestrian and Cycling Network

Stantec contacted the City of Wanneroo and can confirm that there are no changes proposed to the existing pedestrian and cycling network within the short term. However, a comprehensive shared path network within the LSP with footpaths on at least one side of each access road and along both sides of all higher-order roads in accordance with *Liveable Neighbourhoods* are to be expected to help improve accessibility to the public open spaces and schools within the LSP.

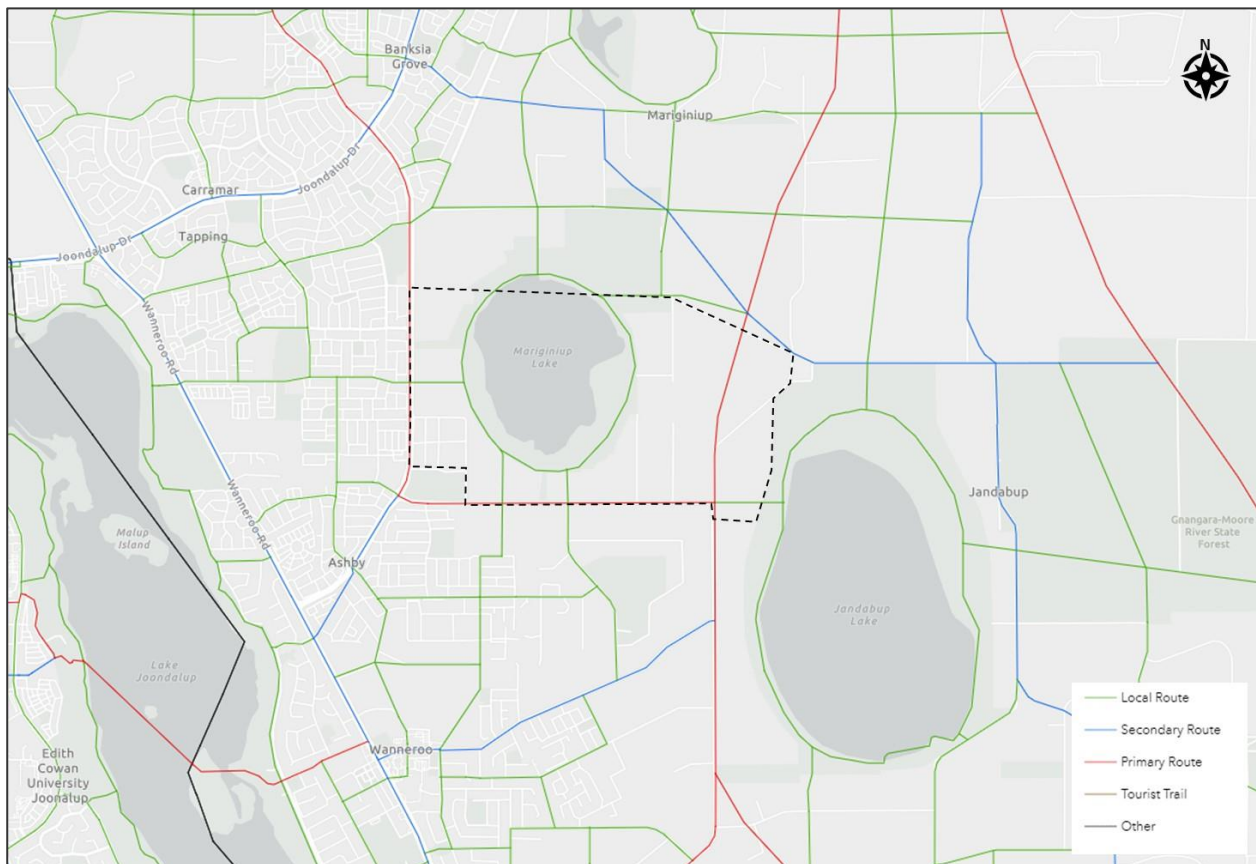
The long-term strategy for cycling infrastructure in the area is defined by the Department of Transport's *Long-Term Cycle Network (LTCN)*, as shown in **Figure 3-6**. This illustrates a range of improvements to the cycle network by year 2050. Note that there are some discrepancies with the road network in the LSP and the LTCN.

The following routes are proposed in the LTCN:

- Primary routes – Caporn Street, Pinjar Road north of Caporn Street and Franklin Road (extended);
- Secondary routes – Pinjar Road south of Caporn Street; and
- Local routes – Garden Park Drive, Ashley Road (extended), around Lake Mariginiup and a north-south road west of Garden Park Drive.

The proposed LTCN has formed the basis of the proposed pedestrian/cycling network within the LSP, modified to suit the planned road network and location of key land uses. The proposed LTCN within the LSP is outlined in Section 5.6.

Figure 3-6 Long Term Cycling Network



Source: Long Term Cycle Network (2023)

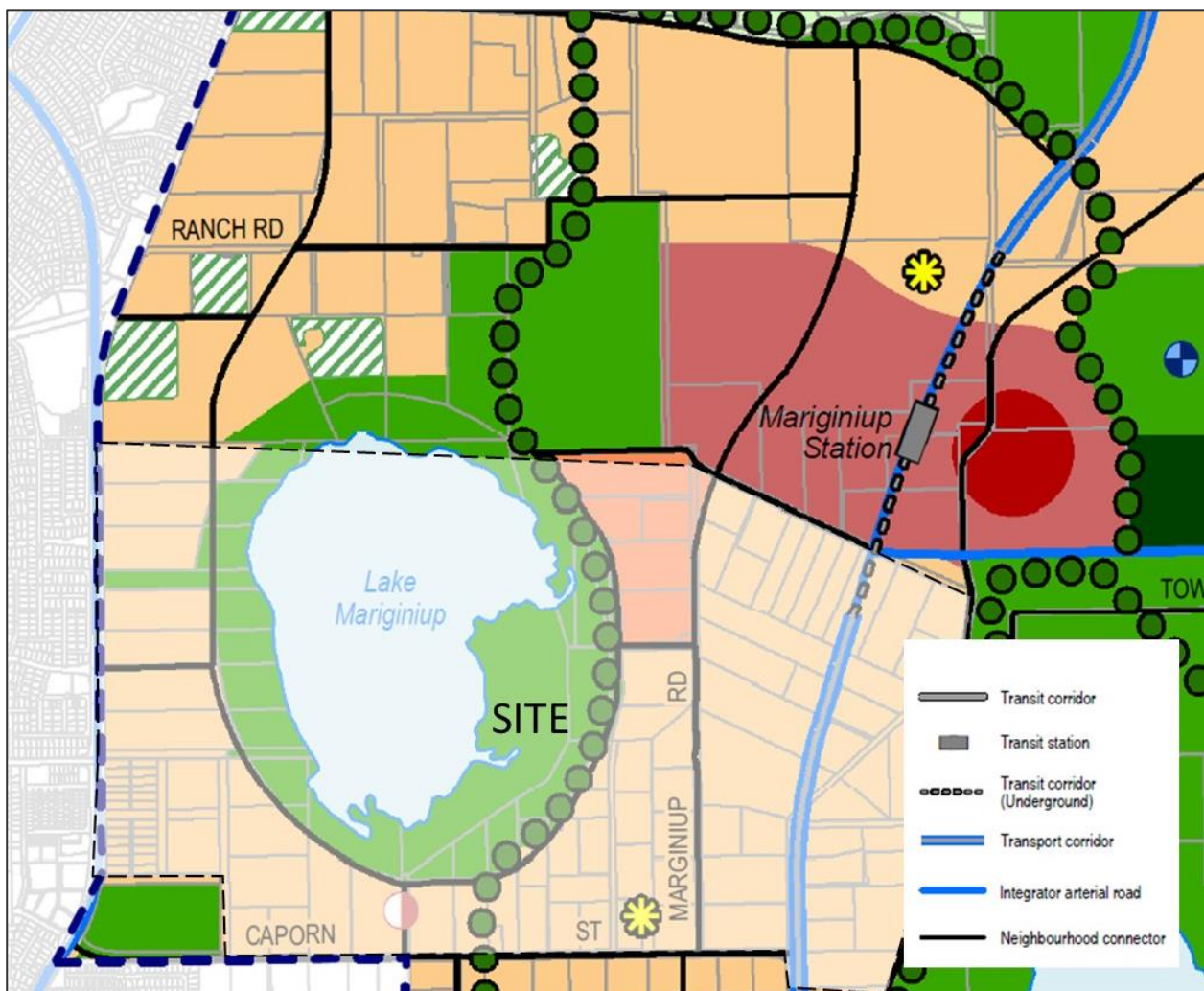
3.3 Public Transport Network

Stantec contacted the Public Transport Authority and can confirm that no changes are proposed to the existing public transport network within the short term.

The DSP provides limited detail regarding the future public transport network in East Wanneroo. A 'Transit Corridor' is shown along the Franklin Road corridor, with underground sections to the northeast of the LSP. However, at this stage it is not known whether a railway line will be constructed along this corridor, or some other transit mode, as well as whether transit infrastructure would be located at-grade or below ground. As the corridor is intended to perform regional function, it is assumed that a maximum of one transit stop would be located within the LSP area. Timing for the development of the transit corridor is not known at this time.

Figure 3-7 shows an extract of the DSP that is focused on the area of the LSP.

Figure 3-7 District Structure Plan Extract



Source: District Structure Plan (2020)

4. Integration with Surrounding Area

4.1 Surrounding Attractors and Generators

Major trip generators and attractors in the vicinity of the LSP include the following:

- Wanneroo City Centre
- Employment, retail, recreational and educational institutions at and around Joondalup area (e.g. Lakeside Joondalup Shopping City, Edith Cowan University Joondalup Campus, Joondalup Resort)
- Employment, retail, recreational and educational institutions at the south of Ocean Reef Road and Gnangara Road (e.g. Kingsway City Shopping Centre, Wanneroo Markets, Kingsway Christian College)

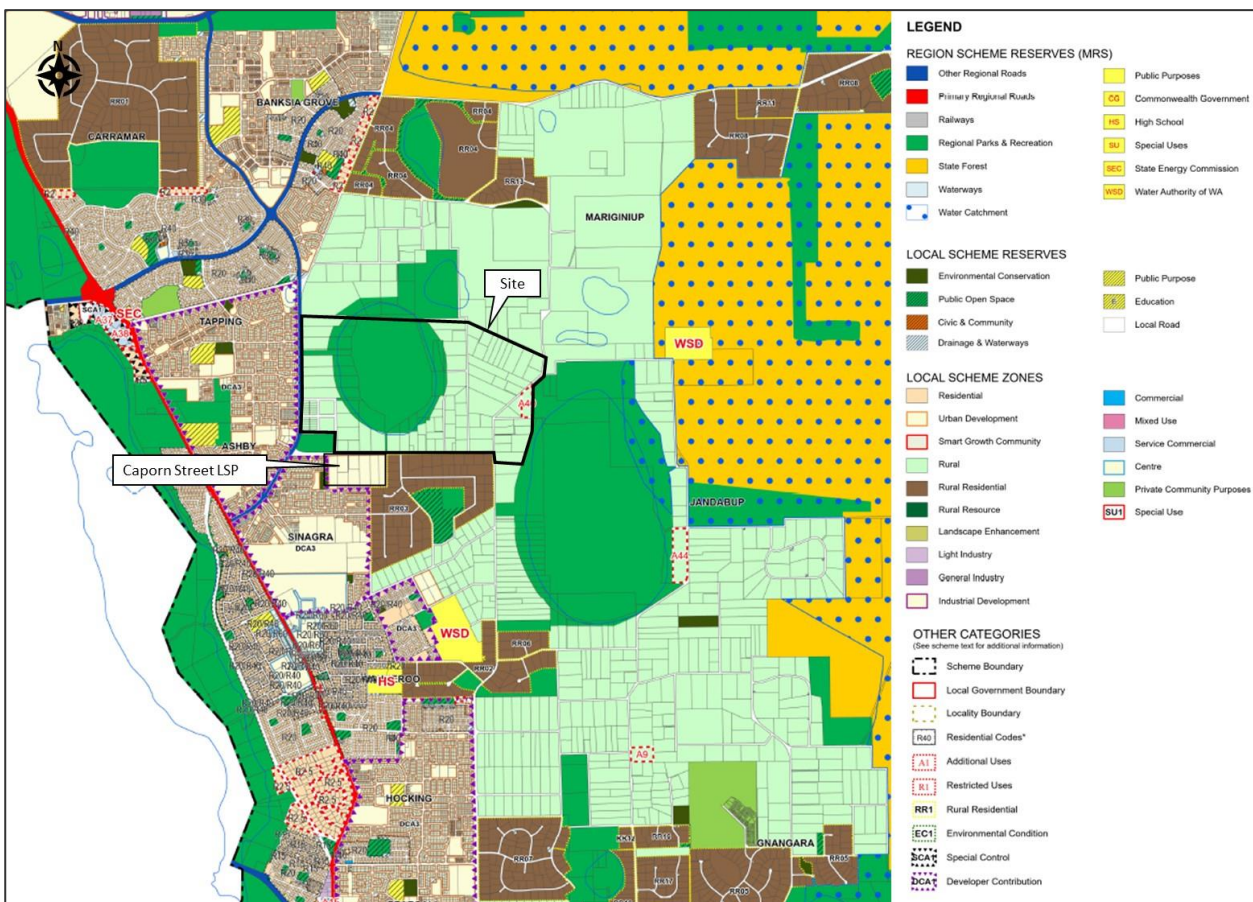
4.2 Proposed Changes to Surrounding Land Uses

The East Wanneroo LSP forms part of a larger area of planned development identified as the East Wanneroo District Structure Plan that covers about 8,000 hectares of land that aims to accommodate around 150,000 people in the next 50 years.

Comparing the land use of the DSP shown in **Figure 3-5** and the existing land use shown in **Figure 4-1**, confirms that large areas of 'Rural' land use within the DSP will be converted to suburban and urban neighbourhoods to accommodate 150,000 people.

The proposed Caporn Street LSP located south of the site and is the only other confirmed development considered in the analysis and is discussed in **Section 5.3.3**.

Figure 4-1 Existing Land Use Around the LSP



Source: City of Wanneroo District Planning Scheme No.2



5. Analysis of Transport Network

5.1 LSP Traffic Generation

Trip generation rates are taken from WAPC “Guidelines for Transport Assessment Guidelines for Developments, Volume 5: Technical Appendix” (August 2006). The trip rates adopted are shown in **Table 5-1**. The estimated trips generated are shown in **Table 5-2**.

For the assessment, it is assumed that the LSP will achieve 100% development by the 2033 horizon year. It is assumed that 50% of the trips of the primary school on the west will be internal, 20% of the trips of the high school will be internal and 100% of the trips of the primary school on the east will be internal however some of the internal trips will use the key intersections. Further information regarding the assumptions of the trip distribution is discussed in **Section 5.2**.

Table 5-1 Trip Rates

Land Use	Unit	AM Peak	PM Peak	Daily	AM		PM		Daily	
					Distribution		Distribution			
					In	Out	In	Out	In	Out
Residential	Dwellings	0.8	0.8	8	25%	75%	67%	33%	50%	50%
School	Pupils	1.0	1.0	2	50%	50%	50%	50%	50%	50%

Table 5-2 Estimated Trip Generation

Land Use	Yield	AM Peak		PM Peak		Daily	
		In	Out	In	Out	In	Out
Residential	3,600 Dwellings	720	2,160	1,930	950	14,400	14,400
Primary School (West)	540 Students	270	270	270	270	540	540
High School	1450 Students	725	725	725	725	1,450	1,450
Primary School (East)	540 Students	270	270	270	270	540	540
Total		5,410		5,410		33,860	

5.2 LSP Traffic Distribution

5.2.1 Residential Traffic

The traffic distribution for the residential LSP traffic was based on the pattern of traffic from the available Traffic Map surveys. The following were observed from the available surveys surrounding the LSP:

- There is a consistent southbound bias comprising approximately 60-65% of movements.
- Existing traffic flows along Pinjar Road are consistent with the above observation, however the impediment of Lake Joondalup results in redirection of traffic to Joondalup Dr / Burns Beach Road for trips headed south along the Mitchell Freeway.

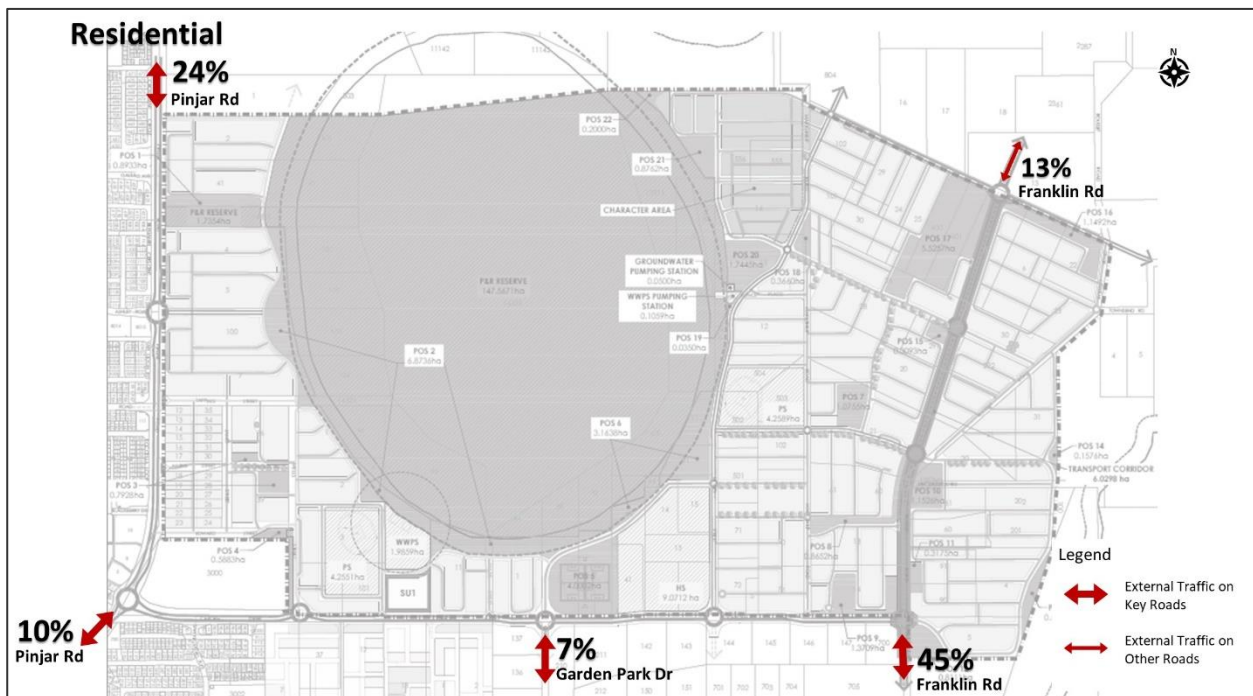
With the above observations in mind, the following assumptions were adopted:

- 60% of traffic on the western side of the LSP uses Pinjar Road north, with the remainder assigned to Pinjar Road south.
- 70% of traffic on the eastern side of the LSP uses either Franklin Road south or Garden Park Drive to access the areas south of the LSP, with the remaining 30% using Franklin Road north of Lakeview Street or Pinjar Road north to access areas north of the LSP.
- To maintain a conservative assessment, it is assumed that residential traffic from the LSP will not use Honey Street south of Caporn Street. This assumption results in an increase in demand at a select few major intersections, resulting in a higher impact at those locations. If Honey Street is extended southward to connect with Garden Park Drive in the future, this would result in reduced traffic volumes using Caporn Street/Garden Park Drive intersection.
- Before 2033 some connectivity between Franklin Road and the area to the north will be provided.

The resulting overall distribution of the residential LSP traffic to the key external roads is shown in **Figure 5-1**.



Figure 5-1 Residential LSP Traffic Distribution



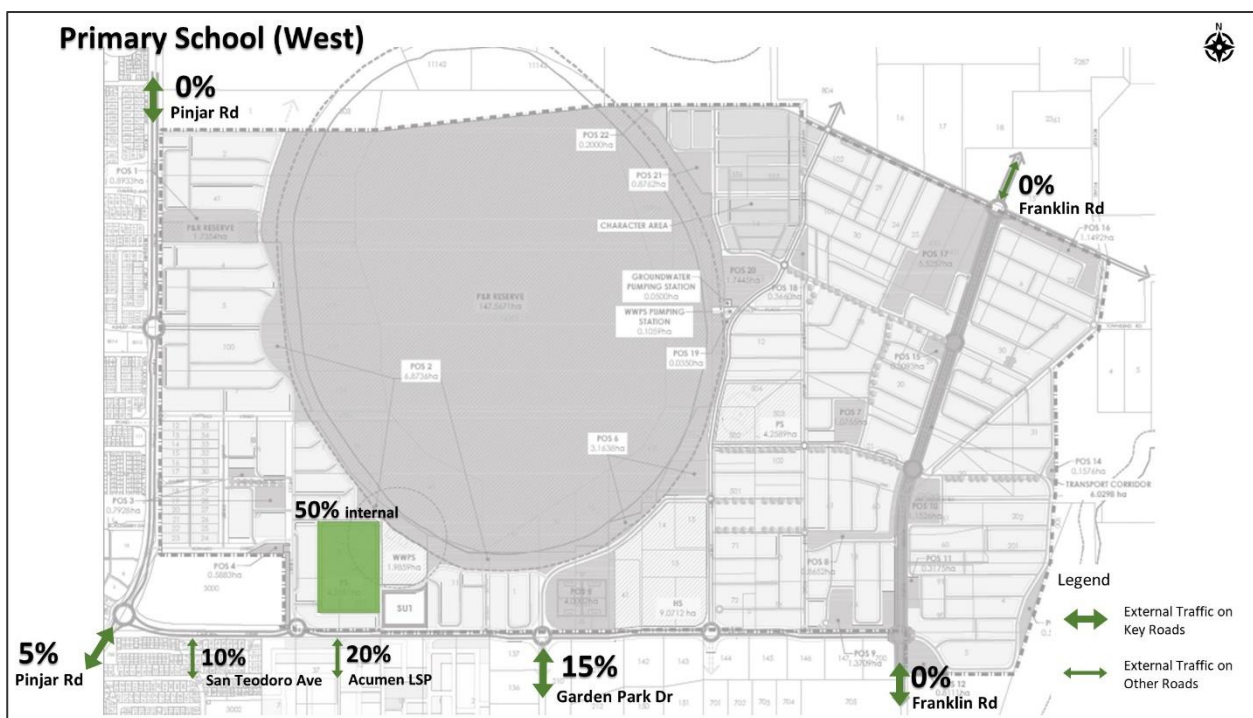
5.2.2 Primary School (West)

The following were assumed for the distribution of the traffic generated by the primary school on the western side of the LSP:

- 50% internal trips and 50% external trips
- The external trips are from the residential areas south of the LSP including the proposed Caporn Street Local Structure Plan (SPN 2280)

The resulting overall distribution of the primary school west traffic is shown in Figure 5-2.

Figure 5-2 Primary School (West) Traffic Distribution



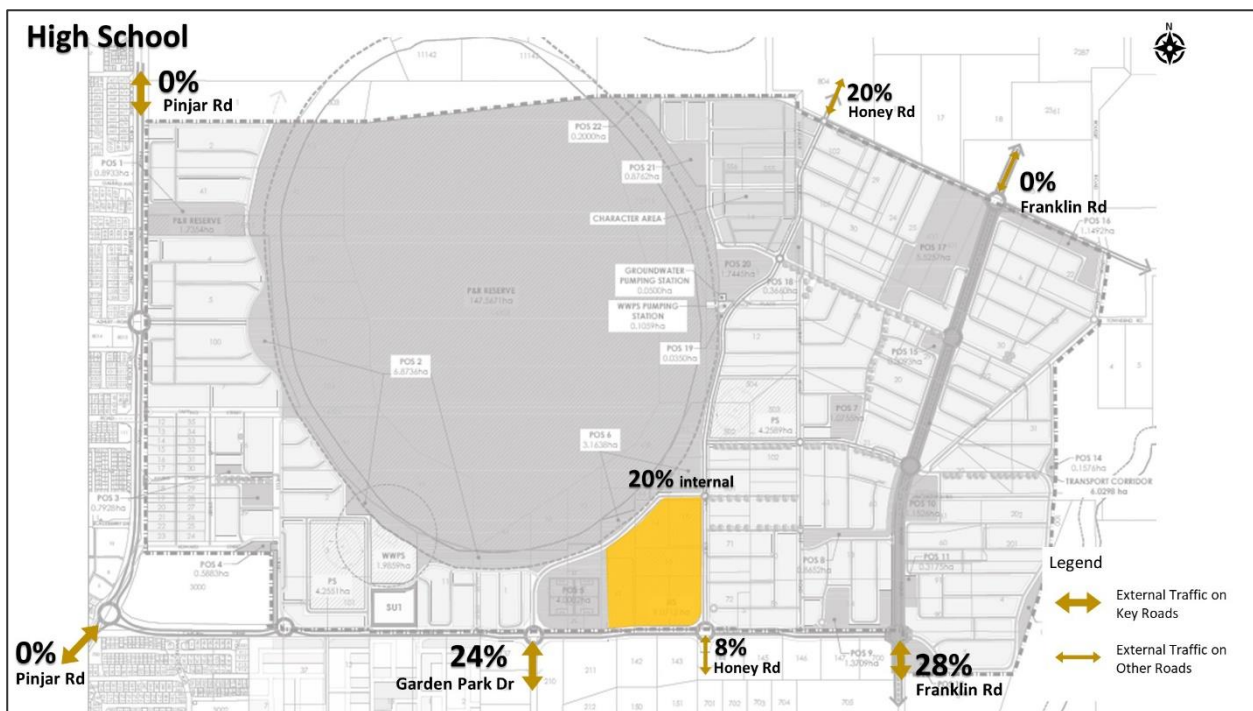
5.2.3 High School

The following were assumed for the traffic distribution of the traffic generated by the high school within the LSP:

- 20% internal trips and 80% external trips (reflecting the larger intake area for the high school).
- At this stage, there is limited information regarding the high school. For the purposes of assessment it was assumed that around 60% of the high school trips circulate around the school in an anti-clockwise orientation (e.g. northbound on Honey Street, westbound/southbound on Garden Park Drive) while the rest approaches in a clockwise orientation.
- Given the uncertainty around the timing of adjacent developments to the south of Caporn Street, and the associated extension of Honey Street south of Caporn Street, it was assumed that a larger percentage of the external trips would use Franklin Road south and Garden Park Drive. The impact of these assumptions is explained further in **Section 5.5**.

The resulting overall distribution of the high school traffic is shown in **Figure 5-3**.

Figure 5-3 High School Traffic Distribution

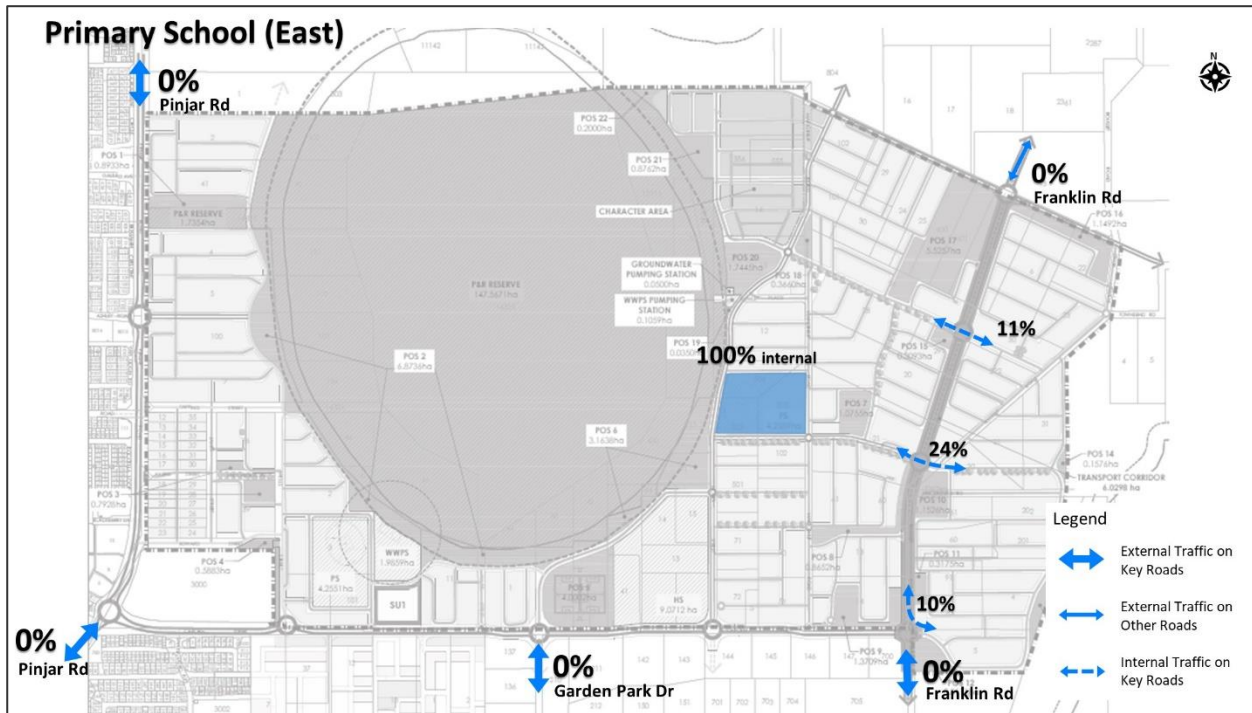


5.2.4 Primary School (East)

Due to the location of the primary school on the eastern side of the LSP, it is assumed that 100% of the trips are internal.

The resulting overall distribution of the Primary School (East) traffic is shown in **Figure 5-4**. The figure also captures the percentage of internal traffic that were assumed to pass through the key intersections.

Figure 5-4 Primary School (East) Traffic Distribution



5.3 Background Traffic

The following sections describe the assumptions that were used as the basis for impact analysis.

5.3.1 Daily Background Traffic

The existing background traffic volumes were sourced from available traffic counts, as shown in **Table 2-2**. Existing traffic generation from within the LSP area has been replaced by the development in future scenarios.

Future traffic volume forecasts were requested from the City of Wanneroo and Department of Planning, Lands and Heritage in October-December 2021 and again in November 2022. Neither organisation was able to supply forecast volumes and therefore reasonable estimates of future traffic volumes were determined by the project team using the following methods:

- Applying a conservative growth rate of 2% per annum, consistent with the growth rate used in the *Proposed Local Structure Plan Multiple Lots Caporn Street, Wanneroo Transport Impact Assessment* by Transcore prepared on August 2020 (the *Caporn Street LSP Report*). This growth rate makes allowance for some development to occur adjacent to the LSP over the life of this assessment.
- Adopting the resulting daily 2031 traffic from the *Caporn Street LSP Report* for Caporn Street between Pinjar Road and Garden Park Drive to incorporate the additional traffic from the Caporn Street LSP.
- To reflect the probable extension of Franklin Road to the north with connectivity to Joondalup Drive/Neaves Road before 2033, a starting point of 30% of the existing traffic on Caporn Street between Pinjar Road and Franklin Road was assumed to divert to Franklin Road north. This was then adjusted during the determination of the turn volumes.

5.3.2 Peak Hour Background Traffic

The peak hours observed from the available counts were 8:00AM - 9:00AM and 4:00PM - 5:00PM. AM and PM peak hourly ratios of 7.1% and 9.3% were observed from the traffic of the boundary roads of the LSP and used to determine the AM and PM peak period demand from the 2033 daily background traffic.

The following methods have been used to determine directional splits:

- Adopted the directional splits from the available counts.
- Computed for the directional splits from the SIDRA model from the *Caporn Street LSP Report* for areas on Caporn Street east of Pinjar Road.

For turn volumes, a gravitational model and trial and error method was used to balance the calculated midblock volumes from the turning volumes and the calculated midblock volumes from the grown existing volumes.

5.3.3 Other Developments

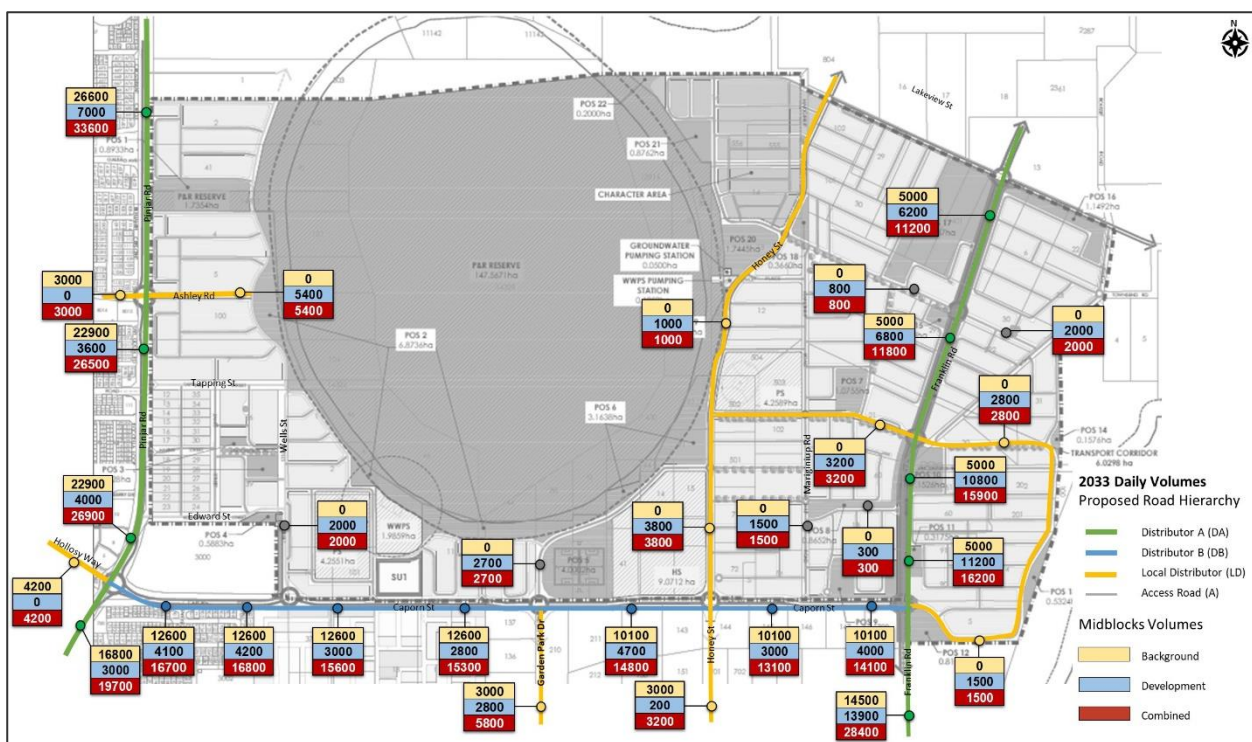
The *Caporn Street LSP* to the south of the East Wanneroo LSP was the only other development integrated into the analysis; in particular, the 2031 daily Caporn Street volumes specified in the *Caporn Street LSP Report*. It is understood that the analysis will be for the year 2033 however it is assumed that there will be no changes to the *Caporn Street LSP* by 2033.

As Precinct 7 is likely to be the first of the East Wanneroo DSP precincts to be developed on a large scale, all other likely development growth is considered to be captured by the 2% background growth assumption.

5.4 Daily Traffic Flows

The estimated daily traffic flow and proposed road hierarchy consistent with the criteria of *Main Roads Functional Hierarchy* at key roads within the LSP are shown below in **Figure 5-5**.

Figure 5-5 Estimated Two-way Daily Traffic Flow in 2033



Note: Volumes rounded to the nearest hundred

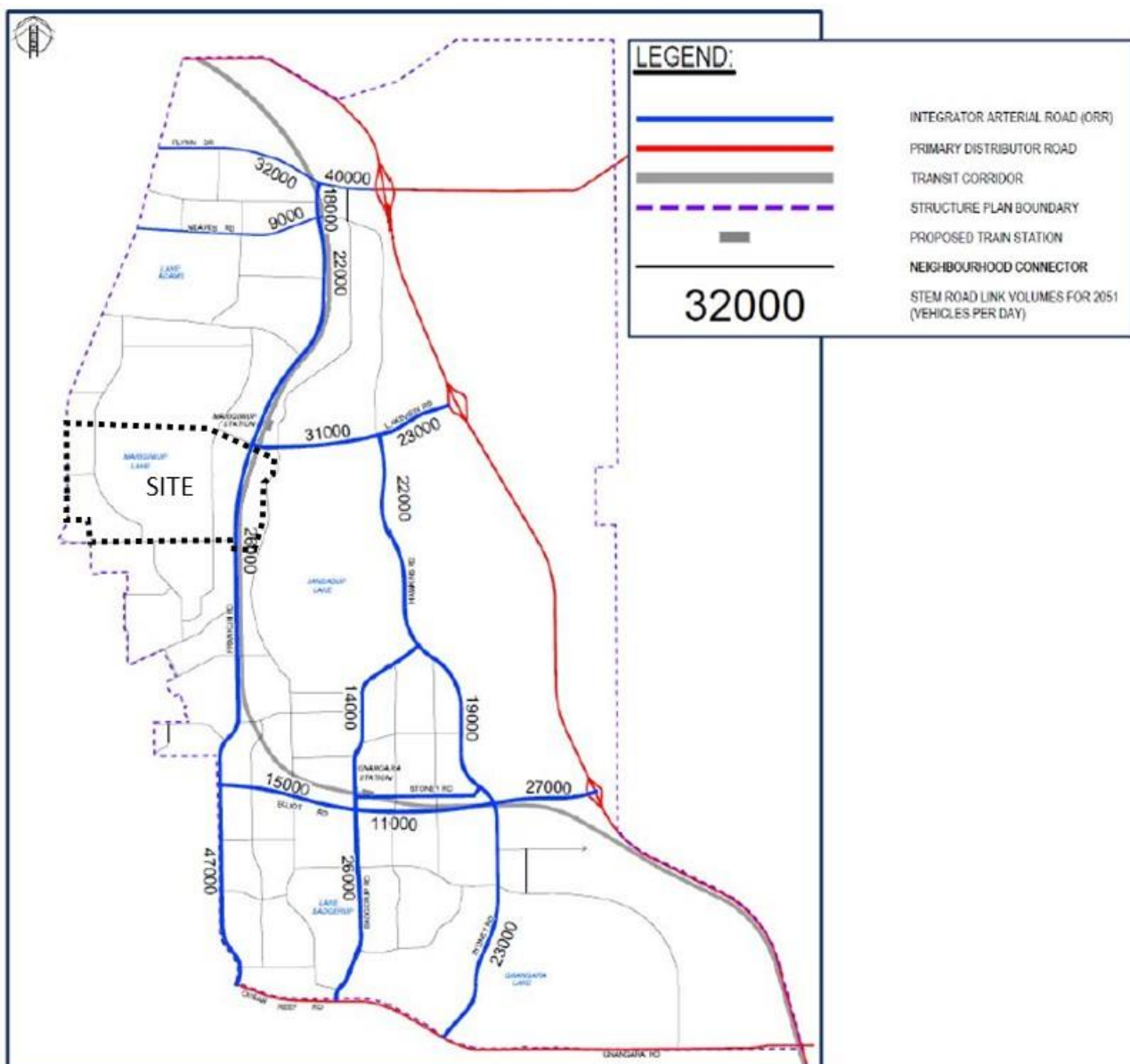
The most significant changes in traffic volumes are estimated to occur on Caporn Street and Franklin Road, which are projected to increase to 16,700vpd and 28,400vpd (vehicles per day), respectively. To accommodate these volumes, Caporn Street and Franklin Road are both proposed to be upgraded to a 4-lane dual carriageways, consistent with the standard for a District Distributor.

Honey Street and the new road south of the Primary School (east) are expected to carry a maximum of between 3,800vpd and 3,200vpd, and are therefore expected to function as Local Distributor roads. The road connecting the new road south of the Primary School (east) and Caporn Street are assumed to function as Local Distributor roads though they carry less than 3,000vpd.

Figure 5-6 Figure 5-7 shows the 2051 East Wanneroo STEM link volumes plots from the *East Wanneroo District Structure Plan Road Planning Study* dated 19 September 2019. From the link volume plots, Franklin Road is expected to carry around 26,000 vehicles per day by year 2051. It should be noted that this is only indicative and that it assumes that a railway will be constructed on the transit corridor.

It is understood that more detailed traffic modelling is currently being undertaken by the Department of Planning, Lands and Heritage (DPLH), however outputs from this model was not available to Stantec at the time of the analysis. Therefore the traffic volumes used in this analysis were assumed based on the available information.

Figure 5-6 2051 East Wanneroo STEM Link Volume Plots from the *East Wanneroo District Structure Plan Road Planning Study*



Source: East Wanneroo District Structure Plan Road Planning Study (11 September 2019 – Figure 4-2)

5.5 Key Intersection Analysis (2033)

5.5.1 Analysis Scenario Summary

In accordance with WAPC Guidelines, SIDRA analysis has been undertaken for the AM and PM peak hours in 2033 (assumed build-out year). The intersections assessed are detailed below:

- Pinjar Road / Ashley Road
- Pinjar Road / Caporn Street / Hollosy Way
- Caporn Street / Wells Street
- Caporn Street / Garden Park Drive
- Caporn Street / Honey Street
- Caporn Street / Franklin Road
- Franklin Road / Primary School Road

The roundabout north of Franklin Road / Primary School Road was not included in the SIDRA analysis as it is assumed to carry less traffic than the Franklin Road / Primary School Road intersection. Therefore, if the layout for the Franklin Road / Primary School Road intersection will perform satisfactorily with the development traffic then the roundabout to the north will also perform satisfactorily.

5.5.2 SIDRA Definitions

SIDRA intersection analysis was undertaken for the subject intersections. SIDRA calculates the performance of intersections based on input parameters, including geometry and traffic volumes. As an output SIDRA provides values for the Degree of Saturation (DOS), queue lengths, delays, level of service, and 95th Percentile Queue. These parameters are defined as follows:

- Degree of Saturation (DOS): the ratio of the arrival traffic flow to the capacity of the approach during the same period. The theoretical intersection capacity is exceeded from an un-signalized intersection where $DOS > 0.80$ and 0.85 for roundabouts.
- 95% Queue: the statistical estimate of the queue length up to or below which 95% of all observed queues would be expected;
- Average Delay: is the average of all travel delays for vehicles through the intersection. An unsigned intersection can be considered to be operating at capacity where the average delay exceeds 40 seconds for any movement; and
- Level of Service (LOS): is the qualitative measure describing operational conditions within a traffic system and the perception by motorists and/or passengers. The different levels of service can generally be described as shown in **Table 5-3**. A LOS exceeding these values indicates that the road section is exceeding its practical capacity. Above these values, users of the intersections are likely to experience unsatisfactory queueing and delays during the peak hour periods.

Table 5-3 Level of Service (LoS) Performance Criteria

LOS	Description	Signalised Intersection	Unsignalised Intersection
A	No or minimal delays (best condition). Queues are rarely more than one vehicle	≤ 10 sec	≤ 10 sec
B	Short traffic delays. Occasionally more than one queued vehicle.	10-20 sec	10-15 sec
C	Average traffic delays. Often more than one queued.	20-35 sec	15-25 sec
D	Long traffic delays. Regularly more than one queued vehicle.	35-55 sec	25-35 sec
E	Very long traffic delays. Traffic demand is near or equal to the practical capacity of the intersection. Almost always more than one queued vehicle.	55-80 sec	35-50 sec
F	Forced flow conditions with extensive delays caused by geometric and/or operational constraints external to the intersection.	≥ 80 sec	≥ 50 sec

As mentioned in the *MRWA Operational Modelling Guidelines*, the modelling results for staged crossing movements should be based on the overall condition for two sites:

- Degree of Saturation: maximum degree of saturation for two stages
- Overall average delay: sum of average delay for two stages
- Level of Service: based on the overall average delay for two stages.



As there are no guidelines for the queue, it was assumed that the queue is a sum of the two stages.

5.5.3 Peak Hour Traffic Flows

Peak hour traffic volumes are presented in the figures below, for a generalised AM and PM peak hour (combining the background and LSP peaks).

Figure 5-7 Caporn Street from Pinjar Road to Wells Street 2033 with Development Traffic Volumes

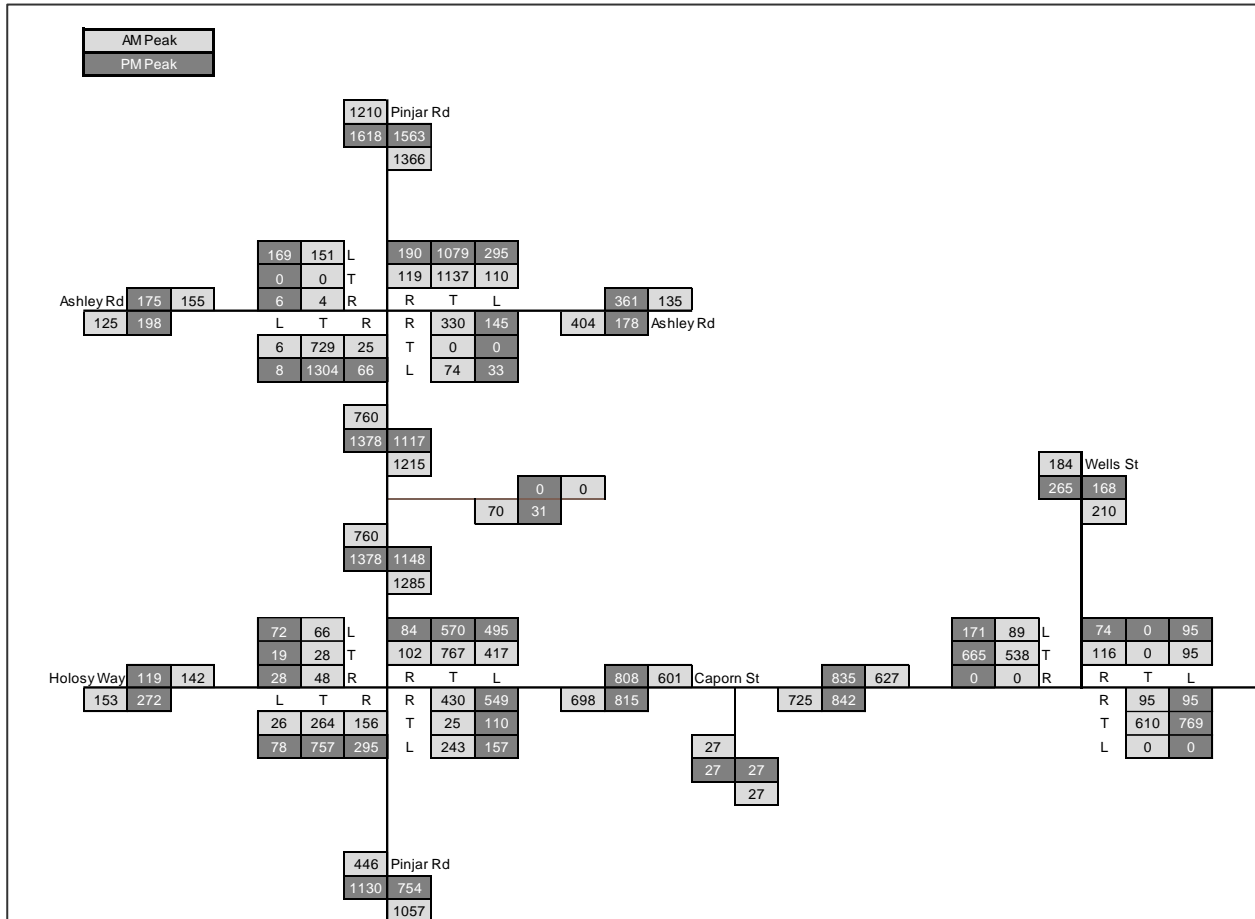
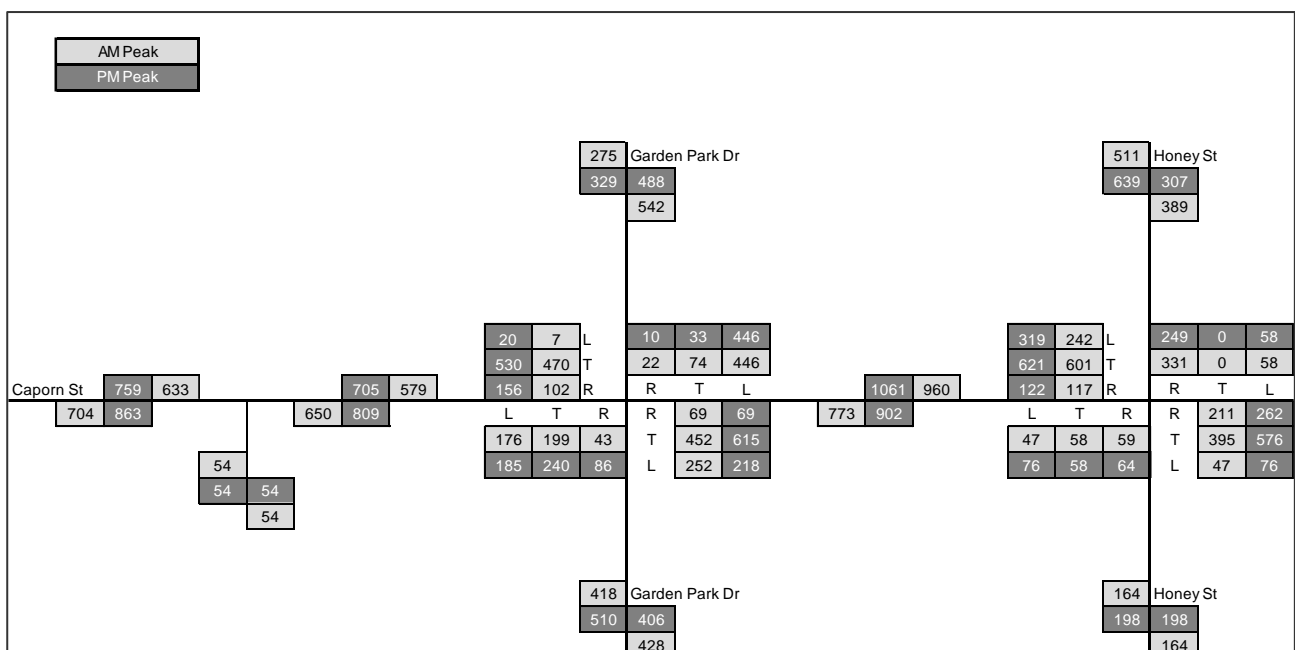


Figure 5-8 Caporn Street from Garden Park Dr to Honey Street 2033 with Development Traffic Volumes



5.5.4 Pinjar Road / Ashley Road

The SIDRA layout of future Pinjar Road / Ashley Road intersection is shown in **Figure 5-10**. Considering that in the future there will be a new road connecting as a 4th leg to the intersection, it has been assessed as a roundabout.

The SIDRA analysis results are shown in **Table 5-4**. The results show that the upgraded future intersection would operate satisfactorily and would be able to cater the proposed development yield.

Figure 5-10 SIDRA Layout – Pinjar Road / Ashley Road

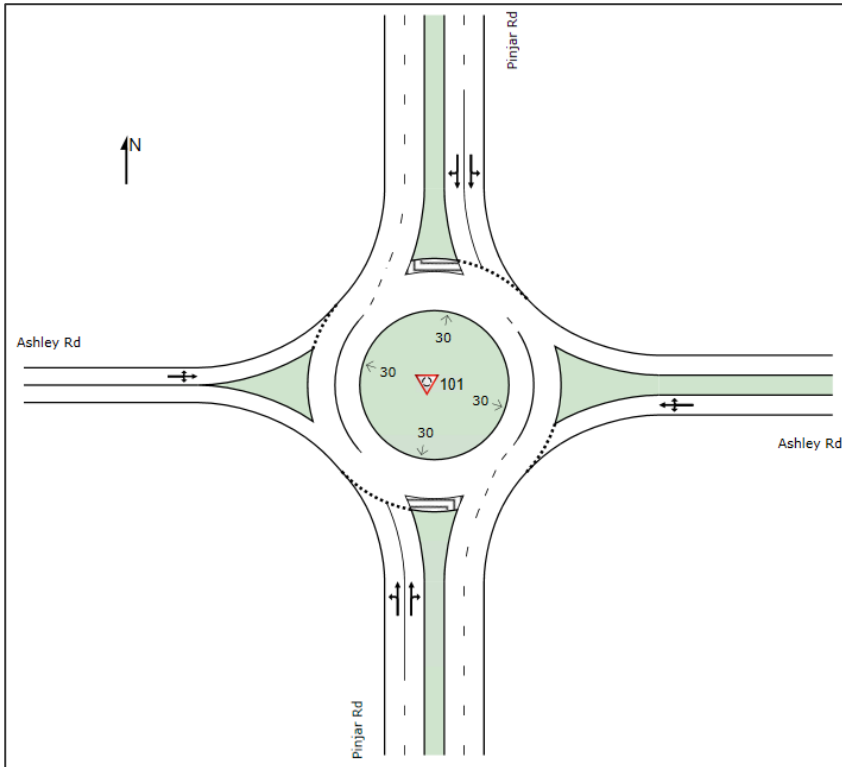


Table 5-4 2033 SIDRA Results – Pinjar Road / Ashley Road

Intersection: Approach	AM					PM			
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Pinjar Rd	L	0.38	7	LOS A	23	0.60	7	LOS A	44
	T	0.38	8	LOS A	23	0.60	8	LOS A	44
	R	0.38	14	LOS B	21	0.60	14	LOS B	44
East: Ashley Rd	L	0.64	10	LOS B	31	0.31	7	LOS A	11
	T	0.64	10	LOS A	31	0.31	7	LOS A	11
	R	0.64	15	LOS B	31	0.31	12	LOS B	11
North: Pinjar Rd	L	0.45	5	LOS A	31	0.54	5	LOS A	42
	T	0.45	5	LOS A	31	0.54	5	LOS A	42
	R	0.45	11	LOS B	31	0.54	11	LOS B	41
West: Ashley Rd	L	0.29	7	LOS A	11	0.44	10	LOS B	18
	T	0.29	7	LOS A	11	0.44	10	LOS B	18
	R	0.29	13	LOS B	11	0.44	16	LOS B	18
All Vehicles		0.64	8	LOS A	31	0.60	8	LOS A	44

5.5.5 Pinjar Road / Caporn Street / Hollosy Way

The SIDRA layout of the existing Pinjar Road / Caporn Street / Hollosy Way intersection is shown in **Figure 5-11**. The current layout of the intersection was tested to determine if this layout can accommodate the future traffic on this intersection.

The SIDRA results are shown in **Table 5-5**Table 5-6. The results show that for the PM peak the DOS is greater than 0.85 and exceeds the theoretical capacity of the intersection. A subsection below discusses remedial measures to improve the performance of the intersection.

Figure 5-11 SIDRA Layout – Pinjar Road / Caporn Street / Hollosy Way

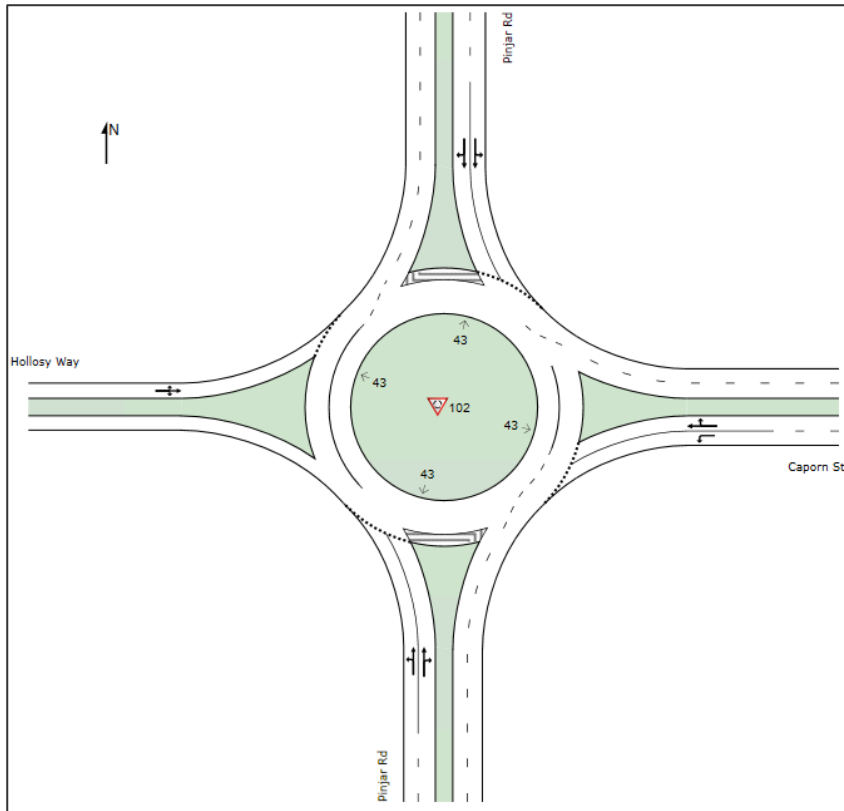


Table 5-5 SIDRA Results – Pinjar Road / Caporn Street / Hollosy Way

Intersection: Approach	AM				PM				
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Pinjar Rd	L	0.25	7	LOS A	14	0.84	28	LOS C	111
	T	0.25	6	LOS A	16	0.84	25	LOS C	138
	R	0.25	12	LOS B	16	0.84	30	LOS C	138
East: Caporn St	L	0.47	12	LOS B	25	0.34	11	LOS B	18
	T	0.63	12	LOS B	48	0.90	29	LOS C	165
	R	0.63	20	LOS B	48	0.90	36	LOS D	165
North: Pinjar Rd	L	0.50	5	LOS A	33	0.50	6	LOS A	34
	T	0.50	4	LOS A	34	0.50	5	LOS A	37
	R	0.50	11	LOS B	34	0.50	11	LOS B	37
West: Hollosy Way	L	0.22	6	LOS A	9	0.39	16	LOS B	19
	T	0.22	5	LOS A	9	0.39	15	LOS B	19
	R	0.22	12	LOS B	9	0.39	22	LOS C	19
All Vehicles	0.63	9	LOS A	48	0.90	20	LOS B	165	

Remedial Measures

Considering that the dominant movement of the intersection is between the north and east approach, the inner lane of the eastern approach was changed to right turn only and the outer lane as shared left turn and through lane as shown in **Figure 5-12**. This will require two circulating lanes on the south side of the roundabout.

The SIDRA results are shown in **Table 5-6**. Based on the results, the changes are effective in improving the performance of the intersection with DOS less than 0.85 and at LOS B or better for both peak periods.

Figure 5-12 SIDRA Layout – Pinjar Road / Caporn Street / Hollosy Way – Remedial Measures

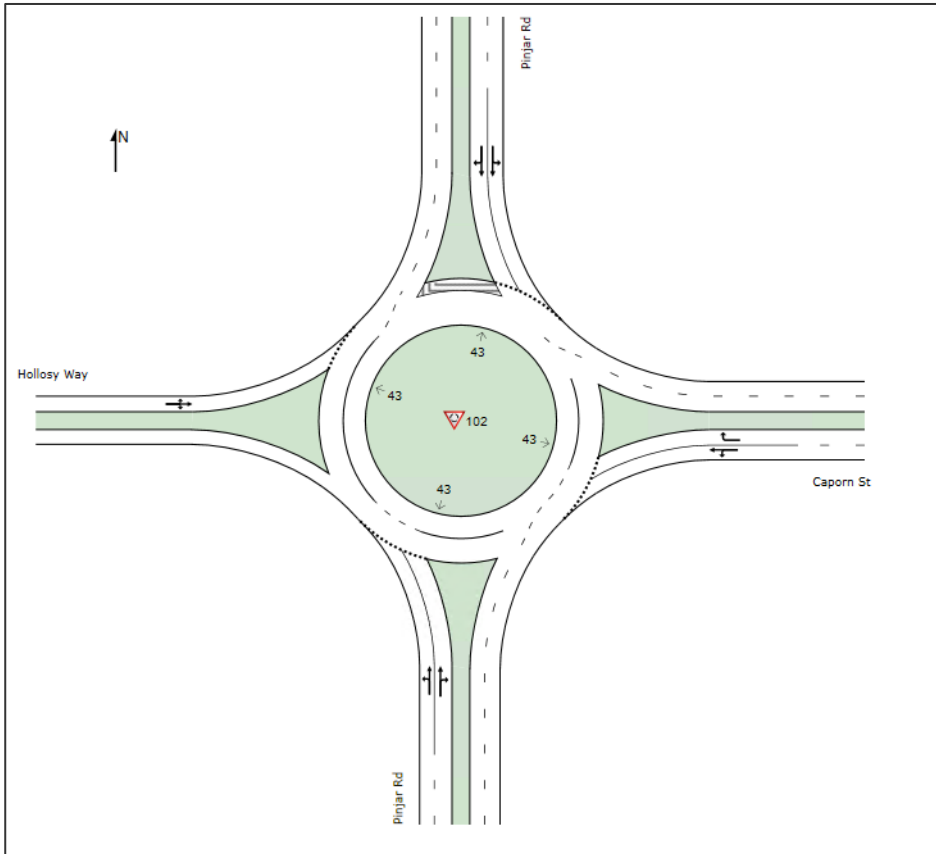


Table 5-6 SIDRA Results – Pinjar Road / Caporn Street / Hollosy Way – Remedial Measures

Intersection: Approach	AM				PM				
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Pinjar Rd	L	0.26	6	LOS A	11	0.77	13	LOS B	62
	T	0.26	5	LOS A	12	0.77	12	LOS B	69
	R	0.26	12	LOS B	12	0.77	18	LOS B	69
East: Caporn St	L	0.50	13	LOS B	28	0.48	12	LOS B	31
	T	0.50	12	LOS B	28	0.48	11	LOS B	31
	R	0.59	19	LOS B	43	0.76	24	LOS C	90
North: Pinjar Rd	L	0.49	5	LOS A	32	0.50	6	LOS A	33
	T	0.49	4	LOS A	33	0.50	5	LOS A	37
	R	0.49	11	LOS B	33	0.50	11	LOS B	37
West: Hollosy Way	L	0.22	6	LOS A	9	0.37	14	LOS B	18
	T	0.22	5	LOS A	9	0.37	14	LOS B	18
	R	0.22	12	LOS B	9	0.37	20	LOS C	18
All Vehicles	0.59	9	LOS A	43	0.77	12	LOS B	90	

5.5.6 Caporn Street / Wells Street

The SIDRA layout of future Caporn Street / Wells Street intersection is shown in **Figure 5-13**. The intersection has been modelled as a priority T-intersection with staged right-turn movement within a wide central median. A preliminary test of the existing layout showed that it would not be able to accommodate future volumes in its current form.

The SIDRA analysis results are shown in **Table 5-7**. The results show that the upgraded intersection would operate satisfactorily and would be able to cater the proposed development yield. However, there may be a need to upgrade this intersection to a roundabout form as more parts of the East Wanneroo DSP are developed beyond 2033. Provision is therefore made in the LSP to accommodate a possible future roundabout.

Figure 5-13 SIDRA Layout – Caporn Street / Wells Street

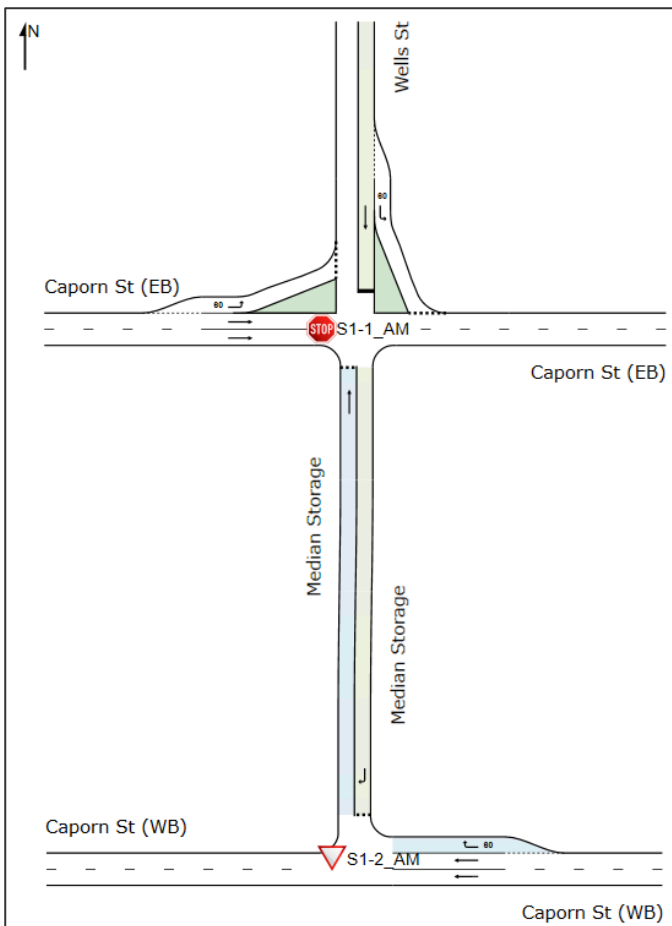


Table 5-7 SIDRA Results – Caporn Street / Wells Street

Intersection: Approach		AM				PM			
		DOS	Delay (s)	LOS	95% Back of Queue (m)	DOS	Delay (s)	LOS	95% Back of Queue (m)
North: Wells St	L	0.08	7	LOS A	3	0.09	7	LOS A	3
	R	0.19	17	LOS C	10	0.15	20	LOS C	7
West: Caporn St	L	0.07	7	LOS A	2	0.14	7	LOS A	5
	T	0.17	7	LOS A	0	0.21	7	LOS A	0
East: Caporn St	T	0.19	0	LOS A	0	0.24	0	LOS A	0
	R	0.12	9	LOS A	3	0.14	10	LOS B	4
All Vehicles		0.19	17	LOS C	10	0.24	20	LOS C	7

5.5.7 Caporn Street / Garden Park Drive

The SIDRA layout of future Caporn Street / Garden Park Drive intersection is shown in **Figure 5-14**. Considering that in the future Garden Park Drive will be extended to the north and the intersection will be a four-legged intersection, it has been assessed as a roundabout.

The SIDRA analysis results are in **Table 5-8**. The results show that the future intersection would operate satisfactorily and would be able to cater for the proposed development yield.

Figure 5-14 SIDRA Layout – Caporn Street / Garden Park Drive

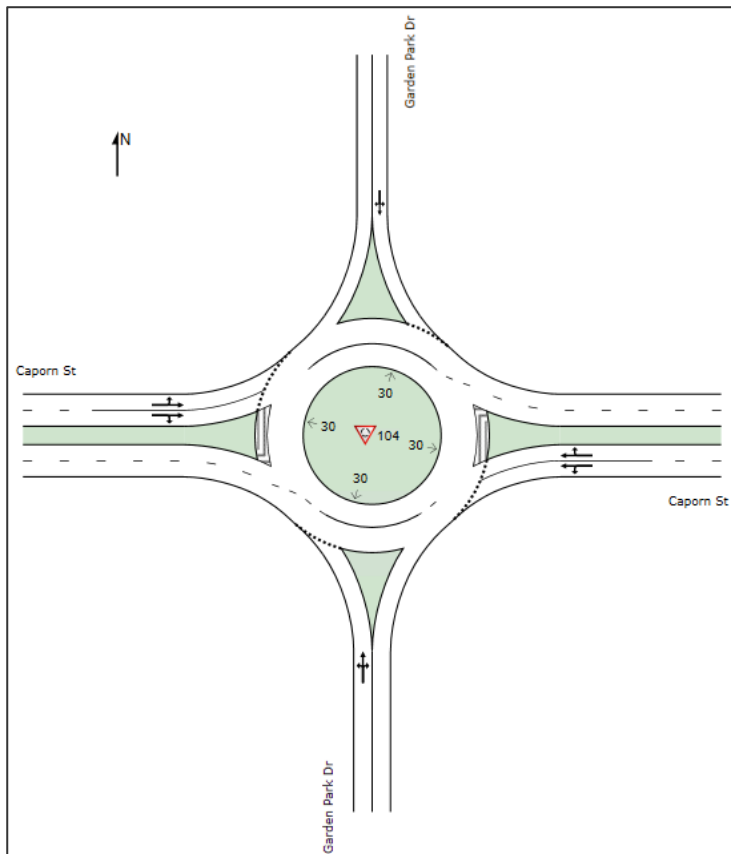


Table 5-8 SIDRA Results – Caporn Street / Garden Park Drive

Intersection: Approach	AM					PM			
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Garden Park Dr	L	0.52	6	LOS A	25	0.70	9	LOS A	43
	T	0.52	6	LOS A	25	0.70	9	LOS A	43
	R	0.52	11	LOS B	25	0.70	14	LOS B	43
East: Caporn St	L	0.32	6	LOS A	19	0.37	6	LOS A	24
	T	0.32	6	LOS A	19	0.37	6	LOS A	24
	R	0.32	12	LOS B	18	0.37	12	LOS B	24
North: Garden Park Dr	L	0.78	12	LOS B	62	0.80	14	LOS B	62
	T	0.78	12	LOS B	62	0.80	14	LOS B	62
	R	0.78	17	LOS B	62	0.80	20	LOS B	62
West: Caporn St	L	0.27	6	LOS A	16	0.36	7	LOS A	24
	T	0.27	7	LOS A	16	0.36	8	LOS A	24
	R	0.27	13	LOS B	15	0.36	14	LOS B	21
All Vehicles		0.78	8	LOS A	62	0.80	9	LOS A	62

5.5.8 Caporn Street / Honey Street

The SIDRA layout of future Caporn Street / Honey Road intersection is shown in **Figure 5-15**. Considering that there are plans to extend Honey Street beyond Caporn Street, it has been assumed that Caporn Street / Honey Street will be upgraded to a roundabout.

The SIDRA analysis results are shown in **Table 5-9**. The results show that the future intersection would operate satisfactorily and would be able to cater for the proposed development yield.

Figure 5-15 SIDRA Layout – Caporn Street / Honey Street

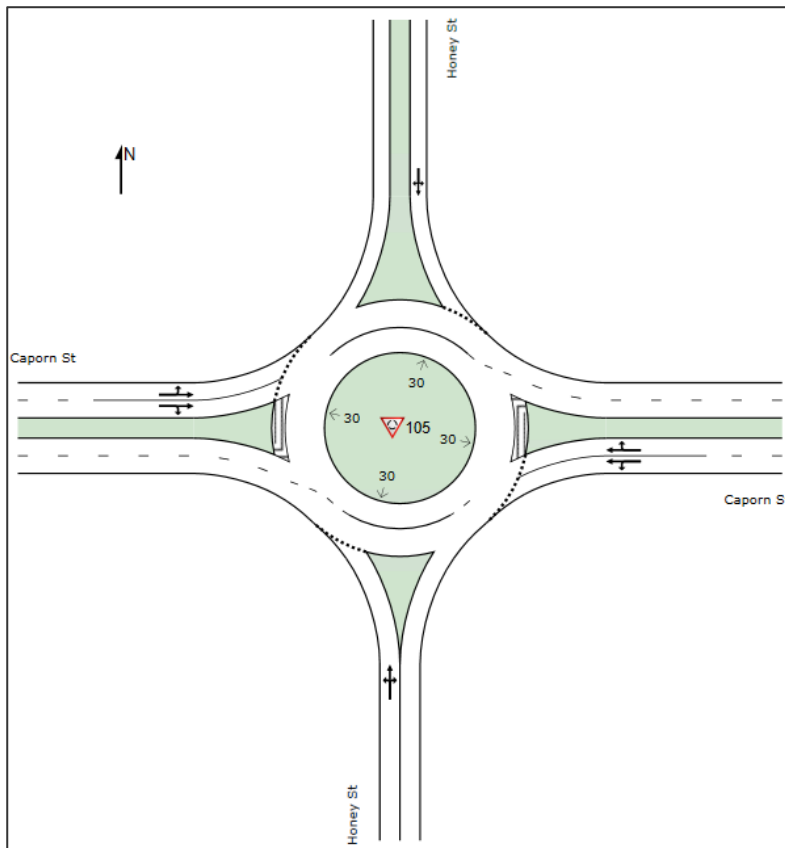


Table 5-9 SIDRA Results – Caporn Street / Honey Street

Intersection: Approach	AM				PM				
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Honey St	L	0.26	6	LOS A	10	0.35	7	LOS A	14
	T	0.26	6	LOS A	10	0.35	7	LOS A	14
	R	0.26	11	LOS B	10	0.35	12	LOS B	14
East: Caporn St	L	0.35	7	LOS A	23	0.44	7	LOS A	31
	T	0.35	8	LOS A	23	0.44	8	LOS A	31
	R	0.35	14	LOS B	20	0.44	14	LOS B	27
North: Honey St	L	0.64	10	LOS B	38	0.53	9	LOS A	28
	T	0.64	10	LOS B	38	0.53	9	LOS A	28
	R	0.64	16	LOS B	38	0.53	14	LOS B	28
West: Caporn St	L	0.45	7	LOS A	30	0.52	7	LOS A	36
	T	0.45	8	LOS A	30	0.52	8	LOS A	36
	R	0.45	13	LOS B	28	0.52	14	LOS B	36
All Vehicles	0.64	10	LOS A	38	0.53	9	LOS A	36	

5.5.9 Caporn Street / Franklin Road

The SIDRA layout of future Caporn Street / Franklin Road intersection is shown in **Figure 5-16**. Considering that this intersection will be a four-legged roundabout, it has been modelled as a roundabout.

The SIDRA analysis results are shown in **Table 5-10**. The results show that the intersection will perform poorly as a basic roundabout. The subsections below show possible remedial measures to improve the performance of the intersection.

Figure 5-16 SIDRA Layout – Caporn Street / Franklin Road

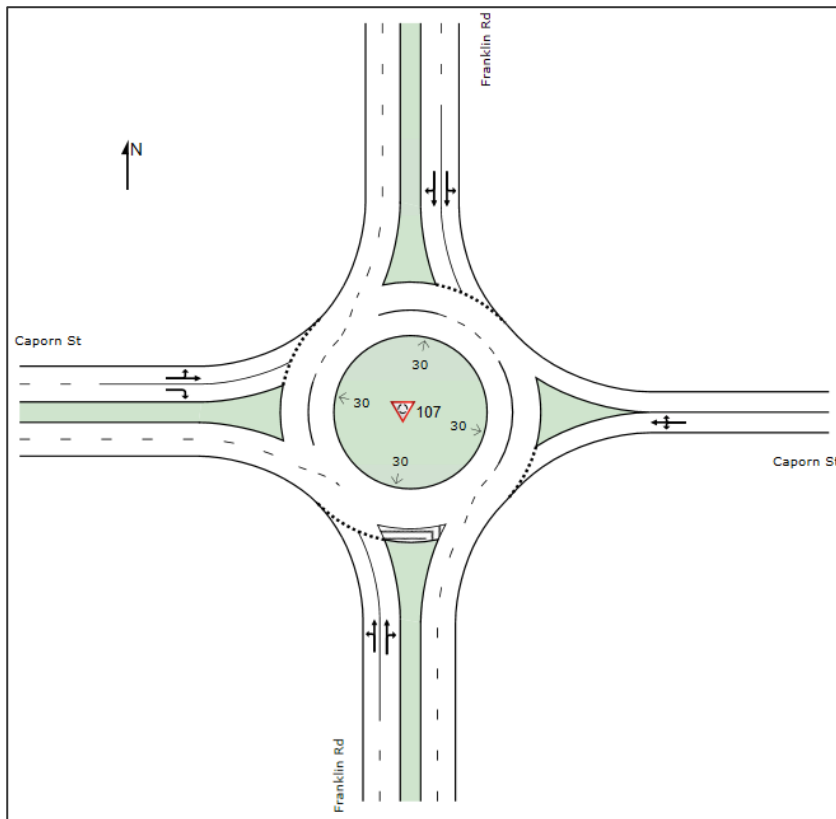


Table 5-10 SIDRA Results – Caporn Street / Franklin Road

Intersection: Approach	AM				PM				
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Franklin Rd	L	0.38	6	LOS A	25	0.71	7	LOS A	73
	T	0.38	6	LOS A	25	0.71	6	LOS A	74
	R	0.38	12	LOS B	25	0.71	12	LOS B	74
East: Caporn St	L	0.64	38	LOS D	40	0.17	7	LOS A	7
	T	0.64	38	LOS D	40	0.17	7	LOS A	7
	R	0.64	44	LOS D	40	0.17	12	LOS B	7
North: Franklin Rd	L	1.07	106	LOS F	313	0.39	8	LOS A	19
	T	1.07	104	LOS F	380	0.39	8	LOS A	20
	R	1.07	108	LOS F	380	0.39	14	LOS B	20
West: Caporn St	L	0.15	9	LOS A	6	0.45	22	LOS C	25
	T	0.15	9	LOS A	6	0.45	22	LOS C	25
	R	0.91	27	LOS C	166	1.53	504	LOS F	1378
All Vehicles	1.07	48	LOS D	380	1.53	107	LOS F	1378	

Remedial Measures – Option 1

Considering that one of the dominant movements in this intersection during the AM peak is the right turn from the west approach, the two lanes on the west approach was changed to both allow right turning movements as shown in **Figure 5-17**.

The SIDRA analysis results are shown in **Table 5-11**. The results show that the additional right turn movement on the west approach will improve the performance of the intersection however it would still result to a DOS greater than 0.85 for the PM peak.

Figure 5-17 SIDRA Layout – Caporn Street / Franklin Road – Remedial Measures – Option 1

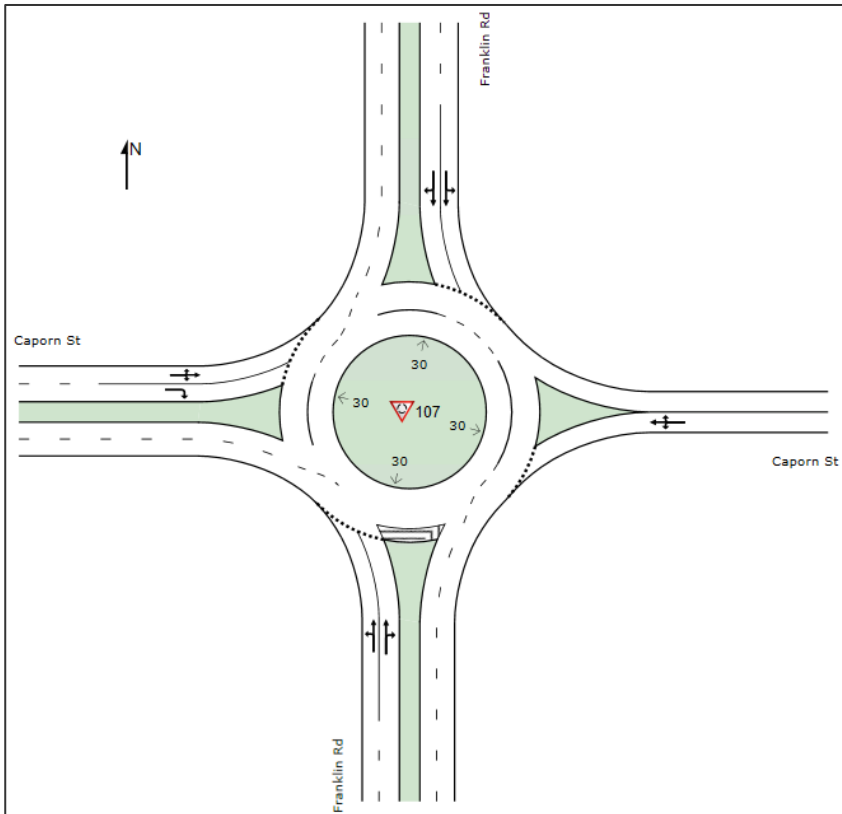


Table 5-11 SIDRA Results – Caporn Street / Franklin Road – Remedial Measures – Option 1

Intersection: Approach	AM					PM			
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Franklin Rd	L	0.38	6	LOS A	26	0.72	7	LOS A	74
	T	0.38	6	LOS A	26	0.72	6	LOS A	75
	R	0.38	12	LOS B	25	0.72	12	LOS B	75
East: Caporn St	L	0.42	14	LOS B	19	0.18	7	LOS A	7
	T	0.42	13	LOS B	19	0.18	7	LOS A	7
	R	0.42	19	LOS B	19	0.18	12	LOS B	7
North: Franklin Rd	L	0.83	17	LOS B	67	0.47	10	LOS A	23
	T	0.83	17	LOS B	73	0.47	9	LOS A	25
	R	0.83	21	LOS C	73	0.47	15	LOS B	25
West: Caporn St	L	0.54	9	LOS A	37	1.03	99	LOS F	276
	T	0.54	9	LOS A	37	1.03	99	LOS F	276
	R	0.54	15	LOS B	37	1.03	108	LOS F	276
All Vehicles	0.83	13	LOS B	73	1.03	31	LOS C	276	

Remedial Measures – Option 2

Considering that the left turn from the south is one of the dominant movements in this intersection during the PM peak, a short slip lane was added to remove allow the vehicles to move continuously while also removing it from the roundabout as shown in **Figure 5-18**.

The SIDRA analysis results are shown in **Table 5-12**. With the two right turns from the west approach and the slip lane on the south approach, the intersection is found to perform satisfactorily with DOS less than 0.85 and LOS B or better for both peak periods.

Figure 5-18 SIDRA Layout – Caporn Street / Franklin Road – Remedial Measures – Option 2

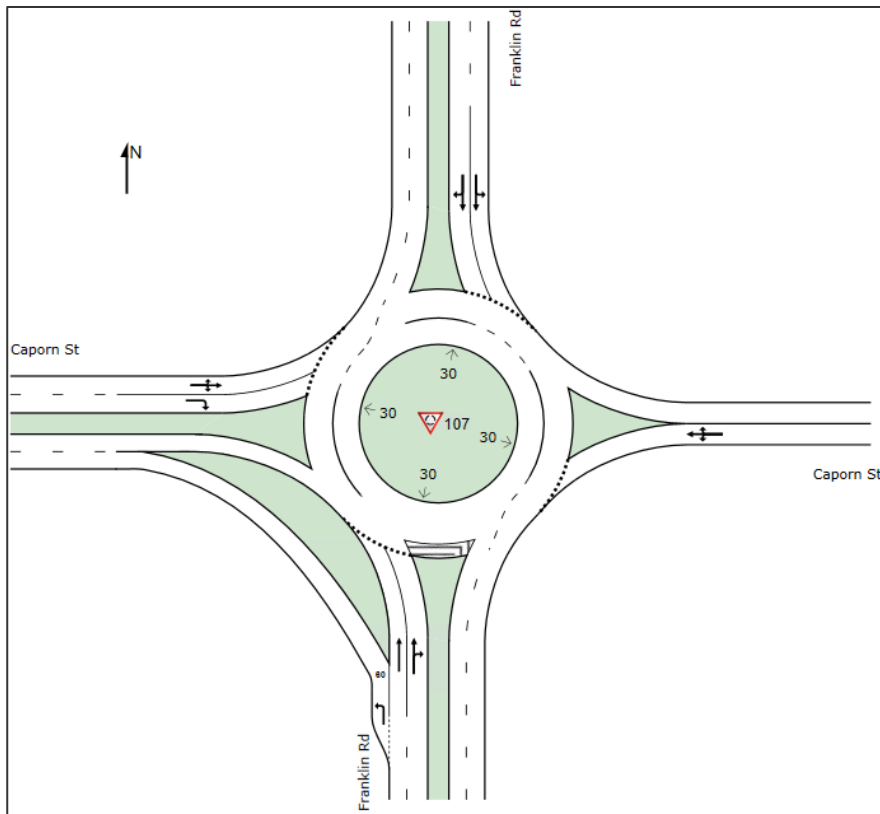


Table 5-12 SIDRA Results – Caporn Street / Franklin Road – Remedial Measures – Option 2

Intersection: Approach	AM				PM				
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Franklin Rd	L	0.34	5	LOS A	0	0.55	5	LOS A	0
	T	0.18	6	LOS A	10	0.40	6	LOS A	28
	R	0.18	12	LOS B	10	0.40	12	LOS B	28
East: Caporn St	L	0.42	14	LOS B	19	0.17	7	LOS A	6
	T	0.42	13	LOS B	19	0.17	7	LOS A	6
	R	0.42	19	LOS B	19	0.17	12	LOS B	6
North: Franklin Rd	L	0.81	17	LOS B	62	0.45	10	LOS A	22
	T	0.81	16	LOS B	68	0.45	9	LOS A	23
	R	0.81	20	LOS C	68	0.45	15	LOS B	23
West: Caporn St	L	0.52	8	LOS A	29	0.68	13	LOS B	45
	T	0.52	8	LOS A	29	0.68	13	LOS B	45
	R	0.52	14	LOS B	29	0.68	21	LOS C	45
All Vehicles	0.81	12	LOS B	68	0.68	10	LOS A	45	

5.5.10 Franklin Road / Primary School Road

The SIDRA layout of future Franklin Road / Primary School Road intersection is shown in **Figure 5-19**. As this intersection will be a four-legged intersection, the intersection has been modelled as a roundabout.

The SIDRA analysis results are shown in **Table 5-13**. The results show that the intersection will perform satisfactorily upon construction of the LSP.

Figure 5-19 SIDRA Layout – Caporn Street / Primary School Road

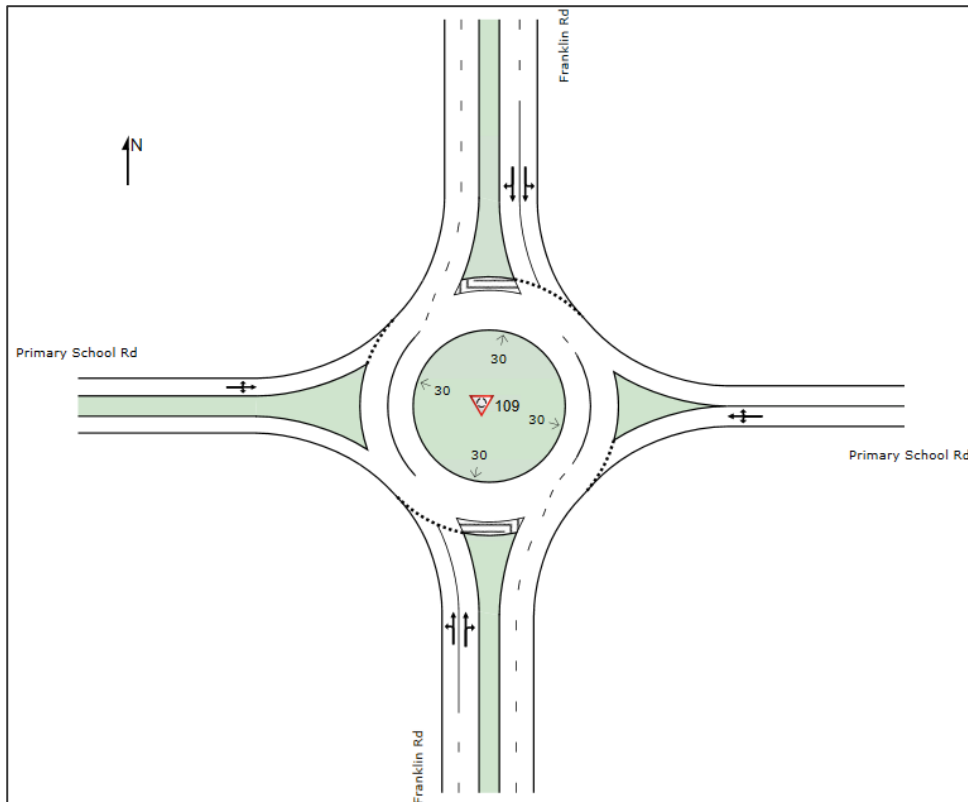


Table 5-13 SIDRA Results – Caporn Street / Primary School Road

Intersection: Approach	AM					PM			
	DOS	Delay (s)	LOS	95% Queue (m)	DOS	Delay (s)	LOS	95% Queue (m)	
South: Franklin Rd	L	0.18	5	LOS A	9	0.39	6	LOS A	24
	T	0.18	6	LOS A	10	0.39	6	LOS A	25
	R	0.18	11	LOS B	10	0.39	11	LOS B	25
East: Primary School Rd	L	0.42	7	LOS A	17	0.21	5	LOS A	7
	T	0.42	7	LOS A	17	0.21	4	LOS A	7
	R	0.42	12	LOS B	17	0.21	10	LOS A	7
North: Franklin Rd	L	0.32	7	LOS A	18	0.21	7	LOS A	11
	T	0.32	7	LOS A	19	0.21	7	LOS A	11
	R	0.32	12	LOS B	19	0.21	12	LOS B	11
West: Primary School Rd	L	0.34	5	LOS A	14	0.28	7	LOS A	11
	T	0.34	4	LOS A	14	0.28	6	LOS A	11
	R	0.34	10	LOS A	14	0.28	12	LOS B	11
All Vehicles		0.42	7	LOS A	19	0.39	7	LOS A	25

5.6 Pedestrian and Cycling Network

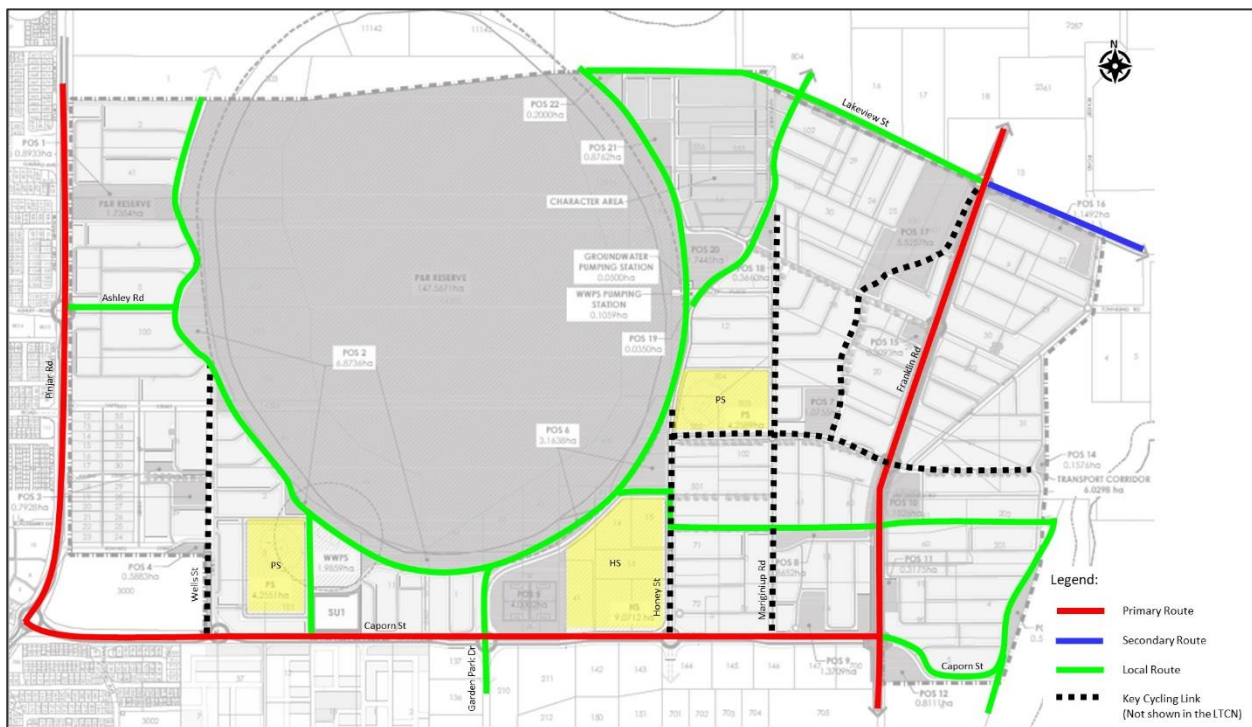
The proposed pedestrian and cycling network is shown in **Figure 5-20**. The network has been developed based on the LTCN shown in **Figure 3-6**, and modified to suit the LSP road network and location of key land uses (e.g. schools and public open space).

Key elements of the proposed network include:

- Primary routes located on Pinjar Road, Caporn Street and Franklin Road
- Secondary route will be on Lakeview Street east of Franklin Road
- Local routes will be on Ashley Road, Garden Park Drive, Caporn Street east of Franklin Road, Lakeview Street west of Franklin Road, Honey Street north of Primary School (east) and new roads such as the road east of Primary School (west) and the road north of the high school. There is also a local route around the perimeter of Lake Mariginiup.
- Key cycling links identified but are not shown in the LTCN will be on Wells Street, Honey Street south of Primary School (east), Mariginiup Road and new roads such as the road south of Primary School (east) and the north-south road between Franklin Road and Mariginiup Road.

The proposed pedestrian and cycling network is categorised by hierarchy, indicating the route function rather than form. The precise form for each route segment will be determined at subsequent planning stages in accordance with the *WA Cycling Network Hierarchy*.

Figure 5-20 Proposed Pedestrian and Cycling Network



5.7 Safe Walk and Cycling to School

Three schools are proposed within the LSP. As described in **Section 3.2**, a comprehensive shared path network will be provided in accordance with *Liveable Neighbourhoods* Guidelines to help students access the schools safely. Additional work will be also required at the subdivision application stage in support of active transport connections to these schools.

As previously mentioned, it is assumed that a local route around Mariginiup Lake will be provided to allow a strong pedestrian and cyclist connectivity between the schools and the residential areas. Aside from this, it is assumed that there will be pedestrian crossings at the roundabouts along Franklin Road. This will allow better connectivity between the schools and the residential area to the east of the transit corridor. In case that the transit corridor will have rail lines, it is assumed that it will not be at grade and safety of the pedestrians and cyclist will not deteriorate.

5.8 Public Transport Access

As identified in **Section 3.3**, there are no changes proposed to the existing public transport network within the short term but a strong transit corridor along the extended Franklin Road, a Transit Station just north of the LSP and bus routes may be expected in the long term.

Future bus route planning will need to be undertaken by the PTA and take into account the location and scale of urban development in other Precincts as it progresses. Allowance for future bus routes through the LSP has been made via the network of Neighbourhood Connector A & B roads, as well as some Access Streets.



6. Conclusions

This assessment has been prepared in accordance with the *WAPC Transport Assessment Guidelines for Developments: Volumes 2 – Planning Schemes, Structure Plans & Activity Centre Plans (2016)*.

The following conclusions have been made in regard to the proposed LSP:

- The LSP is located in the suburb of Mariginiup within the City of Wanneroo.
- The proposed LSP is estimated to yield up to 3,600 dwellings, two primary schools and one high school.
- Analysis of expected daily traffic volumes showed the following:
 - Within the boundary roads, Pinjar Road is projected to increase to between 19,700 and 33,600 vpd, Caporn Street to between 13,100 and 16,700 vpd and Franklin Road to between 11,200 and 28,400 vpd. Both Caporn Street and Franklin Road are proposed to be upgraded to a 4-lane dual carriageway.
 - Honey Street and the road south of the primary school on the east will carry between 3,200 and 3,800 vpd. Both would be considered as local distributors (using the MRWA Functional Hierarchy). Honey Street is proposed to be upgraded to a 2-lane dual carriageway.
- SIDRA analysis of the key intersections showed the following:
 - The following intersections are proposed to be upgraded to roundabouts and will perform satisfactorily in 2033:
 - > Pinjar Road / Ashley Road
 - > Caporn Street / Garden Park Drive
 - > Caporn Street / Honey Street
 - > Caporn Street / Franklin Road
 - > Franklin Road / Primary School Road
 - Caporn Street / Wells Street is proposed to be upgraded to a staged right turn priority intersection and will perform satisfactorily in 2033.
 - Pinjar Road / Caporn Street / Hollosy Way roundabout will require some changes to its current layout to perform satisfactorily in 2033.



Appendix A. WAPC Checklist

ITEM	PROVIDED	COMMENTS
Summary	N/A	The conclusion provides a summary of the contents of the TIA
Introduction/Background	Section 1.1	
Structure plan proposal		
Regional context	Section 1.2	
Proposed land uses	Section 1.3	
Table of land uses and quantities	Table 1-1	
Major attractors/generators	Section 4.1	
Specific Issues	N/A	No specific issue identified
Existing situation		
Existing land uses within structure plan	Section 2.1	
Existing land uses within 800 metres of structure plan area	Section 2.1	
Existing road network within structure plan area	Section 2.2	
Existing pedestrian/cycle networks within structure plan area	Section 2.5	
Existing public transport services within structure plan area	Section 2.4	Provided for surrounding area as there is currently no public transport servicing the structure plan area
Existing road network within 2 (or 5) km of structure plan area (AM and/or PM peak hours)	Section 2.2	
Traffic flows on roads within structure plan area (PM and/or AM peak hours)	Table 2-2	
Traffic flows on road within 2 (or 5) km of structure plan area (AM and/or PM peak hours)	Table 2-2	Provided traffic flows on boundary roads of the LSP
Existing pedestrian/cycle networks within 800m of structure plan area	Section 2.5	
Existing public transport services within 800m of structure plan area	Section 2.4	
Proposed internal transport networks		
Changes/additions to existing road network or proposed new road network	Section 3.1.1	
Road reservation widths	Table 3-1	
Road cross-sections & speed limits	Section 3.1.1	
Intersection controls	Section 3.1.1	
Pedestrian/cycle networks and crossing facilities	Section 3.2	
Public transport routes	Section 3.3	
Changes to external transport networks		
Road network	Section 3.1.2	
Intersection controls	Section 3.1.1	Extent of analysis is only within the boundary road of the LSP
Pedestrian/cycle networks and crossing facilities	Section 3.2	



Public transport services	Section 3.3	
Integration with surrounding area		
Trip attractors/generators within 800 metres	Section 4.1	
Proposed changes to land uses within 800 metres	Section 4.2	
Travel desire lines from structure plan to these attractors/generators	Section 5.2	
Adequacy of external transport networks	Sections 5.5	Provided analysis for the boundary roads of the LSP
Deficiencies of external transport networks	Sections 5.5	Provided analysis for the boundary roads of the LSP
Remedial measures to address deficiencies	Sections 5.5.5 and Section 5.5.9	Provided analysis for the boundary roads of the LSP
Analysis of internal transport networks		
Assessment year(s) and time period (s)	Section 5.5.1	
Structure plan generated traffic	Sections 5.1	
Extraneous (through) traffic	Section 5.3	
Design traffic flows (that is, total traffic)	Sections 5.4	
Road cross-sections	Sections 5.5.4 to 5.5.10	
Intersection controls	Sections 5.5.4 to 5.5.10	
Access strategy	Section 5.2	
Pedestrian/cycle networks	Section 5.6	
Safe routes to schools	Section 5.7	
Pedestrian permeability & efficiency	N/A	Information is not yet available
Access to public transport	Section 5.8	
Analysis of external transport networks		
Extent of analysis	Section 5.5	Extent of analysis is only within the boundary roads of the LSP
Base flow for assessment year(s)	Section 5.5.3	Extent of analysis is only within the boundary roads of the LSP
Total traffic flows	Section 5.5.3	Extent of analysis is only within the boundary roads of the LSP
Road cross-sections	Sections 5.5.4 to 5.5.10	Extent of analysis is only within the boundary roads of the LSP
Intersection layouts & controls	Sections 5.5.4 to 5.5.10	Extent of analysis is only within the boundary roads of the LSP
Pedestrian/cycle networks	Section 5.6	Extent of analysis is only within the boundary roads of the LSP
Conclusions	Section 6	

Appendix B. Structure Plan



LEGEND

STRUCTURE PLAN AREA

MRS RESERVES

PARKS AND RECREATION

LOCAL SCHEME

- RESIDENTIAL R30-R60*
- RESIDENTIAL R40-R80
- PUBLIC OPEN SPACE
- PUBLIC PURPOSES - HIGH SCHOOL
- PUBLIC PURPOSES - PRIMARY SCHOOL
- PUBLIC PURPOSES - WATER CORPORATION
- PUBLIC PURPOSES
- SPECIAL USE 1 (LOCAL CENTRE)

MOVEMENT NETWORK

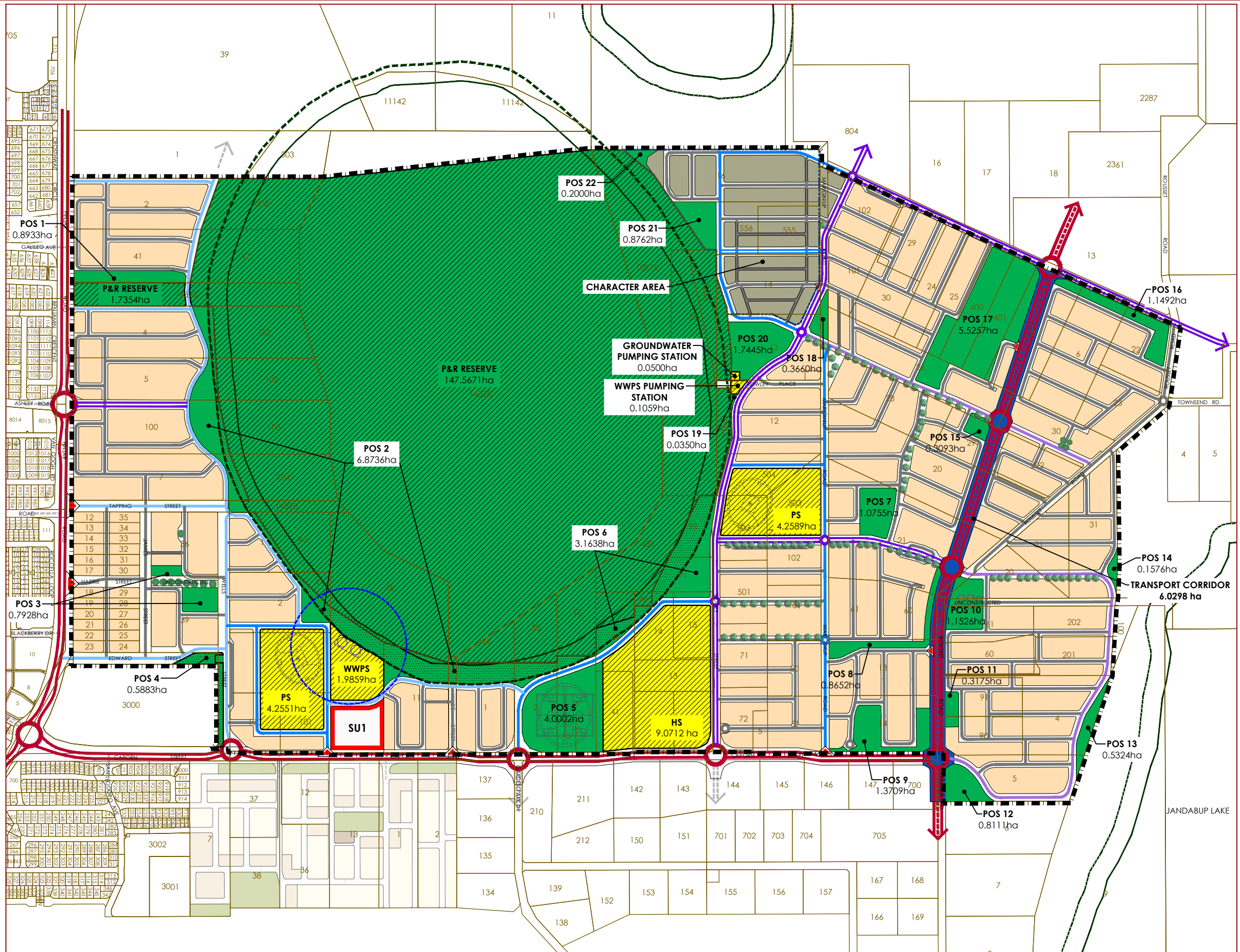
- INTEGRATOR A (35m)
- NEIGHBOURHOOD CONNECTOR A (25m)
- NEIGHBOURHOOD CONNECTOR B (20m)
- ACCESS STREET A (24m)
- ACCESS STREET B (17.9m)
- ACCESS STREET C (15m**)
- INDICATIVE EXTERNAL ROADS
- ROUNDABOUT INTERSECTION***
- LEFT-IN/LEFT-OUT INTERSECTION***

OTHER

- CHARACTER AREA*
- CONSERVATION AREA
- 150m ODOUR BUFFER TO WWPS
- WETLAND CORE
- 50m WETLAND BUFFER
- RAPID TRANSIT ROUTE
- GREEN STREET*

NOTES:

- *REFER TO STRUCTURE PLAN REPORT FOR DETAIL.
- **MAY BE REDUCED TO 13m ADJACENT TO PUBLIC OPEN SPACE (EXCLUDING AREAS IDENTIFIED FOR CONSERVATION PURPOSES), OR 10m WHERE USED AS A CONTROLLED ACCESS PLACE.
- ***ALL OTHER INTERSECTIONS TO BE PRIORITY CONTROLLED.



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NORTH
0 50 100 150 200 250m
SCALE 1:10,000 (A3)

Plan No: HES MAR 03-05f-02 Client: HESPERIA
Date: 21.11.23 Planner: JB/AC

**PLAN 1: STRUCTURE PLAN MAP
EAST WANNEROO: PRECINCT 7
MARIGINIUP**

CITY OF WANNEROO

Appendix C. SIDRA Outputs



C.1 AM Peak

C.1.1 Pinjar Road / Ashley Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Pinjar Rd															
1	L2	All MCs	6	5	6	5	0.376	6.9	LOS A	2.9	22.8	0.7	0.6	0.7	54.3
2	T1	All MCs	767	7	767	7	0.376	7.5	LOS A	2.9	22.8	0.7	0.62	0.7	59
3	R2	All MCs	26	5	26	5	0.376	13.6	LOS B	2.6	20.8	0.71	0.64	0.71	53.9
Approach			800	6.9	800	6.9	0.376	7.7	LOS A	2.9	22.8	0.71	0.62	0.71	58.8
East: Ashley Rd															
4	L2	All MCs	78	5	78	5	0.635	10.2	LOS B	4	30.9	0.79	1.04	1.16	48.9
5	T1	All MCs	1	5	1	5	0.635	10	LOS A	4	30.9	0.79	1.04	1.16	40.2
6	R2	All MCs	347	5	347	5	0.635	15.4	LOS B	4	30.9	0.79	1.04	1.16	43.7
Approach			426	5	426	5	0.635	14.5	LOS B	4	30.9	0.79	1.04	1.16	44.8
North: Pinjar Rd															
7	L2	All MCs	116	5	116	5	0.446	4.9	LOS A	3.9	31.3	0.2	0.4	0.2	53.9
8	T1	All MCs	1197	7	1197	7	0.446	5.1	LOS A	3.9	31.3	0.21	0.42	0.21	60.2
9	R2	All MCs	125	5	125	5	0.446	10.9	LOS B	3.9	30.7	0.22	0.45	0.22	51.8
Approach			1438	6.7	1438	6.7	0.446	5.6	LOS A	3.9	31.3	0.21	0.42	0.21	59.2
West: Ashley Rd															
10	L2	All MCs	159	5	159	5	0.292	7.3	LOS A	1.4	11.2	0.77	0.78	0.77	49.6
11	T1	All MCs	1	5	1	5	0.292	7	LOS A	1.4	11.2	0.77	0.78	0.77	44.1
12	R2	All MCs	4	5	4	5	0.292	12.5	LOS B	1.4	11.2	0.77	0.78	0.77	52.2
Approach			164	5	164	5	0.292	7.4	LOS A	1.4	11.2	0.77	0.78	0.77	49.6
All Vehicles			2828	6.4	2828	6.4	0.635	7.6	LOS A	4	31.3	0.47	0.59	0.52	56.6

C.1.2 Pinjar Road / Caporn Street

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Pinjar Rd															
1	L2	All MCs	27	5	27	5	0.245	6.8	LOS A	1.8	13.9	0.79	0.64	0.79	47.8
2	T1	All MCs	278	7	278	7	0.245	6.1	LOS A	2	16	0.79	0.64	0.79	53.7
3	R2	All MCs	164	7	164	7	0.245	12.3	LOS B	2	16	0.79	0.63	0.79	50.8
Approach			469	6.9	469	6.9	0.245	8.3	LOS A	2	16	0.79	0.63	0.79	52.6
East: Caporn St															
4	L2	All MCs	256	13.4	256	13.4	0.465	12.2	LOS B	3	25.4	0.84	0.88	1.01	49.4
5	T1	All MCs	26	5	26	5	0.627	12	LOS B	5.6	47.9	0.91	0.96	1.24	44.2
6	R2	All MCs	453	13.4	453	13.4	0.627	19.7	LOS B	5.6	47.9	0.91	0.96	1.24	49.9
Approach			735	13.1	735	13.1	0.627	16.8	LOS B	5.6	47.9	0.89	0.93	1.16	49.6
North: Pinjar Rd															
7	L2	All MCs	439	7	439	7	0.496	4.9	LOS A	4.1	32.5	0.62	0.5	0.62	55.8
8	T1	All MCs	807	7	807	7	0.496	4.1	LOS A	4.3	34.2	0.59	0.45	0.59	54.8
9	R2	All MCs	107	5	107	5	0.496	10.8	LOS B	4.3	34.2	0.58	0.44	0.58	51.2
Approach			1354	6.8	1354	6.8	0.496	4.9	LOS A	4.3	34.2	0.6	0.47	0.6	54.9
West: Hollosy Way															
10	L2	All MCs	69	5	69	5	0.221	5.9	LOS A	1.2	9.2	0.74	0.72	0.74	50.6
11	T1	All MCs	29	5	29	5	0.221	5.2	LOS A	1.2	9.2	0.74	0.72	0.74	49.6
12	R2	All MCs	51	5	51	5	0.221	11.7	LOS B	1.2	9.2	0.74	0.72	0.74	45.4
Approach			149	5	149	5	0.221	7.7	LOS A	1.2	9.2	0.74	0.72	0.74	48.9
All Vehicles			2707	8.5	2707	8.5	0.627	8.9	LOS A	5.6	47.9	0.72	0.63	0.79	52.8

C.1.3 Pinjar Road / Caporn Street - Upgraded

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				v/c	sec				
South: Pinjar Rd															
1	L2	All MCs	27	5	27	5	0.255	5.6	LOS A	1.4	10.8	0.65	0.55	0.65	48.6
2	T1	All MCs	278	7	278	7	0.255	5.1	LOS A	1.4	11.6	0.65	0.58	0.65	54.3
3	R2	All MCs	164	7	164	7	0.255	11.6	LOS B	1.4	11.6	0.64	0.64	0.64	51.2
Approach			469	6.9	469	6.9	0.255	7.4	LOS A	1.4	11.6	0.64	0.6	0.64	53.1
East: Caporn St															
4	L2	All MCs	256	13.4	256	13.4	0.499	12.7	LOS B	3.4	28.4	0.85	0.89	1.06	49.2
5	T1	All MCs	26	5	26	5	0.499	11.9	LOS B	3.4	28.4	0.85	0.89	1.06	48
6	R2	All MCs	453	13.4	453	13.4	0.593	19	LOS B	5.1	43.1	0.89	0.93	1.18	50
Approach			735	13.1	735	13.1	0.593	16.5	LOS B	5.1	43.1	0.88	0.92	1.13	49.8
North: Pinjar Rd															
7	L2	All MCs	439	7	439	7	0.492	4.9	LOS A	4	31.5	0.61	0.5	0.61	55.9
8	T1	All MCs	807	7	807	7	0.492	4.1	LOS A	4.2	33.1	0.57	0.45	0.57	54.9
9	R2	All MCs	107	5	107	5	0.492	10.8	LOS B	4.2	33.1	0.56	0.44	0.56	51.2
Approach			1354	6.8	1354	6.8	0.492	4.9	LOS A	4.2	33.1	0.58	0.46	0.58	55
West: Hollosy Way															
10	L2	All MCs	69	5	69	5	0.22	5.8	LOS A	1.2	9	0.73	0.71	0.73	50.7
11	T1	All MCs	29	5	29	5	0.22	5.1	LOS A	1.2	9	0.73	0.71	0.73	49.7
12	R2	All MCs	51	5	51	5	0.22	11.6	LOS B	1.2	9	0.73	0.71	0.73	45.4
Approach			149	5	149	5	0.22	7.6	LOS A	1.2	9	0.73	0.71	0.73	48.9
All Vehicles			2707	8.5	2707	8.5	0.593	8.6	LOS A	5.1	43.1	0.68	0.62	0.75	52.9

C.1.4 Caporn Street / Wells Street – Stage 1

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				v/c	sec				
South: Median Storage															
5	T1	All MCs	100	5	100	5	0.122	2.7	LOS A	0.4	3.4	0.51	0.46	0.51	45.2
Approach			100	5	100	5	0.122	2.7	LOS A	0.4	3.4	0.51	0.46	0.51	45.2
North: Wells St															
1	L2	All MCs	100	5	100	5	0.083	6.8	LOS A	0.3	2.6	0.38	0.59	0.38	55.1
2	T1	All MCs	122	5	122	5	0.189	12.2	LOS B	0.7	5.3	0.56	1	0.56	44.6
Approach			222	5	222	5	0.189	9.8	LOS A	0.7	5.3	0.48	0.82	0.48	51.1
West: Caporn St (EB)															
3	L2	All MCs	94	5	94	5	0.074	7.1	LOS A	0.3	2.3	0.21	0.56	0.21	53.4
4	T1	All MCs	566	13.4	566	13.4	0.168	6.5	LOS A	0	0	0	0.61	0	54.8
Approach			660	12.2	660	12.2	0.168	6.6	LOS A	0.3	2.3	0.03	0.6	0.03	54.7
All Vehicles			982	9.9	982	9.9	0.189	6.9	NA	0.7	5.3	0.18	0.63	0.18	53.4

C.1.5 Caporn Street / Wells Street – Stage 2

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				v/c	sec				
East: Caporn St (WB)															
2	T1	All MCs	642	13.4	642	13.4	0.19	0.1	LOS A	0	0	0	0	0	69.9
3	R2	All MCs	100	5	100	5	0.057	6.4	LOS A	0	0	0	0.66	0	60.1
Approach			742	12.3	742	12.3	0.19	0.9	NA	0	0	0	0.09	0	68.9
North: Median Storage															
1	R2	All MCs	122	5	122	5	0.176	4.4	LOS A	0.6	4.5	0.55	0.65	0.55	46.4
Approach			122	5	122	5	0.176	4.4	LOS A	0.6	4.5	0.55	0.65	0.55	46.4
All Vehicles			864	11.3	864	11.3	0.19	1.4	NA	0.6	4.5	0.08	0.17	0.08	66.8

C.1.6 Caporn Street / Garden Park Drive

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Garden Park Dr															
1	L2	All MCs	185	5.6	185	5.6	0.52	6	LOS A	3.2	25.2	0.69	0.72	0.79	52.2
2	T1	All MCs	209	5.6	209	5.6	0.52	5.8	LOS A	3.2	25.2	0.69	0.72	0.79	45.6
3	R2	All MCs	45	5.6	45	5.6	0.52	11.2	LOS B	3.2	25.2	0.69	0.72	0.79	49.1
Approach			440	5.6	440	5.6	0.52	6.5	LOS A	3.2	25.2	0.69	0.72	0.79	48.8
East: Caporn St															
4	L2	All MCs	265	5.6	265	5.6	0.315	5.7	LOS A	2.3	18.6	0.47	0.5	0.47	52
5	T1	All MCs	476	13.4	476	13.4	0.315	6.3	LOS A	2.3	18.6	0.49	0.52	0.49	56.5
6	R2	All MCs	72	5.6	72	5.6	0.315	12.1	LOS B	2.2	18.4	0.51	0.53	0.51	50.6
Approach			813	10.2	813	10.2	0.315	6.6	LOS A	2.3	18.6	0.49	0.51	0.49	54.7
North: Garden Park Dr															
7	L2	All MCs	469	5.6	469	5.6	0.776	12	LOS B	7.9	61.7	0.9	1.05	1.4	46.5
8	T1	All MCs	78	5.6	78	5.6	0.776	11.8	LOS B	7.9	61.7	0.9	1.05	1.4	42.8
9	R2	All MCs	23	5.6	23	5.6	0.776	17.3	LOS B	7.9	61.7	0.9	1.05	1.4	48.6
Approach			571	5.6	571	5.6	0.776	12.2	LOS B	7.9	61.7	0.9	1.05	1.4	46.1
West: Caporn St															
10	L2	All MCs	7	5.6	7	5.6	0.269	6.2	LOS A	1.9	16.2	0.58	0.53	0.58	53.9
11	T1	All MCs	495	13.4	495	13.4	0.269	6.9	LOS A	1.9	16.2	0.58	0.56	0.58	57.3
12	R2	All MCs	107	5.6	107	5.6	0.269	12.8	LOS B	1.8	14.9	0.6	0.61	0.6	52.5
Approach			609	11.9	609	11.9	0.269	7.9	LOS A	1.9	16.2	0.59	0.57	0.59	56.3
All Vehicles			2433	8.7	2433	8.7	0.776	8.2	LOS A	7.9	61.7	0.65	0.69	0.78	52

C.1.7 Caporn Street / Honey Street

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Honey St															
1	L2	All MCs	49	5	49	5	0.26	6	LOS A	1.2	9.5	0.7	0.74	0.7	49.2
2	T1	All MCs	61	5	61	5	0.26	5.7	LOS A	1.2	9.5	0.7	0.74	0.7	45
3	R2	All MCs	62	5	62	5	0.26	11.2	LOS B	1.2	9.5	0.7	0.74	0.7	48.6
Approach			173	5	173	5	0.26	7.8	LOS A	1.2	9.5	0.7	0.74	0.7	47.4
East: Caporn St															
4	L2	All MCs	49	5	49	5	0.345	7.1	LOS A	2.7	22.5	0.73	0.61	0.73	50.9
5	T1	All MCs	416	13.4	416	13.4	0.345	7.8	LOS A	2.7	22.5	0.73	0.63	0.73	54.5
6	R2	All MCs	222	5	222	5	0.345	13.9	LOS B	2.5	19.8	0.74	0.69	0.74	48.6
Approach			687	10.1	687	10.1	0.345	9.7	LOS A	2.7	22.5	0.73	0.65	0.73	52.2
North: Honey St															
7	L2	All MCs	61	5	61	5	0.64	10.3	LOS B	4.9	38.2	0.86	0.99	1.17	45.5
8	T1	All MCs	1	5	1	5	0.64	10.1	LOS B	4.9	38.2	0.86	0.99	1.17	41.8
9	R2	All MCs	348	5	348	5	0.64	15.5	LOS B	4.9	38.2	0.86	0.99	1.17	44.8
Approach			411	5	411	5	0.64	14.8	LOS B	4.9	38.2	0.86	0.99	1.17	44.9
West: Caporn St															
10	L2	All MCs	255	5	255	5	0.445	6.6	LOS A	3.6	29.5	0.66	0.58	0.66	51.2
11	T1	All MCs	633	13.4	633	13.4	0.445	7.5	LOS A	3.6	29.5	0.68	0.6	0.68	54.8
12	R2	All MCs	123	5	123	5	0.445	13.3	LOS B	3.4	28	0.69	0.63	0.69	49.6
Approach			1011	10.3	1011	10.3	0.445	8	LOS A	3.6	29.5	0.68	0.6	0.68	53.2
All Vehicles			2281	8.9	2281	8.9	0.64	9.7	LOS A	4.9	38.2	0.73	0.69	0.78	50.7

C.1.8 Caporn Street / Franklin Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	537	14.1	537	14.1	0.382	5.8	LOS A	3	25.4	0.48	0.51	0.48	55.6
2	T1	All MCs	423	14.1	423	14.1	0.382	6.3	LOS A	3	25.4	0.51	0.5	0.51	55.2
3	R2	All MCs	25	14.1	25	14.1	0.382	12.2	LOS B	2.8	24.5	0.51	0.5	0.51	50.6
Approach			985	14.1	985	14.1	0.382	6.2	LOS A	3	25.4	0.49	0.5	0.49	55.3
East: Caporn St															
4	L2	All MCs	76	13.4	76	13.4	0.641	38.4	LOS D	4.7	40.1	0.98	1.2	1.6	34
5	T1	All MCs	49	13.4	49	13.4	0.641	38.1	LOS D	4.7	40.1	0.98	1.2	1.6	34.5
6	R2	All MCs	29	13.4	29	13.4	0.641	43.7	LOS D	4.7	40.1	0.98	1.2	1.6	32.7
Approach			155	13.4	155	13.4	0.641	39.3	LOS D	4.7	40.1	0.98	1.2	1.6	33.9
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	1.072	106	LOS F	36.4	312.8	1	2.43	5.19	21.2
8	T1	All MCs	964	14.1	964	14.1	1.072	104.3	LOS F	44.2	379.8	1	2.53	5.34	22.2
9	R2	All MCs	100	14.1	100	14.1	1.072	108.2	LOS F	44.2	379.8	1	2.61	5.48	22.4
Approach			1094	14.1	1094	14.1	1.072	104.7	LOS F	44.2	379.8	1	2.53	5.35	22.1
West: Caporn St															
10	L2	All MCs	58	13.4	58	13.4	0.15	9	LOS A	0.7	6.1	0.62	0.68	0.62	54.2
11	T1	All MCs	28	13.4	28	13.4	0.15	9.1	LOS A	0.7	6.1	0.62	0.68	0.62	51.3
12	R2	All MCs	856	13.4	856	13.4	0.906	27.3	LOS C	19.4	165.9	1	1.25	1.92	43.2
Approach			942	13.4	942	13.4	0.906	25.6	LOS C	19.4	165.9	0.97	1.2	1.8	43.9
All Vehicles			3176	13.9	3176	13.9	1.072	47.5	LOS D	44.2	379.8	0.83	1.44	2.61	34.4



C.1.9 Caporn Street / Franklin Road – Upgraded Option 1

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	537	14.1	537	14.1	0.384	5.8	LOS A	3	25.5	0.48	0.51	0.48	55.6
2	T1	All MCs	423	14.1	423	14.1	0.384	6.4	LOS A	3	25.5	0.51	0.5	0.51	55.2
3	R2	All MCs	25	14.1	25	14.1	0.384	12.2	LOS B	2.9	24.5	0.51	0.5	0.51	50.5
Approach			985	14.1	985	14.1	0.384	6.2	LOS A	3	25.5	0.5	0.51	0.5	55.3
East: Caporn St															
4	L2	All MCs	76	13.4	76	13.4	0.418	13.6	LOS B	2.2	18.9	0.86	0.98	1.05	43.8
5	T1	All MCs	49	13.4	49	13.4	0.418	13.3	LOS B	2.2	18.9	0.86	0.98	1.05	44.5
6	R2	All MCs	29	13.4	29	13.4	0.418	18.8	LOS B	2.2	18.9	0.86	0.98	1.05	42.4
Approach			155	13.4	155	13.4	0.418	14.5	LOS B	2.2	18.9	0.86	0.98	1.05	43.8
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	0.829	17.4	LOS B	7.8	66.7	0.93	1.14	1.62	44.5
8	T1	All MCs	964	14.1	964	14.1	0.829	16.5	LOS B	8.5	73.3	0.94	1.13	1.59	48.6
9	R2	All MCs	100	14.1	100	14.1	0.829	21	LOS C	8.5	73.3	0.94	1.12	1.57	47.8
Approach			1094	14.1	1094	14.1	0.829	16.9	LOS B	8.5	73.3	0.94	1.13	1.59	48.4
West: Caporn St															
10	L2	All MCs	58	13.4	58	13.4	0.541	8.9	LOS A	4.3	37.1	0.76	0.77	0.85	51
11	T1	All MCs	28	13.4	28	13.4	0.541	9	LOS A	4.3	37.1	0.76	0.77	0.85	48.7
12	R2	All MCs	856	13.4	856	13.4	0.541	15.4	LOS B	4.3	37.1	0.77	0.78	0.87	49.9
Approach			942	13.4	942	13.4	0.541	14.8	LOS B	4.3	37.1	0.77	0.78	0.87	49.9
All Vehicles			3176	13.9	3176	13.9	0.829	12.9	LOS B	8.5	73.3	0.75	0.83	1.01	50.5

C.1.10 Caporn Street / Franklin Road – Upgraded Option 2

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	537	14.1	537	14.1	0.339	4.6	LOS A	0	0	0	0.48	0	58
2	T1	All MCs	423	14.1	423	14.1	0.176	6	LOS A	1.1	9.8	0.42	0.48	0.42	55.7
3	R2	All MCs	25	14.1	25	14.1	0.176	11.7	LOS B	1.1	9.8	0.41	0.48	0.41	50.9
Approach			985	14.1	985	14.1	0.339	5.3	LOS A	1.1	9.8	0.19	0.48	0.19	56.8
East: Caporn St															
4	L2	All MCs	76	13.4	76	13.4	0.415	13.5	LOS B	2.2	18.7	0.86	0.98	1.05	43.9
5	T1	All MCs	49	13.4	49	13.4	0.415	13.3	LOS B	2.2	18.7	0.86	0.98	1.05	44.5
6	R2	All MCs	29	13.4	29	13.4	0.415	18.8	LOS B	2.2	18.7	0.86	0.98	1.05	42.5
Approach			155	13.4	155	13.4	0.415	14.4	LOS B	2.2	18.7	0.86	0.98	1.05	43.8
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	0.808	16.5	LOS B	7.2	62.2	0.92	1.11	1.55	45.1
8	T1	All MCs	964	14.1	964	14.1	0.808	15.6	LOS B	7.9	68.2	0.92	1.1	1.52	49.1
9	R2	All MCs	100	14.1	100	14.1	0.808	20.3	LOS C	7.9	68.2	0.92	1.09	1.49	48.3
Approach			1094	14.1	1094	14.1	0.808	16.1	LOS B	7.9	68.2	0.92	1.1	1.52	48.9
West: Caporn St															
10	L2	All MCs	58	13.4	58	13.4	0.515	7.9	LOS A	3.4	28.9	0.67	0.76	0.74	51.6
11	T1	All MCs	28	13.4	28	13.4	0.515	8	LOS A	3.4	28.9	0.67	0.76	0.74	49.3
12	R2	All MCs	856	13.4	856	13.4	0.515	14.4	LOS B	3.4	28.9	0.68	0.78	0.76	50.6
Approach			942	13.4	942	13.4	0.515	13.8	LOS B	3.4	28.9	0.68	0.78	0.76	50.6
All Vehicles			3176	13.9	3176	13.9	0.808	12	LOS B	7.9	68.2	0.62	0.81	0.86	51.4

C.1.11 Caporn Street / Primary School Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	95	5	95	5	0.176	5.2	LOS A	1.1	9.4	0.34	0.45	0.34	51.7
2	T1	All MCs	317	14.1	317	14.1	0.176	5.5	LOS A	1.2	9.8	0.33	0.48	0.33	55.4
3	R2	All MCs	82	5	82	5	0.176	11.1	LOS B	1.2	9.8	0.32	0.49	0.32	50.2
Approach			494	10.8	494	10.8	0.176	6.4	LOS A	1.2	9.8	0.33	0.47	0.33	53.7
East: Primary School Rd															
4	L2	All MCs	189	5	189	5	0.417	6.8	LOS A	2.3	17.4	0.73	0.78	0.82	49
5	T1	All MCs	80	5	80	5	0.417	6.5	LOS A	2.3	17.4	0.73	0.78	0.82	45.4
6	R2	All MCs	19	5	19	5	0.417	12	LOS B	2.3	17.4	0.73	0.78	0.82	49
Approach			288	5	288	5	0.417	7	LOS A	2.3	17.4	0.73	0.78	0.82	47.9
North: Franklin Rd															
7	L2	All MCs	6	5	6	5	0.322	6.8	LOS A	2.1	18.1	0.61	0.57	0.61	51.1
8	T1	All MCs	702	14.1	702	14.1	0.322	7.1	LOS A	2.3	19.3	0.6	0.56	0.6	54.8
9	R2	All MCs	12	5	12	5	0.322	12.3	LOS B	2.3	19.3	0.59	0.55	0.59	50.6
Approach			720	13.9	720	13.9	0.322	7.1	LOS A	2.3	19.3	0.6	0.56	0.6	54.7
West: Primary School Rd															
10	L2	All MCs	36	5	36	5	0.338	4.7	LOS A	1.7	13.5	0.58	0.65	0.58	48.9
11	T1	All MCs	67	5	67	5	0.338	4.4	LOS A	1.7	13.5	0.58	0.65	0.58	44.9
12	R2	All MCs	202	5	202	5	0.338	9.9	LOS A	1.7	13.5	0.58	0.65	0.58	47.6
Approach			305	5	305	5	0.338	8.1	LOS A	1.7	13.5	0.58	0.65	0.58	47.1
All Vehicles			1807	10.1	1807	10.1	0.417	7.1	LOS A	2.3	19.3	0.54	0.59	0.56	51.8

C.2 PM Peak

C.2.1 Pinjar Road / Ashley Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Pinjar Rd															
1	L2	All MCs	8	5	8	5	0.601	7.1	LOS A	5.5	43.7	0.7	0.61	0.73	54.3
2	T1	All MCs	1373	7	1373	7	0.601	7.8	LOS A	5.5	44	0.72	0.63	0.76	58.9
3	R2	All MCs	69	5	69	5	0.601	14.2	LOS B	5.5	44	0.74	0.67	0.8	53.6
Approach			1451	6.9	1451	6.9	0.601	8.1	LOS A	5.5	44	0.72	0.64	0.76	58.7
East: Ashley Rd															
4	L2	All MCs	35	5	35	5	0.313	7.2	LOS A	1.4	11.1	0.74	0.86	0.76	50.7
5	T1	All MCs	1	5	1	5	0.313	6.9	LOS A	1.4	11.1	0.74	0.86	0.76	41.9
6	R2	All MCs	153	5	153	5	0.313	12.4	LOS B	1.4	11.1	0.74	0.86	0.76	45.7
Approach			188	5	188	5	0.313	11.4	LOS B	1.4	11.1	0.74	0.86	0.76	46.8
North: Pinjar Rd															
7	L2	All MCs	311	5	311	5	0.539	5.1	LOS A	5.3	42	0.37	0.43	0.37	53
8	T1	All MCs	1136	7	1136	7	0.539	5.4	LOS A	5.3	42	0.38	0.46	0.38	59.4
9	R2	All MCs	200	5	200	5	0.539	11.3	LOS B	5.2	41.2	0.4	0.48	0.4	50.8
Approach			1646	6.4	1646	6.4	0.539	6.1	LOS A	5.3	42	0.38	0.45	0.38	57.5
West: Ashley Rd															
10	L2	All MCs	178	5	178	5	0.438	10.4	LOS B	2.4	18.4	0.85	0.95	1.02	47.5
11	T1	All MCs	1	5	1	5	0.438	10.2	LOS B	2.4	18.4	0.85	0.95	1.02	42
12	R2	All MCs	6	5	6	5	0.438	15.7	LOS B	2.4	18.4	0.85	0.95	1.02	50.4
Approach			185	5	185	5	0.438	10.6	LOS B	2.4	18.4	0.85	0.95	1.02	47.6
All Vehicles			3471	6.4	3471	6.4	0.601	7.5	LOS A	5.5	44	0.57	0.58	0.59	57

C.2.2 Pinjar Road / Caporn Street

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Pinjar Rd															
1	L2	All MCs	82	5	82	5	0.837	28	LOS C	13.9	110.7	1	1.31	1.92	35.3
2	T1	All MCs	797	7	797	7	0.837	25.3	LOS C	17.3	137.8	1	1.31	1.89	45.3
3	R2	All MCs	311	7	311	7	0.837	29.5	LOS C	17.3	137.8	1	1.31	1.86	42.4
Approach			1189	6.9	1189	6.9	0.837	26.5	LOS C	17.3	137.8	1	1.31	1.88	44.1
East: Caporn St															
4	L2	All MCs	165	13.4	165	13.4	0.338	10.9	LOS B	2.1	17.6	0.83	0.77	0.83	50.3
5	T1	All MCs	116	5	116	5	0.9	28.5	LOS C	19.6	164.9	1	1.41	2.23	35.1
6	R2	All MCs	578	13.4	578	13.4	0.9	36.2	LOS D	19.6	164.9	1	1.41	2.23	43.2
Approach			859	12.3	859	12.3	0.9	30.3	LOS C	19.6	164.9	0.97	1.29	1.96	43.3
North: Pinjar Rd															
7	L2	All MCs	521	7	521	7	0.503	5.7	LOS A	4.2	33.7	0.76	0.61	0.76	55.5
8	T1	All MCs	600	7	600	7	0.502	4.6	LOS A	4.6	36.9	0.73	0.48	0.73	54.2
9	R2	All MCs	88	5	88	5	0.502	11.3	LOS B	4.6	36.9	0.73	0.48	0.73	50.5
Approach			1209	6.9	1209	6.9	0.503	5.5	LOS A	4.6	36.9	0.74	0.54	0.74	54.5
West: Hollosy Way															
10	L2	All MCs	76	5	76	5	0.385	15.7	LOS B	2.5	19.1	0.95	0.95	1.09	45.2
11	T1	All MCs	20	5	20	5	0.385	15	LOS B	2.5	19.1	0.95	0.95	1.09	42.2
12	R2	All MCs	29	5	29	5	0.385	21.5	LOS C	2.5	19.1	0.95	0.95	1.09	39.2
Approach			125	5	125	5	0.385	17	LOS B	2.5	19.1	0.95	0.95	1.09	43.6
All Vehicles			3383	8.2	3383	8.2	0.9	19.6	LOS B	19.6	164.9	0.9	1.01	1.47	47.3

C.2.3 Pinjar Road / Caporn Street - Upgraded

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
South: Pinjar Rd															
1	L2	All MCs	82	5	82	5	0.771	13	LOS B	7.8	62	0.95	1.04	1.43	44.1
2	T1	All MCs	797	7	797	7	0.771	11.9	LOS B	8.6	68.8	0.95	1.03	1.41	51.5
3	R2	All MCs	311	7	311	7	0.771	17.6	LOS B	8.6	68.8	0.96	1.02	1.39	48.8
Approach			1189	6.9	1189	6.9	0.771	13.4	LOS B	8.6	68.8	0.96	1.03	1.41	50.5
East: Caporn St															
4	L2	All MCs	165	13.4	165	13.4	0.482	12.1	LOS B	3.7	30.6	0.89	0.82	1.02	49.9
5	T1	All MCs	116	5	116	5	0.482	11.4	LOS B	3.7	30.6	0.89	0.82	1.02	48.9
6	R2	All MCs	578	13.4	578	13.4	0.759	24.4	LOS C	10.5	89.9	1	1.05	1.54	47.5
Approach			859	12.3	859	12.3	0.759	20.3	LOS C	10.5	89.9	0.96	0.98	1.37	48
North: Pinjar Rd															
7	L2	All MCs	521	7	521	7	0.501	5.7	LOS A	4.2	33.4	0.75	0.6	0.75	55.5
8	T1	All MCs	600	7	600	7	0.501	4.6	LOS A	4.6	36.5	0.73	0.48	0.73	54.2
9	R2	All MCs	88	5	88	5	0.501	11.3	LOS B	4.6	36.5	0.73	0.48	0.73	50.5
Approach			1209	6.9	1209	6.9	0.501	5.5	LOS A	4.6	36.5	0.74	0.54	0.74	54.5
West: Hollosy Way															
10	L2	All MCs	76	5	76	5	0.365	14.3	LOS B	2.3	17.6	0.94	0.93	1.05	46
11	T1	All MCs	20	5	20	5	0.365	13.7	LOS B	2.3	17.6	0.94	0.93	1.05	43.2
12	R2	All MCs	29	5	29	5	0.365	20.1	LOS C	2.3	17.6	0.94	0.93	1.05	40
Approach			125	5	125	5	0.365	15.6	LOS B	2.3	17.6	0.94	0.93	1.05	44.4
All Vehicles			3383	8.2	3383	8.2	0.771	12.4	LOS B	10.5	89.9	0.88	0.84	1.15	51.1

C.2.4 Caporn Street / Wells Street – Stage 1

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
South: Median Storage															
5	T1	All MCs	100	5	100	5	0.144	3.8	LOS A	0.5	3.9	0.56	0.56	0.56	44.1
Approach			100	5	100	5	0.144	3.8	LOS A	0.5	3.9	0.56	0.56	0.56	44.1
North: Wells St															
1	L2	All MCs	100	5	100	5	0.09	7.2	LOS A	0.4	2.8	0.42	0.63	0.42	54.9
2	T1	All MCs	78	5	78	5	0.153	13.9	LOS B	0.5	4.1	0.64	1.01	0.64	43
Approach			178	5	178	5	0.153	10.1	LOS B	0.5	4.1	0.52	0.8	0.52	51.5
West: Caporn St (EB)															
3	L2	All MCs	180	5	180	5	0.142	7.1	LOS A	0.6	4.7	0.23	0.56	0.23	53.4
4	T1	All MCs	700	13.4	700	13.4	0.207	6.5	LOS A	0	0	0	0.61	0	54.8
Approach			880	11.7	880	11.7	0.207	6.6	LOS A	0.6	4.7	0.05	0.6	0.05	54.6
All Vehicles			1158	10.1	1158	10.1	0.207	6.9	NA	0.6	4.7	0.16	0.62	0.16	53.6

C.2.5 Caporn Street / Wells Street – Stage 2

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
East: Caporn St (WB)															
2	T1	All MCs	809	13.4	809	13.4	0.24	0.1	LOS A	0	0	0	0	0	69.8
3	R2	All MCs	100	5	100	5	0.057	6.4	LOS A	0	0	0	0.66	0	60.1
Approach			909	12.5	909	12.5	0.24	0.8	NA	0	0	0	0.07	0	69.1
North: Median Storage															
1	R2	All MCs	78	5	78	5	0.137	5.7	LOS A	0.4	3.3	0.62	0.71	0.62	44.9
Approach			78	5	78	5	0.137	5.7	LOS A	0.4	3.3	0.62	0.71	0.62	44.9
All Vehicles			987	11.9	987	11.9	0.24	1.2	NA	0.4	3.3	0.05	0.12	0.05	67.8

C.2.6 Caporn Street / Garden Park Drive

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Garden Park Dr															
1	L2	All MCs	195	5.6	195	5.6	0.701	8.9	LOS A	5.6	43.3	0.82	0.94	1.14	50.6
2	T1	All MCs	253	5.6	253	5.6	0.701	8.6	LOS A	5.6	43.3	0.82	0.94	1.14	44.1
3	R2	All MCs	91	5.6	91	5.6	0.701	14.1	LOS B	5.6	43.3	0.82	0.94	1.14	47.4
Approach			538	5.6	538	5.6	0.701	9.6	LOS A	5.6	43.3	0.82	0.94	1.14	47.1
East: Caporn St															
4	L2	All MCs	229	5.6	229	5.6	0.373	5.7	LOS A	2.9	24.2	0.52	0.5	0.52	51.8
5	T1	All MCs	647	13.4	647	13.4	0.373	6.4	LOS A	2.9	24.2	0.53	0.52	0.53	56.4
6	R2	All MCs	73	5.6	73	5.6	0.373	12.2	LOS B	2.8	23.6	0.55	0.54	0.55	50.5
Approach			949	10.9	949	10.9	0.373	6.7	LOS A	2.9	24.2	0.53	0.52	0.53	55
North: Garden Park Dr															
7	L2	All MCs	469	5.6	469	5.6	0.8	14.2	LOS B	7.9	61.9	0.93	1.14	1.55	45.3
8	T1	All MCs	35	5.6	35	5.6	0.8	14	LOS B	7.9	61.9	0.93	1.14	1.55	41.7
9	R2	All MCs	11	5.6	11	5.6	0.8	19.5	LOS B	7.9	61.9	0.93	1.14	1.55	47.5
Approach			515	5.6	515	5.6	0.8	14.3	LOS B	7.9	61.9	0.93	1.14	1.55	45.1
West: Caporn St															
10	L2	All MCs	21	5.6	21	5.6	0.36	6.8	LOS A	2.8	23.9	0.7	0.59	0.7	53.4
11	T1	All MCs	558	13.4	558	13.4	0.36	7.6	LOS A	2.8	23.9	0.71	0.61	0.71	56.7
12	R2	All MCs	164	5.6	164	5.6	0.36	13.6	LOS B	2.6	21.4	0.72	0.66	0.72	51.8
Approach			743	11.5	743	11.5	0.36	8.9	LOS A	2.8	23.9	0.71	0.62	0.71	55.4
All Vehicles			2745	9	2745	9	0.8	9.3	LOS A	7.9	61.9	0.71	0.75	0.89	51.6

C.2.7 Caporn Street / Honey Street

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Honey St															
1	L2	All MCs	80	5	80	5	0.348	6.9	LOS A	1.8	13.5	0.76	0.82	0.8	48.8
2	T1	All MCs	61	5	61	5	0.348	6.6	LOS A	1.8	13.5	0.76	0.82	0.8	44.7
3	R2	All MCs	67	5	67	5	0.348	12.1	LOS B	1.8	13.5	0.76	0.82	0.8	48.3
Approach			208	5	208	5	0.348	8.5	LOS A	1.8	13.5	0.76	0.82	0.8	47.4
East: Caporn St															
4	L2	All MCs	80	5	80	5	0.444	6.8	LOS A	3.6	30.5	0.71	0.6	0.71	51
5	T1	All MCs	606	13.4	606	13.4	0.444	7.6	LOS A	3.6	30.5	0.72	0.62	0.72	54.6
6	R2	All MCs	276	5	276	5	0.444	13.6	LOS B	3.4	27.3	0.73	0.67	0.73	48.9
Approach			962	10.3	962	10.3	0.444	9.3	LOS A	3.6	30.5	0.72	0.63	0.72	52.5
North: Honey St															
7	L2	All MCs	61	5	61	5	0.53	8.9	LOS A	3.6	27.6	0.83	0.92	1.03	46.4
8	T1	All MCs	1	5	1	5	0.53	8.7	LOS A	3.6	27.6	0.83	0.92	1.03	42.5
9	R2	All MCs	262	5	262	5	0.53	14.2	LOS B	3.6	27.6	0.83	0.92	1.03	45.6
Approach			324	5	324	5	0.53	13.2	LOS B	3.6	27.6	0.83	0.92	1.03	45.7
West: Caporn St															
10	L2	All MCs	336	5	336	5	0.518	7.1	LOS A	4.5	36.3	0.75	0.62	0.75	50.9
11	T1	All MCs	654	13.4	654	13.4	0.518	8.4	LOS A	4.5	36.3	0.76	0.66	0.78	54.3
12	R2	All MCs	128	5	128	5	0.518	14.3	LOS B	4.4	36.2	0.78	0.68	0.81	49.2
Approach			1118	9.9	1118	9.9	0.518	8.7	LOS A	4.5	36.3	0.76	0.65	0.78	52.7
All Vehicles			2613	9.1	2613	9.1	0.53	9.4	LOS A	4.5	36.3	0.75	0.69	0.79	51.2

C.2.8 Caporn Street / Franklin Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	866	14.1	866	14.1	0.714	6.6	LOS A	8.5	73.1	0.68	0.53	0.68	54.8
2	T1	All MCs	1032	14.1	1032	14.1	0.714	6.3	LOS A	8.6	74.2	0.61	0.5	0.61	54.7
3	R2	All MCs	67	14.1	67	14.1	0.714	12.1	LOS B	8.6	74.2	0.61	0.5	0.61	50.1
Approach			1965	14.1	1965	14.1	0.714	6.6	LOS A	8.6	74.2	0.64	0.51	0.64	54.6
East: Caporn St															
4	L2	All MCs	34	13.4	34	13.4	0.168	7.1	LOS A	0.8	6.6	0.72	0.76	0.72	47.1
5	T1	All MCs	32	13.4	32	13.4	0.168	6.8	LOS A	0.8	6.6	0.72	0.76	0.72	47.8
6	R2	All MCs	29	13.4	29	13.4	0.168	12.3	LOS B	0.8	6.6	0.72	0.76	0.72	45.7
Approach			95	13.4	95	13.4	0.168	8.6	LOS A	0.8	6.6	0.72	0.76	0.72	46.9
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	0.393	8	LOS A	2.2	19.2	0.72	0.71	0.74	49.7
8	T1	All MCs	531	14.1	531	14.1	0.393	8	LOS A	2.3	20	0.71	0.69	0.72	53.6
9	R2	All MCs	65	14.1	65	14.1	0.393	13.5	LOS B	2.3	20	0.71	0.67	0.71	51.7
Approach			625	14.1	625	14.1	0.393	8.6	LOS A	2.3	20	0.71	0.69	0.72	53.2
West: Caporn St															
10	L2	All MCs	85	13.4	85	13.4	0.452	22.4	LOS C	2.9	24.8	0.93	0.96	1.15	45.1
11	T1	All MCs	46	13.4	46	13.4	0.452	22.1	LOS C	2.9	24.8	0.93	0.96	1.15	43.5
12	R2	All MCs	701	13.4	701	13.4	1.525	504.3	LOS F	161.4	1378.1	1	5.88	14.87	6.9
Approach			833	13.4	833	13.4	1.525	428.2	LOS F	161.4	1378.1	0.99	5.1	12.7	7.9
All Vehicles			3518	13.9	3518	13.9	1.525	106.8	LOS F	161.4	1378.1	0.74	1.64	3.51	22.1



C.2.9 Caporn Street / Franklin Road – Upgraded Option 1

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	866	14.1	866	14.1	0.715	6.6	LOS A	8.6	73.8	0.68	0.53	0.68	54.8
2	T1	All MCs	1032	14.1	1032	14.1	0.715	6.3	LOS A	8.7	75.1	0.62	0.5	0.62	54.6
3	R2	All MCs	67	14.1	67	14.1	0.715	12.1	LOS B	8.7	75.1	0.62	0.5	0.62	50.1
Approach			1965	14.1	1965	14.1	0.715	6.6	LOS A	8.7	75.1	0.65	0.52	0.65	54.5
East: Caporn St															
4	L2	All MCs	34	13.4	34	13.4	0.178	6.9	LOS A	0.8	6.5	0.72	0.8	0.72	47.2
5	T1	All MCs	32	13.4	32	13.4	0.178	6.6	LOS A	0.8	6.5	0.72	0.8	0.72	47.9
6	R2	All MCs	29	13.4	29	13.4	0.178	12.1	LOS B	0.8	6.5	0.72	0.8	0.72	45.8
Approach			95	13.4	95	13.4	0.178	8.4	LOS A	0.8	6.5	0.72	0.8	0.72	47
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	0.465	9.5	LOS A	2.7	23	0.79	0.83	0.9	49.3
8	T1	All MCs	531	14.1	531	14.1	0.465	9.3	LOS A	2.9	24.6	0.79	0.81	0.89	53.2
9	R2	All MCs	65	14.1	65	14.1	0.465	14.6	LOS B	2.9	24.6	0.79	0.8	0.88	51.2
Approach			625	14.1	625	14.1	0.465	9.8	LOS A	2.9	24.6	0.79	0.81	0.89	52.7
West: Caporn St															
10	L2	All MCs	85	13.4	85	13.4	1.026	98.9	LOS F	32.3	276.2	1	2.24	4.52	22.8
11	T1	All MCs	46	13.4	46	13.4	1.026	98.8	LOS F	32.3	276.2	1	2.24	4.52	23
12	R2	All MCs	701	13.4	701	13.4	1.026	108.1	LOS F	32.3	276.2	1	2.15	4.38	22.9
Approach			833	13.4	833	13.4	1.026	106.7	LOS F	32.3	276.2	1	2.17	4.4	22.9
All Vehicles			3518	13.9	3518	13.9	1.026	30.9	LOS C	32.3	276.2	0.76	0.97	1.58	40.3

C.2.10 Caporn Street / Franklin Road – Upgraded Option 2

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	866	14.1	866	14.1	0.547	4.7	LOS A	0	0	0	0.47	0	57.8
2	T1	All MCs	1032	14.1	1032	14.1	0.403	5.9	LOS A	3.2	27.5	0.43	0.46	0.43	55.7
3	R2	All MCs	67	14.1	67	14.1	0.403	11.6	LOS B	3.2	27.5	0.41	0.47	0.41	50.9
Approach			1965	14.1	1965	14.1	0.547	5.6	LOS A	3.2	27.5	0.24	0.47	0.24	56.4
East: Caporn St															
4	L2	All MCs	34	13.4	34	13.4	0.172	6.9	LOS A	0.7	6.2	0.71	0.79	0.71	47.2
5	T1	All MCs	32	13.4	32	13.4	0.172	6.6	LOS A	0.7	6.2	0.71	0.79	0.71	47.9
6	R2	All MCs	29	13.4	29	13.4	0.172	12.1	LOS B	0.7	6.2	0.71	0.79	0.71	45.8
Approach			95	13.4	95	13.4	0.172	8.4	LOS A	0.7	6.2	0.71	0.79	0.71	47
North: Franklin Rd															
7	L2	All MCs	29	14.1	29	14.1	0.451	9.5	LOS A	2.5	21.9	0.77	0.83	0.88	49.4
8	T1	All MCs	531	14.1	531	14.1	0.451	9.2	LOS A	2.7	23.3	0.77	0.81	0.86	53.2
9	R2	All MCs	65	14.1	65	14.1	0.451	14.5	LOS B	2.7	23.3	0.77	0.79	0.85	51.3
Approach			625	14.1	625	14.1	0.451	9.8	LOS A	2.7	23.3	0.77	0.81	0.86	52.8
West: Caporn St															
10	L2	All MCs	85	13.4	85	13.4	0.678	13.4	LOS B	5.3	45.1	0.87	1.03	1.29	48.4
11	T1	All MCs	46	13.4	46	13.4	0.678	13.3	LOS B	5.3	45.1	0.87	1.03	1.29	46.4
12	R2	All MCs	701	13.4	701	13.4	0.678	20.9	LOS C	5.3	45.1	0.87	1.05	1.31	46.8
Approach			833	13.4	833	13.4	0.678	19.7	LOS B	5.3	45.1	0.87	1.05	1.3	46.9
All Vehicles			3518	13.9	3518	13.9	0.678	9.7	LOS A	5.3	45.1	0.5	0.67	0.62	52.8

C.2.11 Caporn Street / Primary School Road

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flow s		Arrival Flow s		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Franklin Rd															
1	L2	All MCs	205	5	205	5	0.39	5.5	LOS A	3	24.4	0.41	0.46	0.41	51.4
2	T1	All MCs	717	14.1	717	14.1	0.39	5.8	LOS A	3	25.3	0.39	0.48	0.39	55.1
3	R2	All MCs	182	5	182	5	0.39	11.3	LOS B	3	25.3	0.38	0.5	0.38	50
Approach			1104	10.9	1104	10.9	0.39	6.6	LOS A	3	25.3	0.39	0.48	0.39	53.5
East: Primary School Rd															
4	L2	All MCs	89	5	89	5	0.206	4.5	LOS A	0.9	7	0.55	0.55	0.55	50.2
5	T1	All MCs	79	5	79	5	0.206	4.3	LOS A	0.9	7	0.55	0.55	0.55	46.4
6	R2	All MCs	8	5	8	5	0.206	9.7	LOS A	0.9	7	0.55	0.55	0.55	50.1
Approach			177	5	177	5	0.206	4.6	LOS A	0.9	7	0.55	0.55	0.55	48.4
North: Franklin Rd															
7	L2	All MCs	17	5	17	5	0.211	6.6	LOS A	1.3	10.7	0.56	0.56	0.56	51.3
8	T1	All MCs	429	14.1	429	14.1	0.211	6.9	LOS A	1.3	11.3	0.55	0.55	0.55	55
9	R2	All MCs	32	5	32	5	0.211	12.1	LOS B	1.3	11.3	0.54	0.55	0.54	50.6
Approach			478	13.2	478	13.2	0.211	7.2	LOS A	1.3	11.3	0.55	0.55	0.55	54.5
West: Primary School Rd															
10	L2	All MCs	16	5	16	5	0.284	6.6	LOS A	1.4	10.7	0.71	0.77	0.71	48.2
11	T1	All MCs	67	5	67	5	0.284	6.4	LOS A	1.4	10.7	0.71	0.77	0.71	44.2
12	R2	All MCs	105	5	105	5	0.284	11.9	LOS B	1.4	10.7	0.71	0.77	0.71	46.8
Approach			188	5	188	5	0.284	9.5	LOS A	1.4	10.7	0.71	0.77	0.71	46
All Vehicles			1947	10.4	1947	10.4	0.39	6.9	LOS A	3	25.3	0.48	0.53	0.48	52.4

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