Redmond Place Masterplan

Traffic and Transport Assessment

Landcom

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1. Introduction

1.1 Project description

Landcom and Orange City Council have signed a Project Delivery Agreement to deliver the Redmond Place Project (the project). The Site is owned by Orange City Council, and Landcom are taking the lead in preparing a planning proposal to amend the Orange Local Environmental Plan 2011 (LEP) to rezone the Site for residential uses.

The key objectives of the project are:

– Supply – increase the supply of land to facilitate housing.
– Diversity – promote housing diversity.
– Affordability – increase the supply of land for affordable housing by delivering at least 20 percent of all residential dwellings for affordable housing.
– Sustainability – develop a climate resilient, healthy and inclusive place, at the forefront of environmental and social sustainability.

The urban design approach for the project focuses on socio-economic activation, innovative sustainability solutions and urban vibrancy through place-making. The master plan for the future new community of Redmond Place will be based on a landscape-led approach to urban design, informed by the unique qualities of the Site and Connecting with Country principles. A thorough community and stakeholder engagement process, including community workshops, a Walk on Country and indigenous stakeholder interviews, will also inform the urban design process.

1.2 Site information

The Site is located on the southeast fringe of Orange, the largest city in the Central West Region. It is adjacent to the suburb of Glenroi, 4.4 kilometres from Orange City Centre and approximately 3.2 kilometres from Orange Train Station.

The Site has a significant frontage along Bathurst Road (previously referred to as the Mitchell Highway), which runs from east to west from the M4 Motorway in Greater Sydney, connecting through Penrith, Katoomba, Bathurst to Orange (refer to Figure 1.1). The Site has additional frontage to Lone Pine Avenue (to the west) and Dairy Creek Road (to the south).

The Site is surrounded by a mixture of land uses with low density residential to the west, retail and large format retail to the north, rural farmland to the south and east, as well as a kart racing track 250 metres north of Bathurst Road.

The Site is approximately 24.2 hectares in size and is currently vacant, except for a structure that previously housed an emergency services helicopter hangar.

Figure 1.1 The Site

Source: Oculus - Redmond Place, Orange Concept Options Report

The Site comprises three lots, as detailed in Table 1.1

Table 1.1 Lots comprising the Site

Legal description	Address	Area
Lot 1 DP 153167	154 Lone Pine Avenue	4.10 ha
Lot 6 DP 1031236	3 Redmond Place	2.28 ha
Lot 200 DP 1288388	5255 Bathurst Road	17.85 ha
Total		24.23 ha

1.3 The planning proposal

The planning proposal is to amend *Orange Local Environmental Plan 2011* to rezone the Site to facilitate delivery of a residential precinct in accordance with the Redmond Place Masterplan.

The objectives of the Masterplan (as detailed in the Redmond Place Orange Concept Options Report) are to:

– Increase the supply of land to facilitate housing through the creation of lots to support a sustainable, innovative, and affordable community.
– Promote housing diversity by supporting a diverse mix of houses and townhouses.
– Increase the supply of land for affordable housing by delivering at least 20 percent of all residential dwellings for affordable housing managed by a community housing provider.

– Develop a climate resilient, healthy and inclusive place, at the forefront of environmental and social sustainability.

1.4 Purpose of this report

GHD has been commissioned by Landcom to conduct a Traffic and Transport Assessment (TTA) for the Redmond Place Masterplan including modelling for potential impacts of the development of the road network after completion of construction.

The results of the TTA aim to inform the recommendations for the development of the masterplan for the Site in relation to access and egress points as well as the suitability of the surrounding road network to accommodate the increased traffic generation at the Site.

Additionally, observations and recommendations regarding the suitability of the proposed public and active transport links in the masterplan have been provided.

1.5 Scope and limitations

The scope of the assessment includes the following tasks:

– A literature review of relevant local and state government planning documents, policies and strategic documents to be provided by Landcom and Orange City Council (OCC).
– A desktop review of existing facilities in proximity to the Site, including public and active transport services.
– Traffic surveys at key intersections near the Site.
– SIDRA intersection modelling, including a base model (current year) and future year models (for both With Development scenarios and No Development scenario)
    - The assessment will use seven intersection models in SIDRA for analysis in the base model and “No Development” scenarios.
    - The With Development scenarios will use the seven intersection locations as per the other models with the addition of the proposed access and egress points to the Site.
    - The SIDRA assessment is limited to analysis of the external surrounding road network.
– An assessment of proposed active and public transport facilities will be undertaken but is limited to guidance and comments based on the proposed facilities on the basis of NSW standards and is not included in the modelling.

The following assumptions have been made in preparation of this assessment:

– The intersection configurations, as per the aerial imagery, are accurate to on-ground conditions.
– The traffic survey data gathered is indicative of typical road network performance, including typical queue lengths.
– All information gathered in the desktop assessment is accurate to current conditions if imagery or maps have been updated within the last two-year period.

This report: has been prepared by GHD for Landcom and may only be used and relied on by Landcom for the purpose agreed between GHD and Landcom as set out in this report.

GHD otherwise disclaims responsibility to any person other than Landcom arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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GHD has prepared the 12630195_Redmond Place Masterplan_SIDRA Model.sip9 ("Model") for, and for the benefit and sole use of, Landcom to support the assessment of possible impacts on the surrounding road network relating to development at the Site and must not be used for any other purpose or by any other person.

The Model is a representation only and does not reflect reality in every aspect. The Model contains simplified assumptions to derive a modelled outcome. The actual variables will inevitably be different to those used to prepare the Model. Accordingly, the outputs of the Model cannot be relied upon to represent actual conditions without due consideration of the inherent and expected inaccuracies. Such considerations are beyond GHD's scope.

The information, data and assumptions ("Inputs") used as inputs into the Model are from publicly available sources or provided by or on behalf of the Landcom, (including possibly through stakeholder engagements). GHD has not independently verified or checked Inputs beyond its agreed scope of work. GHD's scope of work does not include review or update of the Model as further Inputs becomes available.

The Model is limited by the mathematical rules and assumptions that are set out in the Report or included in the Model and by the software environment in which the Model is developed.

The Model is a customised model and not intended to be amended in any form or extracted to other software for amending. Any change made to the Model, other than by GHD, is undertaken on the express understanding that GHD is not responsible, and has no liability, for the changed Model including any outputs.

1.6 Definitions/ explanations of common terms

- **Low density housing** is single detached dwellings and secondary dwellings.
- **Medium density housing** includes a range of housing forms, including dual occupancies, townhouses, terraces and manor housing. This is sometimes also referred to as low rise housing.
- **Residential flat buildings** are buildings which include three or more dwellings where some dwellings do not have access at ground level.
- **Shop-top housing** is a form of development where one or more dwellings are located above the ground floor level and at least the ground floor is used for commercial premises or health services facilities.
- **Affordable Housing** is housing for low to moderate income households.

1.7 Engagement

GHD engaged with stakeholders throughout the preparation of the assessment, including meetings with Landcom and OCC on the 12th February 2024 as well as Landcom, OCC and Transport for NSW (TfNSW) on the 3rd April 2024. Some key items that were discussed and agreed in these meetings include:

- The location and timing of the traffic surveys (refer to Section 2.5.1).
- Proposed upgrades to the adjoining road network (refer to Section 3.1).
- TfNSW/OCC model data that is available to support the TTA (refer to Section 3.3).
- Trip generation rates (refer to Section 4.1).
- The trip distribution methodology (refer to Section 4.2).

The meeting minutes are provided in Appendix C.

1.8 Report structure

This report follows the following structure:

- **Section 1** – Introduction including project background, scope of the study, limitations and assumptions
- **Section 2** – Existing conditions assessment, including a desktop assessment of the road network hierarchy, public and active transport facilities, freight permissions and crash history in proximity to the Site, as well as analysis of the base year (2024) SIDRA models.
- **Section 3 –** Identification and analysis of future land use in proximity to the Site location, including the land use changes proposed in the masterplan for the Redmond Place Site
- **Section 4** – Traffic generation and trip distribution for the future year scenarios based on the expected development on the Site.
- **Section 5** – Future year scenario analysis for both with and without the expected development at the Site location
- **Section 6** – Summary of the traffic and transport assessment conducted and recommendations for any potential road network upgrades recommended as a result of development at the Site location.

2. Existing conditions

2.1 Road network

2.1.1 Functional hierarchy

Functional road classification involves the relative balance of mobility and access functions. TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility to high accessibility and low mobility. These road classes are:

- **Arterial Roads:** generally controlled by TfNSW. They typically have no limit in flow and are designed to carry vehicles long distances between regional centres.
- **Sub-Arterial Roads:** can be managed by either TfNSW or the local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub-region or provide connectivity from arterial road routes (regional links).
- **Collector Roads:** provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads:** provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

2.1.2 Road network classifications

The road network classifications for the area around the Site are shown in Figure 2.1, with the following breakdown of roads identified:

- State roads:
  - Bathurst Road
- Local roads:
  - Dairy Creek Road
  - Lone Pine Avenue
  - Redmond Place
  - All other roads around the Site location

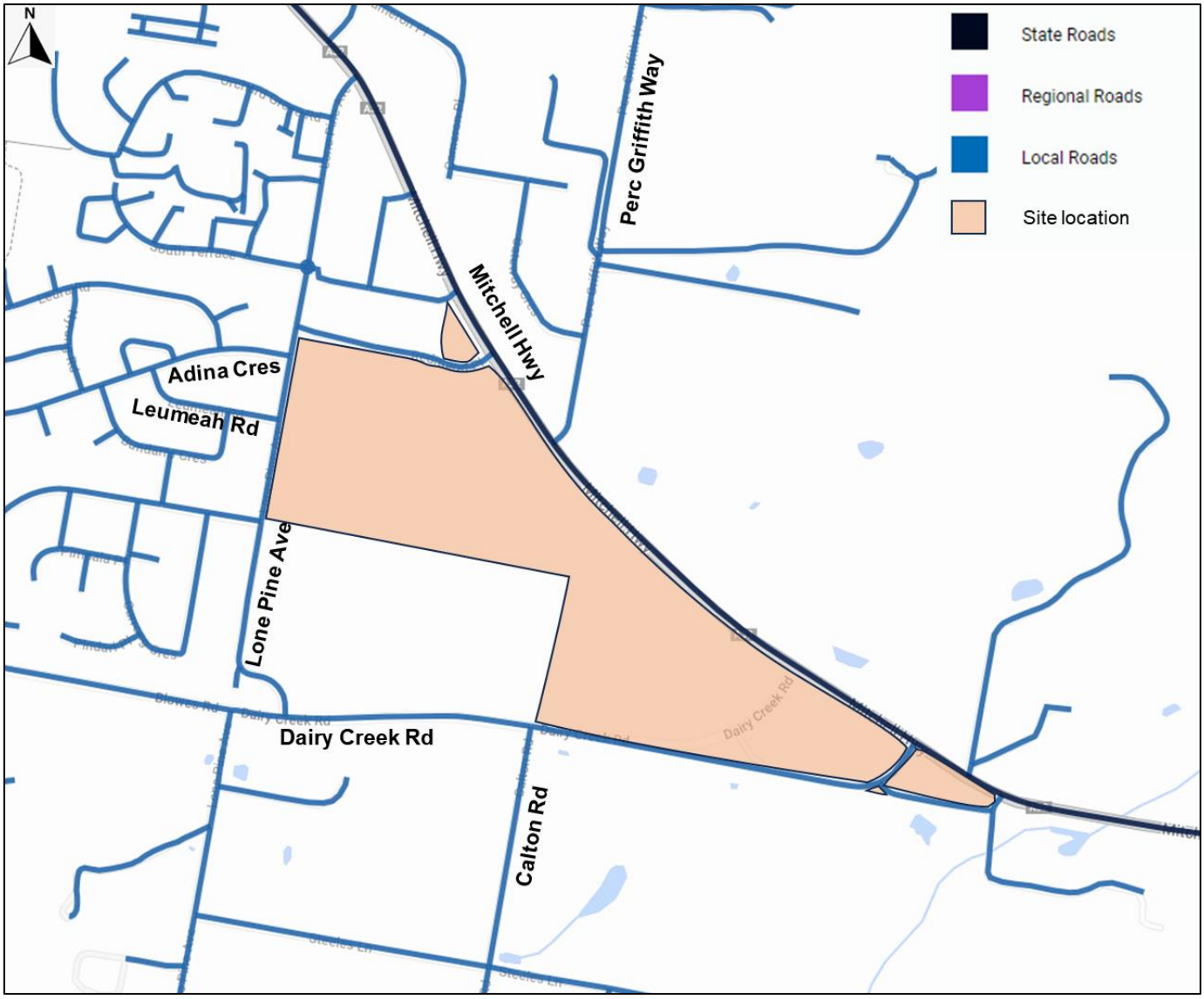

Figure 2.1 Road network classifications in proximity to the Site

Source: TfNSW NSW Road Network Classifications (modified by GHD)

2.1.3 Key road features

The road characteristics of key roads in the vicinity of the Site are outlined below.

Bathurst Road

Bathurst Road (refer to Figure 2.2), previously referred to as the Mitchell Highway, is a state road/sub-arterial road that provides a connection between Dubbo and Bathurst via Orange. The key features of Bathurst Road in the vicinity of the Site are outlined in Table 2.1.

Table 2.1 Bathurst Road key features

Feature	Description
Carriageway	The carriageway is sealed with one lane of travel in each direction, and extra short lanes are provided for turning movements at intersection locations. There are no kerbs or gutters provided along the edge of the carriageway. The carriageway is approximately seven metres wide (3.5 metres for each travel lane), with additional space provided by the road shoulders on either side. Line markings are provided along the entire segment in proximity to the Site.

Feature	Description
Parking	No parking is available on the road near the Site location.
Speed Limit	80 km/h
Pedestrian Facilities	No pedestrian facilities are provided along the road near the Site location.
Bicycle Facilities	No dedicated cycling facilities are located along the road in proximity to the Site.
Public Transport	Two bus stops are located approximately 170 metres southeast of the intersection with Dairy Creek Road.

Figure 2.2 Bathurst Road in proximity to the Site

Source: Google Streetview (image captured June 2023)

Dairy Creek Road

Dairy Creek Road (refer to Figure 2.3) is a local road traversing the southern boundary of the Site that provides a connection between Bathurst Road and the western areas of the Orange Township. The key characteristics of Dairy Creek Road are outlined in Table 2.2.

Table 2.2 Dairy Creek Road key features

Feature	Description
Carriageway	The carriageway is sealed with one lane of travel in each direction, and extra short lanes are provided for turning movements at intersection locations. There are no kerbs or gutters provided along the edge of the carriageway. The carriageway is approximately seven metres wide (3.5 metres for each travel lane), with additional space provided by the road shoulders on either side of the road. Line markings are provided along the entire segment in proximity to the Site.
Parking	No parking facilities are provided in proximity to the Site.
Speed Limit	80 km/h
Pedestrian Facilities	No pedestrian facilities are provided near the Site location.
Bicycle Facilities	No dedicated cycling facilities are provided in proximity to the Site.
Public Transport	Two bus stops are located on Dairy Creek Road near Bathurst Road.

Figure 2.3 Dairy Creek Road in proximity to the Site

Source: Google Streetview (image captured May 2023)

Lone Pine Avenue

Lone Pine Avenue (refer to Figure 2.4) is a local road traversing the western boundary of the Site, connecting to established residential areas within the Orange Township. The key characteristics of Lone Pine Avenue are outlined in Table 2.3.

Table 2.3 Lone Pine Avenue key features

Feature	Description
Carriageway	The carriageway is sealed with one lane of travel in each direction. There are kerbs/ gutter provided along the western edge of the carriageway, but no kerb or gutter on the eastern edge. The carriageway is approximately 6.5 metres wide (3.25 metres for each travel lane), with additional space provided by the road shoulders on the eastern side. No line markings are provided along the entire segment in proximity to the Site.
Parking	Parking is provided along the western side of the street.
Speed Limit	50 km/h
Pedestrian Facilities	A footpath is provided along the western side of the road for some segments.
Bicycle Facilities	Lone Pine Avenue is identified as a route for cyclists to use in mixed conditions with other vehicles. No dedicated cycling facilities have been identified.
Public Transport	Two bus stops are located on Lone Pine Avenue, approximately 40 metres north of the intersection with Redmond Place.

Figure 2.4 Lone Pine Avenue near the Site location

Source: Google Streetview (image captured May 2023)

Redmond Place

Redmond Place (refer to Figure 2.5) is a local road connecting to Bathurst Road at the northern boundary of the Site. It currently serves as an access road for deliveries to the local shops at the southern end of the Orange Homemakers Centre. The key characteristics of Redmond Place are outlined in Table 2.4.

Table 2.4 Redmond Place key features

Feature	Description
Carriageway	The carriageway is sealed with one lane of travel in each direction. There are kerbs or gutters provided along the edge of the carriageway. The carriageway is approximately 12.3 metres wide (approximately six metres for each lane) and splits to provide access to a loading dock.
Parking	No parking is available on the road near the Site location.
Speed Limit	50 km/h
Pedestrian Facilities	No pedestrian facilities are provided along the road near the Site location.
Bicycle Facilities	No dedicated cycling facilities are located along the road in proximity to the Site.
Public Transport	No public transport facilities are located on Redmond Place.

Figure 2.5 Redmond Place

Source: Google Streetview (image captured June 2023)

2.2 Crash data

Data from the TfNSW Centre for Road Safety was assessed to identify crashes in proximity to the Site. Recorded incidents were assessed for a five-year period between 2018 and 2022 for up to 500 metres from the Site location. The breakdown of incidents by crash severity and year is presented in Table 2.5.

Table 2.5 Crashes within 500m of the Site by year and crash severity

Year of crash	Non-casualty (towaway)	Minor/ Other Injury	Moderate Injury	Serious Injury	Fatality	Total
2018	0	0	1	1	0	**2**
2019	2	0	2	0	0	**4**
2020	2	0	2	0	0	**4**
2021	0	0	0	0	0	**0**
2022	0	0	2	0	0	**2**
Total	**4**	**0**	**7**	**1**	**0**	**12**

The analysis shows that of the total of 12 incidents recorded, most of which were of a moderate injury severity with one serious injury and four non-casualty (towaway) severity crashes. The locations of the crashes are shown in Figure 2.6.

The serious injury crash was reported at the intersection of Dairy Creek Road and Lone Pine Avenue where the other moderate injury crash (indicated by the blue dot) is reported.

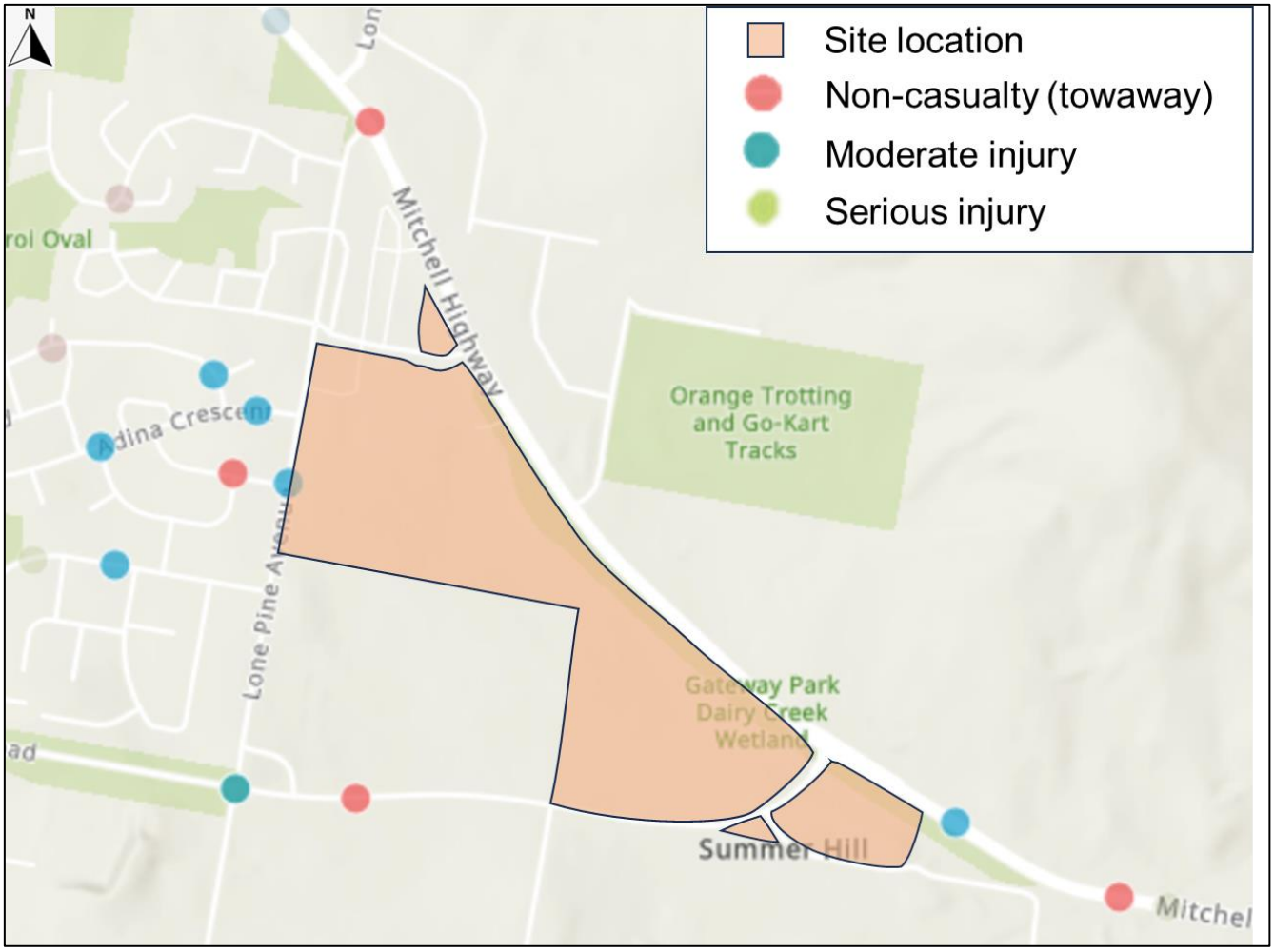

Figure 2.6 Recorded crashes near the Site 2018-2022

Source: NSW Centre for Road Safety (modified by GHD

2.3 Active transport

2.3.1 Cycling facilities

The TfNSW Cycleway finder provides the following definitions for the cycling facilities above:

– **General Roads:** A road where bicycles share space with motor vehicles (Mixed Traffic), buses (Bus Lane) or parked cars (Parking Lane).
– **Road Shoulders:** The edge of a road that has a high-speed limit (High-speed Shoulder) or is for vehicle breakdowns (Emergency Stopping Lane).

A review of the TfNSW Cycleway finder was undertaken to identify any cycleways around the Site location. The following existing facilities were identified, as shown in Figure 2.7:

– General road cycling was identified along Lone Pine Avenue between Bathurst Road and Adina Crescent.
– On street road shoulder cycling along Bathurst Road.

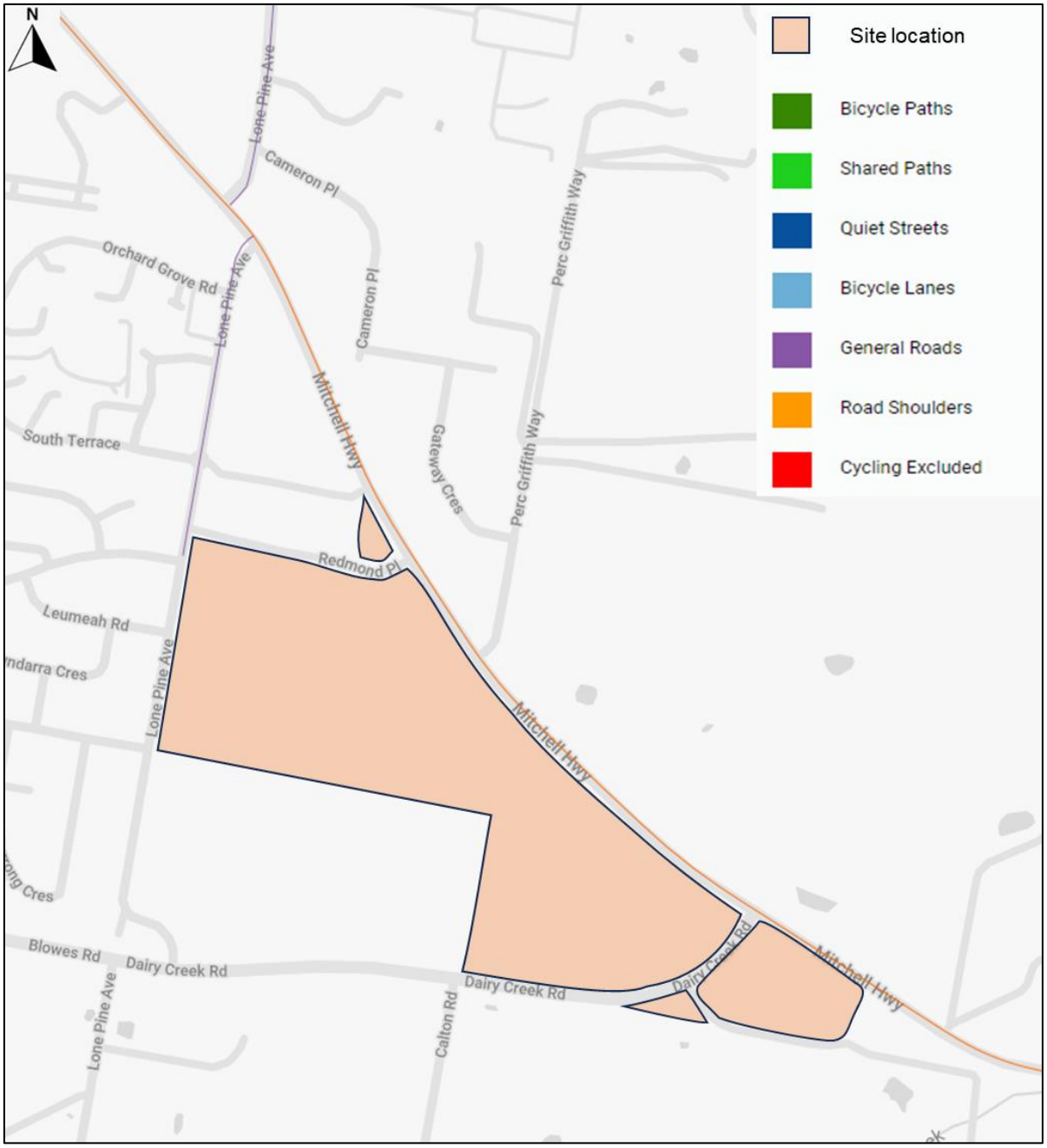

Figure 2.7 Cycleways in vicinity to the Site

Source: TfNSW Cycleway Finder (modified by GHD)

No other dedicated cycling facilities, such as cycle lanes or bicycle paths, were located near the Site.

Additionally, there are no logos or other markings that identify Bathurst Road as being part of a bike route.

2.3.2 Pedestrian facilities

The existing pedestrian facilities in proximity to the Site were assessed using Nearmaps aerial imagery and Google Street View, as follows:

– A footpath along the western side of Lone Pine Avenue between Bathurst Road and Kurim Avenue.
– A footpath along Bathurst Road to the north of Lone Pine Avenue.
– Pedestrian crossings at the signalised intersection of Bathurst Road and Lone Pine Avenue (northwest).

All other roads in proximity to the Site do not have footpaths or other pedestrian facilities present.

2.4 Public transport

The TfNSW trip planner was reviewed to identify the public transport services in the general proximity of the Site. While there is a train station located in the Orange Urban area it is not in close vicinity or walking distance with the Site.

The following bus routes/ services were found in proximity to the Site:

– 530 – Bathurst to Orange
– 530X – Bathurst to Orange
– 531 – Orange City Centre to Glenroi (Loop Service)
– 581 – Orange City Centre to Glenroi (Loop Service)

The routes above in relation to the Site location are shown in Figure 2.8.

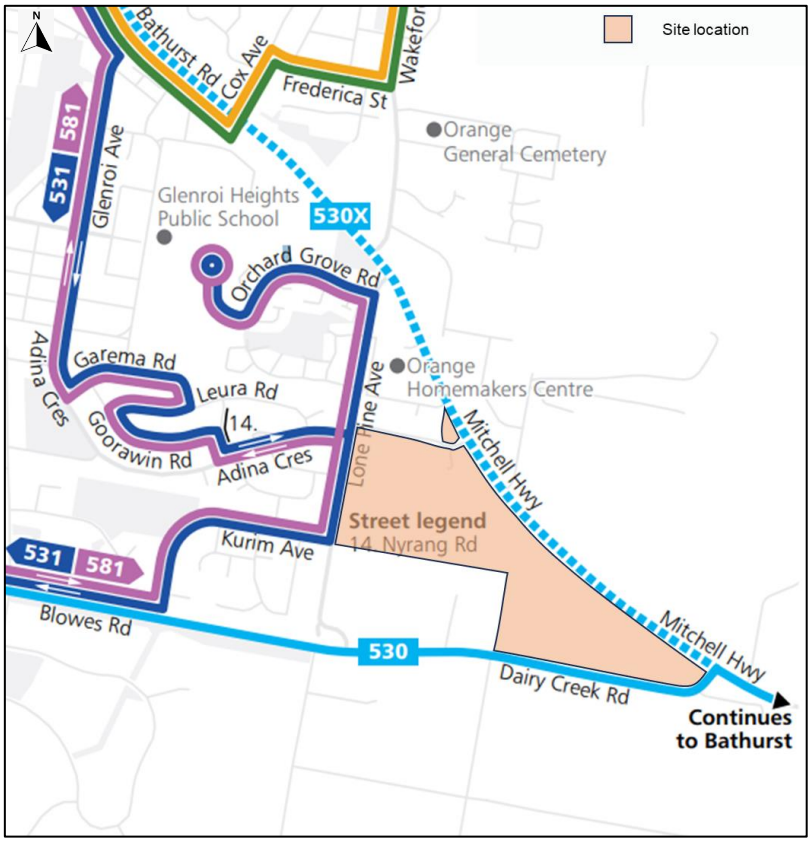

Figure 2.8 Local bus routes in relation to the Site

Source: TfNSW (modified by GHD)

The frequency of services for the weekday AM and PM periods and weekends (as sourced from timetable information) are outlined in Table 2.6.

Table 2.6 Bus service frequency

Route	Direction of service	Weekday services	Number of services		Weekend services
			Weekday AM	Weekday PM	
530	Bathurst to Orange	0	0	0	0
	Orange to Bathurst	1	0	1	0
530X	Bathurst to Orange	1	0	1	0
	Orange to Bathurst	0	0	0	0
531	Orange City Centre to Glenroi (Loop Service)	12	4	8	6
581	Orange City Centre to Glenroi (Loop Service)	10	5	5	5

The analysis of the frequency of services demonstrated that:

– The city loop services are relatively frequent, with 10 – 12 services per day.
– The long-range regional routes between Orange and Bathurst only have one service per day.

2.5 Existing road network performance

2.5.1 Traffic surveys

To obtain baseline data, traffic surveys were undertaken at key intersections around the Site location and included queue length assessments. The traffic surveys were carried out by a subcontractor in Trans Traffic Survey (TTS) with counts conducted at the following intersections (refer to Figure 2.9):

– Dairy Creek Road / Lone Pine Avenue
– Lone Pine Avenue / Adina Crescent
– Lone Pine Avenue / Bathurst Road (northwest)
– Lone Pine Avenue / Bathurst Road (southeast)
– Bathurst Road / Retail Access Road
– Bathurst Road / Perc Griffith Way
– Bathurst Road / Dairy Creek Road

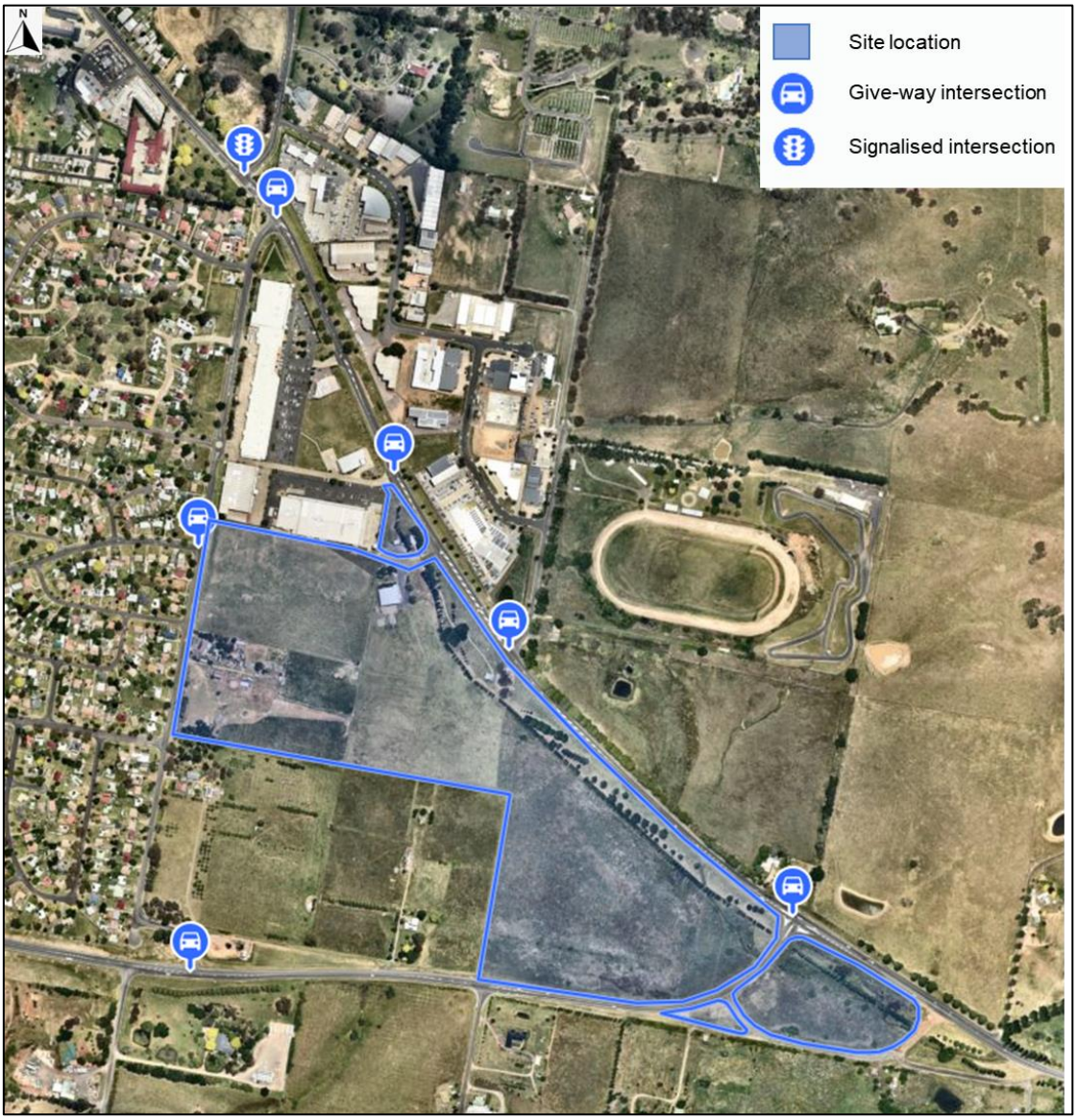

Figure 2.9 Traffic count locations

Source: Nearmap (modified by GHD)

It is noted that the location of the surveys were discussed and agreed upon with Landcom and OCC representatives at the project inception meeting undertaken on the 12th February 2024 (refer to Section 1.7).

The traffic surveys were undertaken for the following peak periods of road network activity:

– 7:00 am – 9:00 am
– 4:00 pm – 6:00 pm

The peak hours of vehicle activity were identified as:

– 8:00 am – 9:00 am
– 4:30 pm - 5:30 pm

It is noted that the intersection of Bathurst Road and Redmond Place was excluded from the traffic surveys, noting:

– Redmond Place primarily provides access to the Amart Furniture loading area.
– Redmond Place does not provide a public connection between Lone Pine Avenue and Bathurst Road.
– Therefore, it was assumed that the vehicle activity at Redmond Place would be negligible.

With respect to the final point, a review of the traffic survey data (refer to Section 2.5.1) of the upstream and downstream flows at the adjoining intersections (i.e. the Retail Access Road/Bathurst Road and Perc Griffith Way/Bathurst Road) indicates that approximately three vehicles enter/exit Redmond Place during peak periods of road network activity.

2.5.2 Existing traffic volumes

The existing peak hour traffic volumes identified from the traffic surveys (as per Section 2.5.1) are outlined in Table 2.7, with a breakdown of volumes by each approach. The traffic data indicates that the highest movement of vehicles occurs along Bathurst Road in proximity to the Lone Pine Avenue intersections.

Table 2.7 Existing Traffic Volumes (2024) – by approach

Intersection	Approach	Total vehicles AM Peak (8:00 am – 9:00 am)	Total vehicles PM Peak (4:30- pm 5:30 pm)
Bathurst Road / Lone Pine Avenue (Northwest)	Bathurst Road (Northwest)	299	448
	Lone Pine Avenue (Northeast)	205	181
	Bathurst Road (Southeast)	578	468
Bathurst Road / Lone Pine Avenue (Southeast)	Bathurst Road (Northwest)	366	536
	Lone Pine Avenue (southwest)	182	156
	Bathurst Road (Southeast)	404	320
Bathurst Road / Retail Access	Bathurst Road (Northwest)	196	346
	Retail Access (southwest)	18	32
	Bathurst Road (Southeast)	406	240
Bathurst Road / Perc Griffith Way	Bathurst Road (Northwest)	191	347
	Perc Griffith Way (Northeast)	30	62
	Bathurst Road (Southeast)	432	205
Bathurst Road / Dairy Creek Road	Bathurst Road (Northwest)	168	361
	Dairy Creek Road (southwest)	129	175
	Bathurst Road (Southeast)	582	273
Dairy Creek Road / Lone Pine Avenue	Dairy Creek Road (east)	192	92
	Lone Pine Avenue (north)	64	32
	Dairy Creek Road (west)	152	225

Intersection	Approach	Total vehicles AM Peak (8:00 am – 9:00 am)	Total vehicles PM Peak (4:30- pm 5:30 pm)
Lone Pine Avenue / Adina Crescent	Lone Pine Avenue (north)	148	124
	Adina Cresent (west)	71	47
	Lone Pine Avenue (south)	107	131

The volumes for each approach are further outlined in Table 2.8, with light and heavy vehicle numbers for each turning movement outlined. The stick figures for the intersection peak hour traffic volumes are presented in Appendix A-1 and A-2.

Table 2.8 Existing Traffic Volumes (2024) – light and heavy vehicle breakdown by turning movement

Intersection	Approach	Turning Movement	AM Peak (8:00 am – 9:00 am)			PM Peak (4:30 pm – 5:30 pm)		
			Total	Light	Heavy	Total	Light	Heavy
Bathurst Road / Lone Pine Avenue (Northwest)	Bathurst Road (Northwest)	Left turn	65	63	2	24	23	1
		Through	234	211	23	424	413	11
	Lone Pine Avenue (Northeast)	Right turn	67	66	1	69	69	0
		Left turn	138	132	6	112	110	2
	Bathurst Road (Southeast)	Through	451	434	17	358	346	12
		Right turn	127	119	8	110	108	2
Bathurst Road / Lone Pine Avenue (Southeast)	Bathurst Road (Northwest)	Through	220	204	16	400	390	10
		Right turn	146	139	7	136	133	3
	Lone Pine Avenue (southwest)	Left turn	178	170	8	153	152	1
		Right turn	4	3	1	3	3	0
	Bathurst Road (Southeast)	Through	400	383	17	315	302	13
		Left turn	4	4	0	5	5	0
Bathurst Road / Retail Access	Bathurst Road (Northwest)	Through	185	168	17	334	325	9
		Right turn	11	11	0	12	12	0
	Retail Access (southwest)	Left turn	9	9	0	22	22	0
		Right turn	9	9	0	10	10	0
	Bathurst Road (Southeast)	Left turn	10	8	2	8	7	1
		Through	396	379	17	232	219	13
Bathurst Road / Perc Griffith Way	Bathurst Road (Northwest)	Left turn	40	39	1	11	11	0
		Through	151	135	16	336	325	11
	Perc Griffith Way (Northeast)	Right turn	13	13	0	37	35	2
		Left turn	17	15	2	25	25	0
	Bathurst Road (Southeast)	Through	396	377	19	199	188	11
		Right turn	36	33	3	6	5	1

Intersection	Approach	Turning Movement	AM Peak (8:00 am – 9:00 am)			PM Peak (4:30 pm – 5:30 pm)		
			Total	Light	Heavy	Total	Light	Heavy
Bathurst Road / Dairy Creek Road	Bathurst Road (Northwest)	Through	155	139	16	343	333	10
		Right turn	13	11	2	18	17	1
	Dairy Creek Road (southwest)	Left turn	23	20	3	9	9	0
		Right turn	106	83	23	166	159	7
	Bathurst Road (Southeast)	Left turn	173	145	28	77	64	13
		Through	409	390	19	196	184	12
Dairy Creek Road / Lone Pine Avenue	Dairy Creek Road (east)	Right turn	7	6	1	8	8	0
		Through	185	157	28	84	72	12
	Lone Pine Avenue (north)	Left turn	7	7	0	8	8	0
		Right Turn	57	53	4	24	23	1
	Dairy Creek Road (west)	Left turn	28	25	3	57	56	1
		Through	124	37	27	168	160	8
Lone Pine Avenue / Adina Crescent	Lone Pine Avenue (north)	Through	119	114	5	88	84	4
		Right turn	29	26	3	36	32	4
	Adina Cresent (west)	Left turn	59	54	5	38	36	2
		Right turn	12	12	0	9	9	0
	Lone Pine Avenue (south)	Left turn	7	6	1	2	2	0
		Through	100	94	6	129	127	2

2.5.3 Base year SIDRA analysis

The operation of the intersections of interest have been assessed using SIDRA 9. SIDRA calculates the amount of delay to vehicles using an intersection and, amongst other performance measures, gives a Level of Service (LoS) rating, which indicates the relative performance of traffic movements within the intersection.

Table 2.9 presents the criteria generally applied to intersection performance. The LoS is determined from the calculated delay to traffic movements, which is a representation of driver frustration, fuel consumption and increased travel time. There are six LoS measures ranging from A (very low delay and very good operating conditions) to F (over saturation where arrival rates exceed intersection capacity). Typically, a LoS D or better is considered to be acceptable. However, a LoS E may be acceptable if it also operates with a low degree of saturation.

Table 2.9 Intersection Level of Service Criteria

LoS	Average Delay/ Vehicle (sec)	Traffic Signals & Roundabouts	Give-way & Stop signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	28 to 42	Satisfactory	Satisfactory, but accident study required
D	42 to 56	Operating near capacity	Near capacity, accident study required
E	56 to 70	At capacity, excessive delays; roundabout requires other control mode	At capacity; requires other control mode
F	Exceeding 70	Unsatisfactory; requires additional capacity	Unsatisfactory, requires other control mode.

To best assess the overall performance of the road network surrounding the Site:

– A SIDRA network model was prepared for the intersections along the Bathurst Road and the intersection of Dairy Creek Road and Lone Pine Avenue (refer to Figure 2.10).
– Lone Pine Avenue and Adina Crescent was modelled as an isolated intersection (refer to Figure 2.11).

For the SIDRA model, the individual intersection identification numbers are outlined in Table 2.10.

Table 2.10 SIDRA Site ID numbers

SIDRA Intersection ID	Intersection description
1	Bathurst Road / Lone Pine Avenue (northwest)
2	Bathurst Road / Lone Pine Avenue (southeast)
3	Bathurst Road / Retail Access
4	Bathurst Road / Perc Griffith Way
5	Bathurst Road / Dairy Creek Road
6	Dairy Creek Road / Lone Pine Avenue
7	Lone Pine Avenue / Adina Crescent

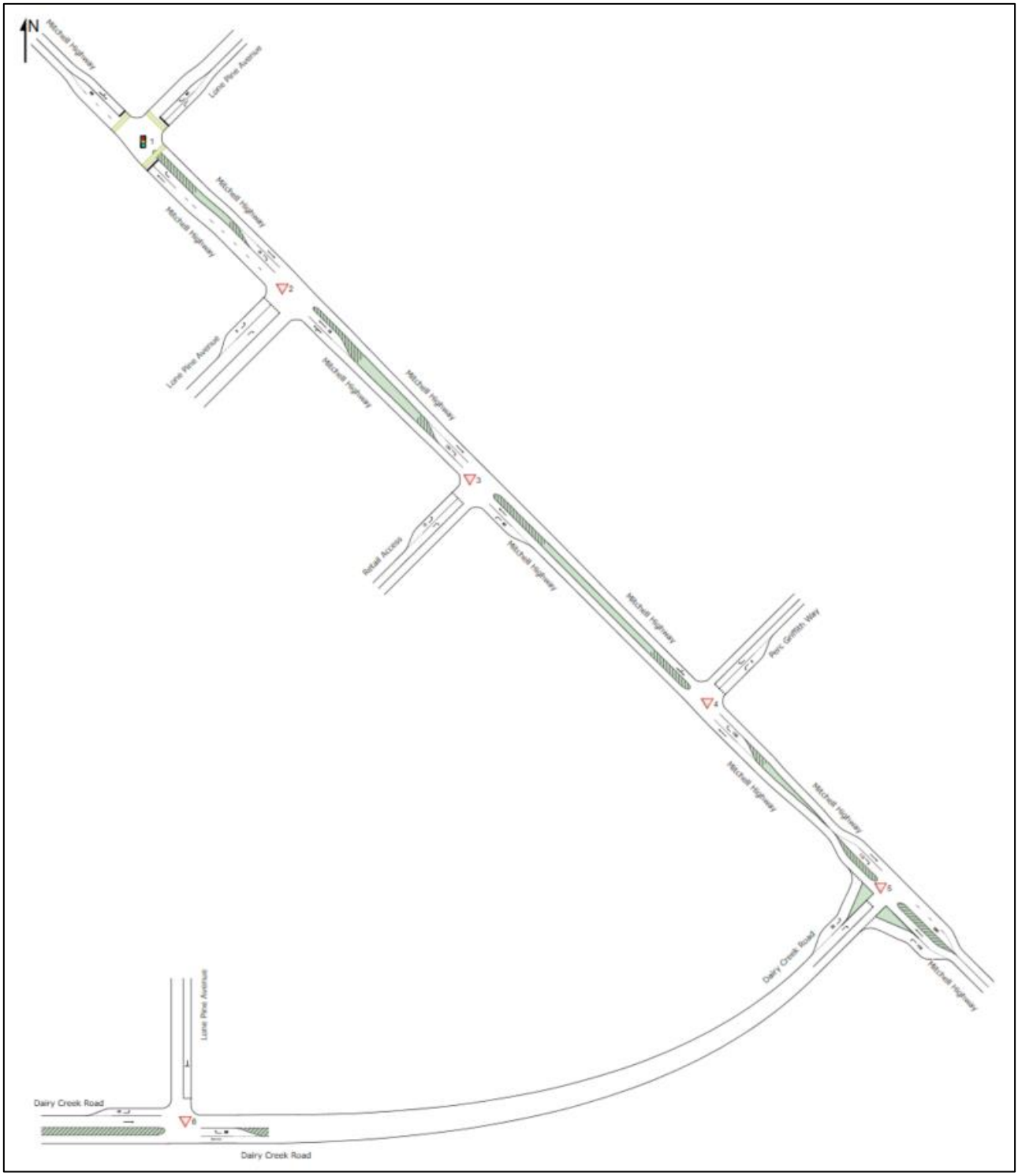

Figure 2.10 SIDRA Network Layout – Bathurst Road and Dairy Creek Road

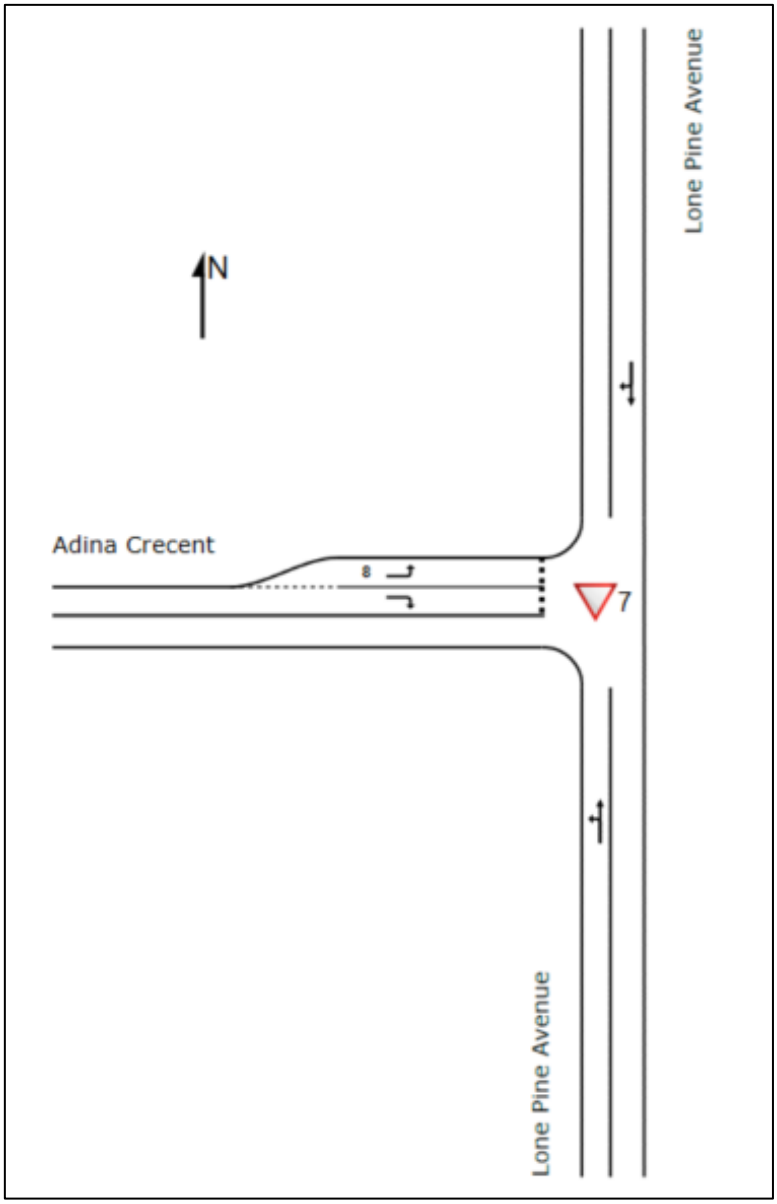

Figure 2.11 Lone Pine Avenue / Adina Crescent SIDRA Layout

To accurately reflect the existing road network conditions, model calibration was undertaken using the gap acceptance parameters. Default gap acceptance values, as per Austroads guides, were initially entered into the model, which were then further adjusted so that the 95th percentile queue lengths reflected the average observed queue lengths from the traffic surveys collected.

The gap acceptance values were adjusted, and the model was rerun in order to achieve modelled 95th percentile queues lengths within 0.1 vehicles of the observed queue counts during the peak hour period. These values have been carried through to the 2040 intersection layouts to ensure consistency in the modelling.

A summary of the results from the 2024 base year SIDRA are presented below in Table 2.11. The full SIDRA outputs, including the network performance and intersection movement summaries, are in Appendix B-1.

Table 2.11 2024 SIDRA results summary

Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:30 – 17:30)			
	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS
Bathurst Road / Lone Pine Avenue (Northwest)	17	B	63	0.61	18	B	94	0.74
Bathurst Road / Lone Pine Avenue (Southeast)	8.7	A	13	0.36	7.7	A	11	0.34
Bathurst Road / Retail Access	17	C	1	0.23	17	C	2	0.19
Bathurst Road / Perc Griffith Way	13	B	2	0.22	28	D	8	0.34
Bathurst Road / Dairy Creek Road	9.5	A	3	0.23	7.5	A	3	0.19
Dairy Creek Road / Lone Pine Avenue	19	C	9	0.31	14	B	3	0.15
Lone Pine Avenue / Adina Crescent	5.6	A	2	0.09	8.2	A	2	0.11

Notes:

The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.

The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.

Analysis of the 2024 SIDRA results indicates the following:

– All intersections operate at or above an acceptable level of service (LoS D), with the majority operating at LOS A and LOS B in both peak periods.
– The two intersections between Bathurst Road and Lone Pine had the longest queue lengths, with 95th percentile queues of 63 metres and 13 metres for the signalised and priority-controlled intersections, respectively, in the AM peak. The queues in the PM peak were 94 metres and 11 metres for the signalised and priority-controlled intersections, respectively.
– All other intersections had 95th percentile queues of less than 10 metres in both peak periods.
– All intersections had degrees of saturation lower than the required 0.9 for signalised intersections and 0.8 for priority-controlled intersections, indicating all intersections currently operate within capacity.

Figure 2.12 –Figure 2.15 shows the degree of saturation and level of service for each lane for the 2024 network, as well as the isolated intersection on Lone Pine Avenue.

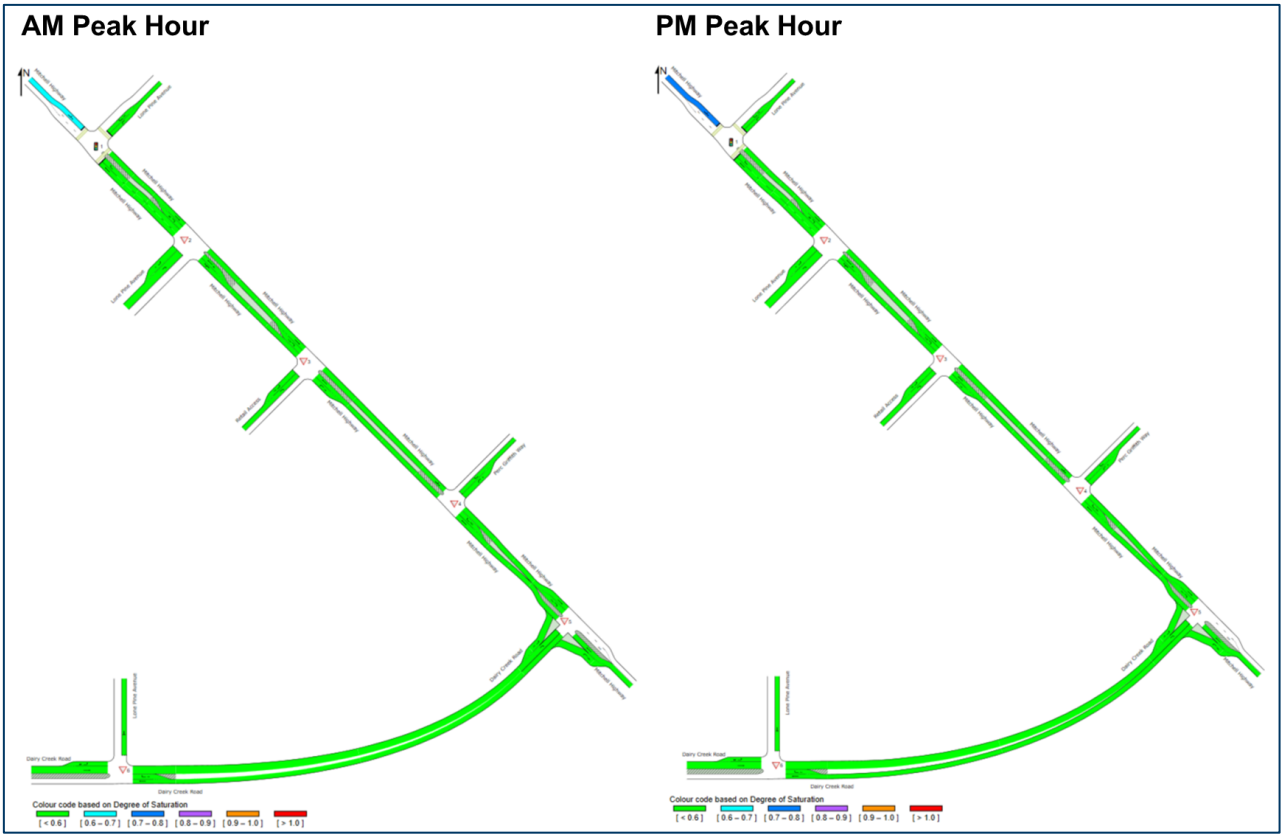

Figure 2.12 2024 SIDRA network output – Degree of saturation

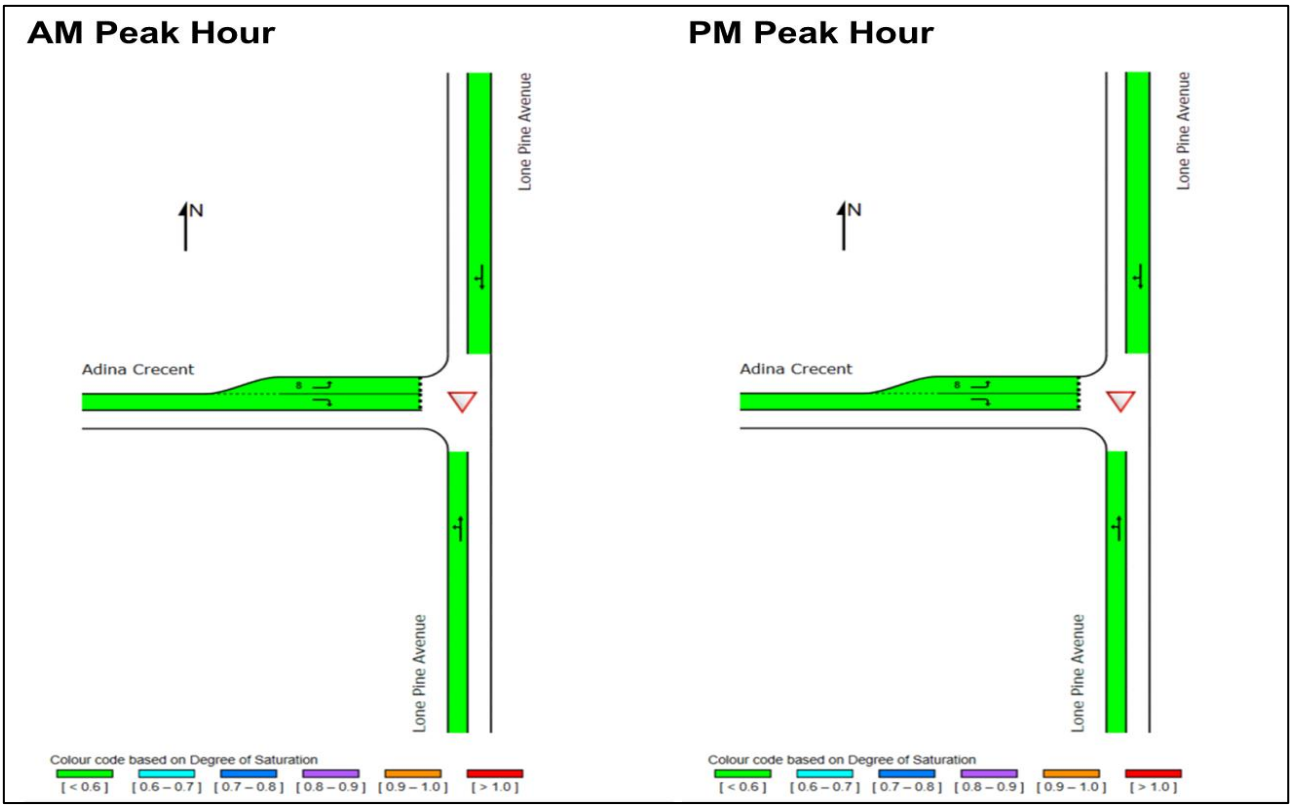

Figure 2.13 2024 SIDRA Lone Pine Avenue/Adina Crescent output – Degree of saturation

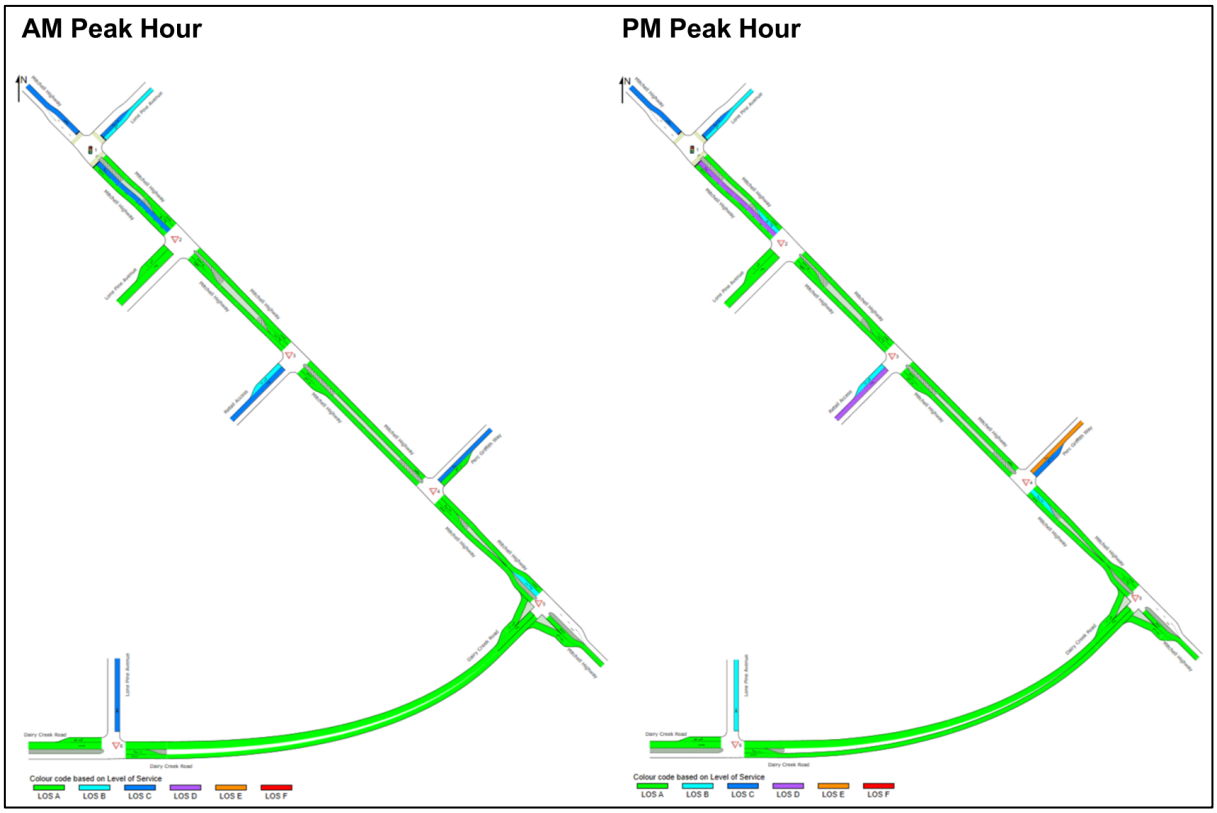

Figure 2.14 2024 SIDRA network output – Level of service

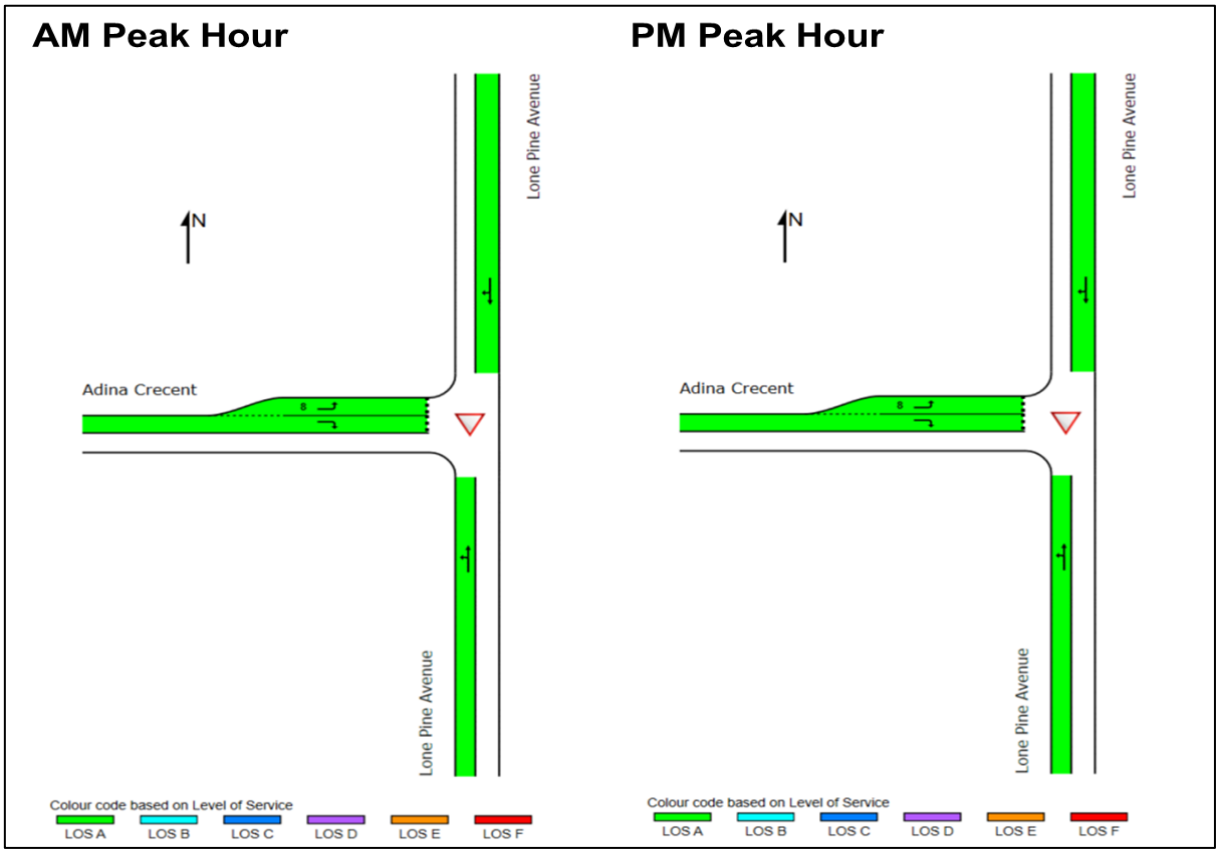

Figure 2.15 2024 SIDRA Lone Pine Avenue/Adina Crescent output – Level of service

3. Future transport and land use

3.1 Future transport and road network changes

A review of proposed transport and road network changes in proximity to the Site has been undertaken to identify any future changes that may affect future traffic volumes and/or traffic distribution.

OCC began constructing the Southern Feeder Road Stage 4 in 2023 with the aim to provide a connection between the residential areas of south and west Orange to industrial and health precincts via Bathurst Road.

The Southern Feeder Road is a 1.7 kilometre segment of road from Anson Road to Park Road (refer to Figure 3.1), which connects to the existing network at Blowes Road with a continuing connection to Bathurst Road via Dairy Creek Road.

Figure 3.1 Southern Feeder Road construction location

Source: Nearmap (modified by GHD)

Construction of this segment of the Southern Feeder Road is expected to be completed by the end of 2024. With the improved connectivity of the road network provided by the Southern Feeder Road, some change in the distribution of traffic on the local road network is expected. This is likely to be in the form of additional traffic volume travelling along Dairy Creek Road as well as connecting streets such as Lone Pine Avenue when accessing the Orange City Centre and other nearby regional areas.

3.2 Future land use changes

A review of known land use changes around the Site location was conducted in order to assess any potential increases in traffic volumes as a result of changing land use for future year modelling. Based on discussions with OCC, no known land use changes are planned/proposed within proximity of the Redmond Place Site.

3.2.1 Proposed subdivision

As part of the rezoning and development of the project, Landcom has prepared a masterplan that outlines the type, size and location of the dwellings proposed to be constructed. The masterplan also identifies the internal road network, cycleway opportunities and public transport integration possibilities. The indicative lot layout of the masterplan is shown in Figure 3.2.

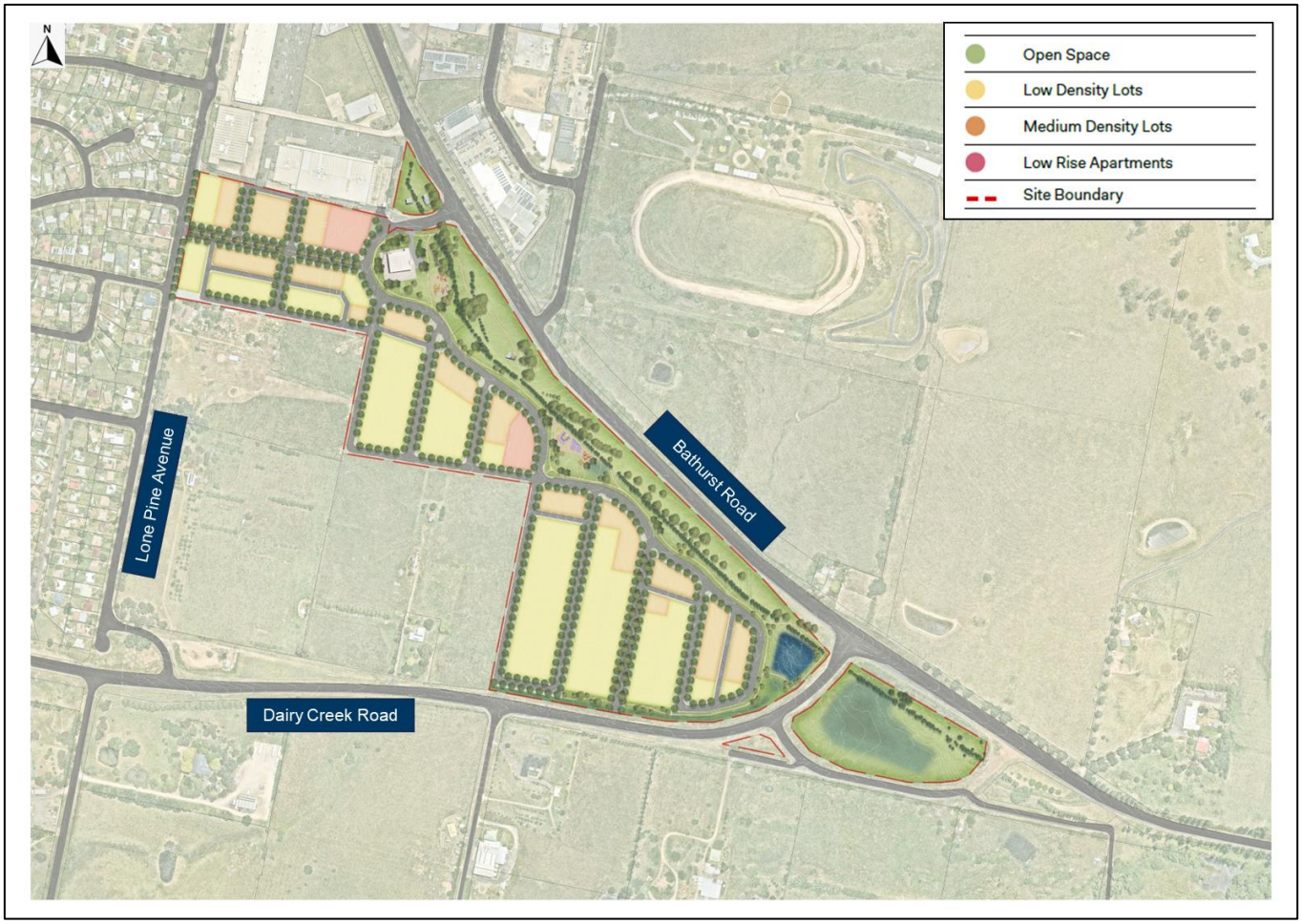

Figure 3.2 Redmond Place Masterplan – indicative lot layout

Source: Oculus - Redmond Place, Orange Concept Options Report

The project proposes to provide a total of 330 dwellings, as follows:

– 66 apartments/high density dwellings
– 130 medium density dwellings
– 134 low density dwellings

3.2.2 Road Network

The proposed street structure and road hierarchy of the project are displayed in Figure 3.3.

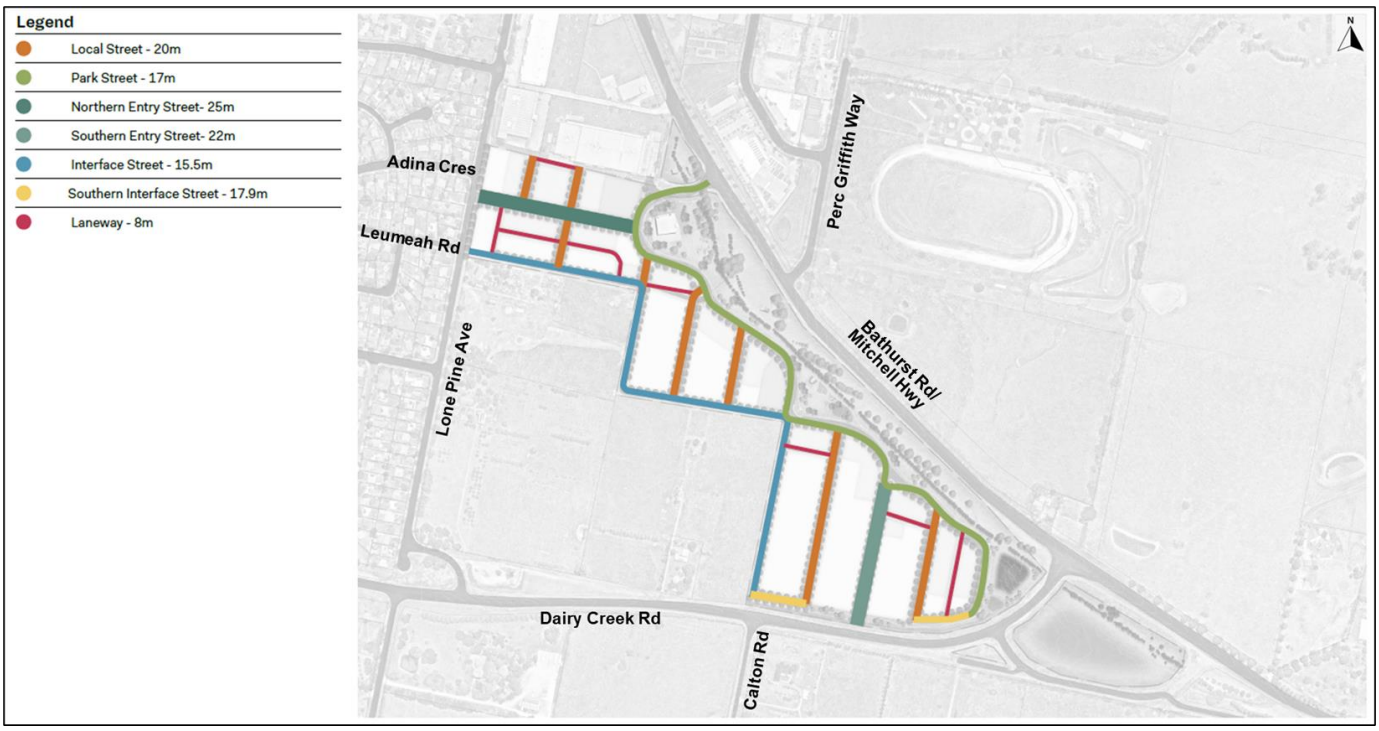

Figure 3.3 Redmond Place Masterplan – internal road network

Source: Oculus - Redmond Place, Orange Concept Options Report

The proposed internal Site road network (shown in Figure 3.3) is comprised of five different street types. The features of each street type include:

- **Local streets –** 20 metre road reserve with an 11 metre carriageway, 1.2 metre footpaths on both sides of the streets, as well as trees in carriageways and parking zones (refer to Figure 3.4).
- **Park Street –** the street runs along the green space/ reserve along the boundary with the Bathurst Road. The verge area of this street is to be incorporated into the park area, which would reduce the road reserve to 17 metres with seven metres for the carriageway. A 2.5 metre shared path is provided within the green space with a 1.2 metre footpath on the opposite side of the road. Parking is provided along both sides of the street (refer to Figure 3.5).
- **Northern Entry Street –** creating an avenue or green link to open space around the park area with a vegetated median treatment. A road reserve width of 25 metres is identified with travel lanes of 3.5 metre width and a combination of 2.5 metre shared paths and 1.5 metre footpaths (refer to Figure 3.6).
- **Southern Entry Street** – A road reserve width of 22 metres is identified with travel lanes of 3.5 metre width and a 1.2 metre footpaths on either side of the road. Parking on both sides of the road is identified with parking to be mixed with a tree zone providing a link to the open space (refer to Figure 3.7).
- **Interface Street –** total road reserve width of 15.5 metres with an eight-metre two-way carriageway. No parking is designated for these streets, with a three-metre landscape strip on the Site boundary. A 1.2 metre footpath is proposed along one side of the street (refer to Figure 3.8).
- **Southern Interface Street –** total road reserve width of 17.9 metres with a seven-metre two-way carriageway. Parking is designated along one side of these streets, with a landscaping along the verges on both sides of the road. A 1.2 metre footpath is proposed along one side of the street with a 2.5 metre shared path next to a six metre swale (refer to Figure 3.9).
- **Laneways –** smaller connecting roads with an eight-metre road reserve and six metre carriageway. No parking or footpaths are identified along these roads (refer to Figure 3.10).

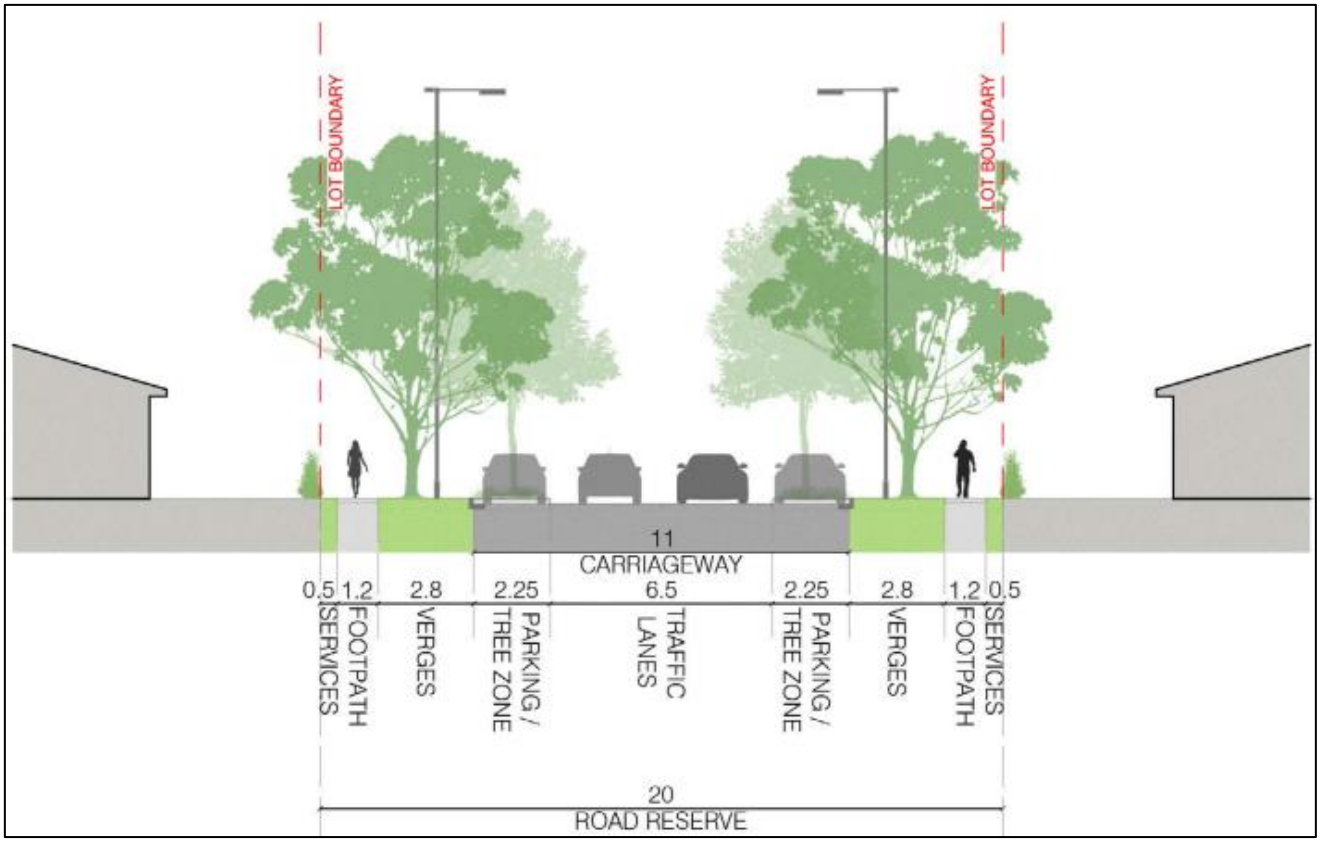

Figure 3.4 Local street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

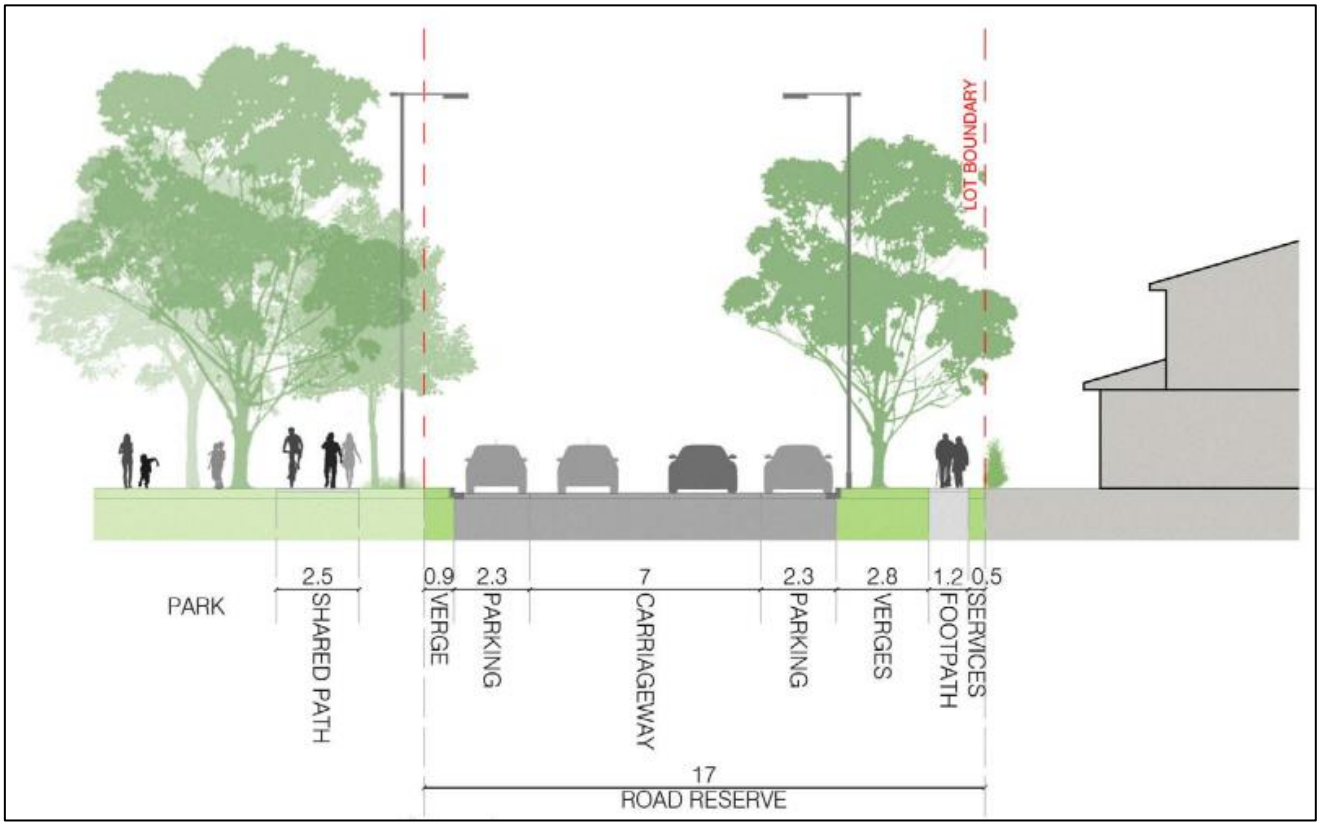

Figure 3.5 Park street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

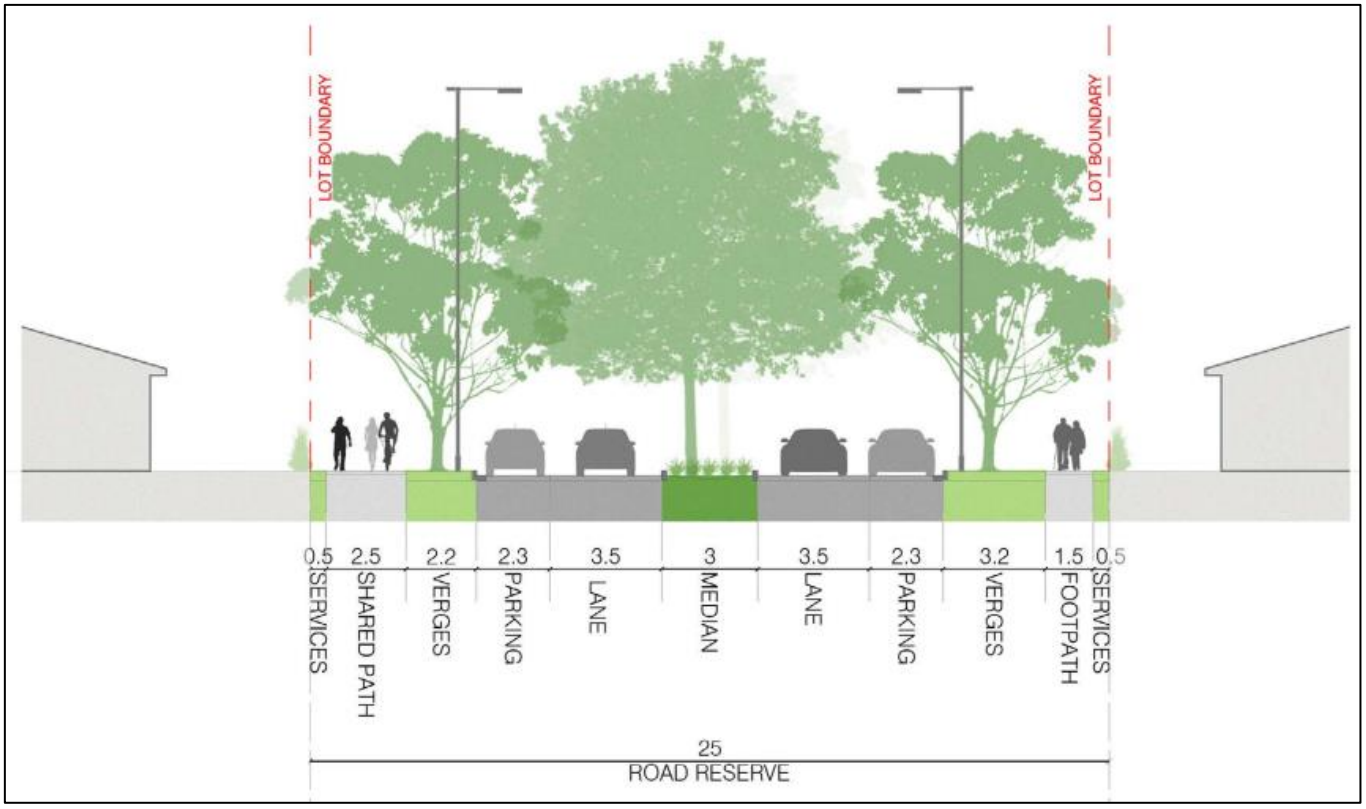

Figure 3.6 Northern Entry Street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

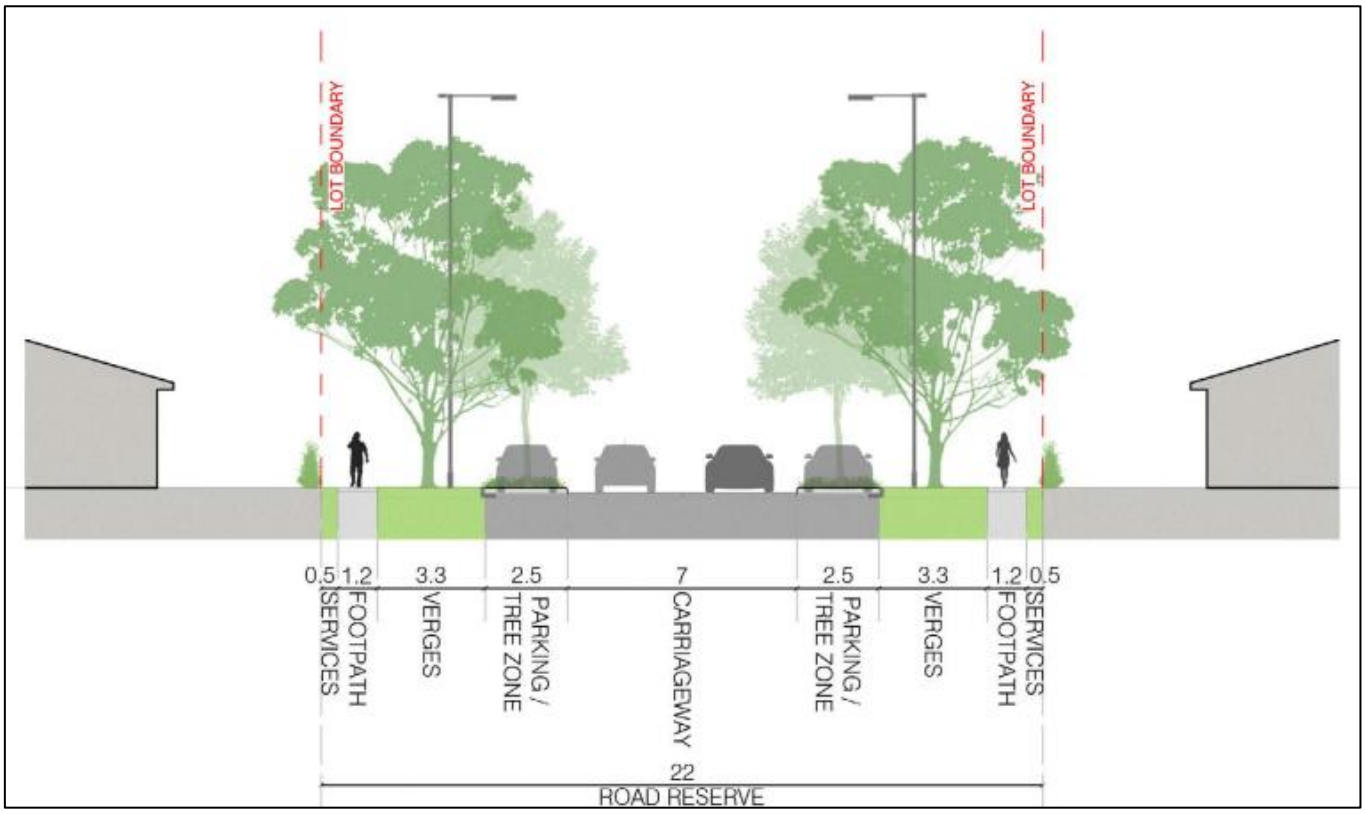

Figure 3.7 Southern Entry Street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

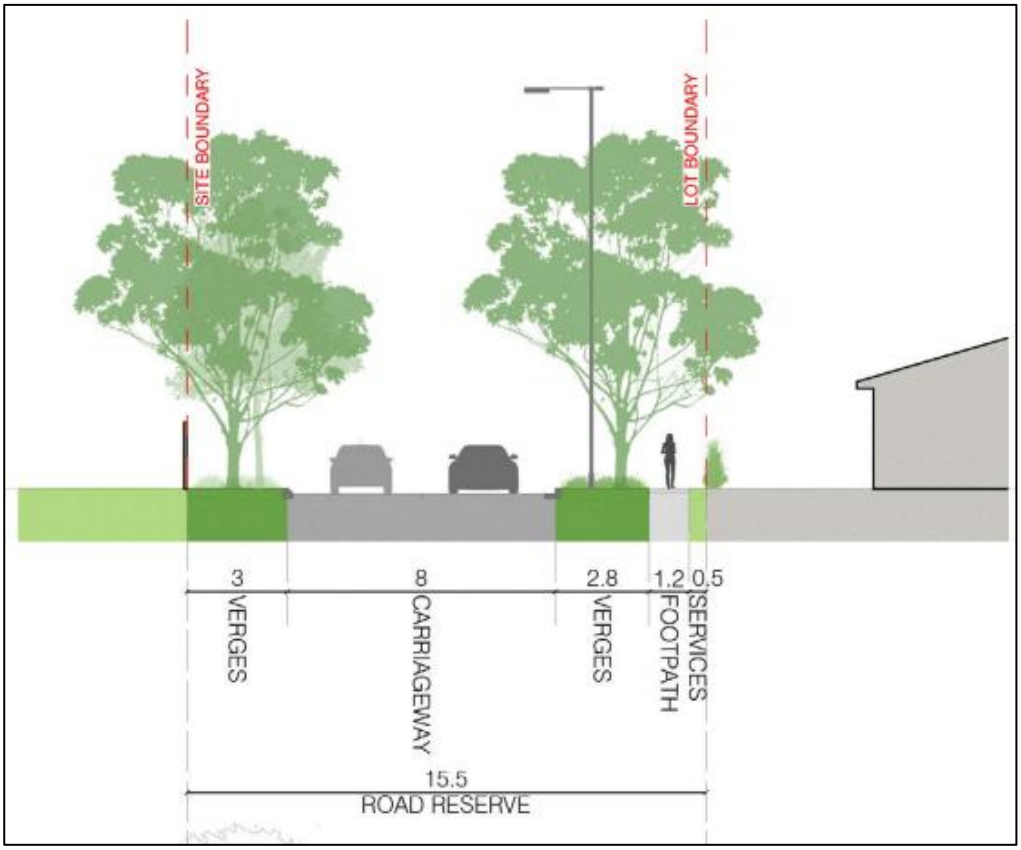

Figure 3.8 Interface street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

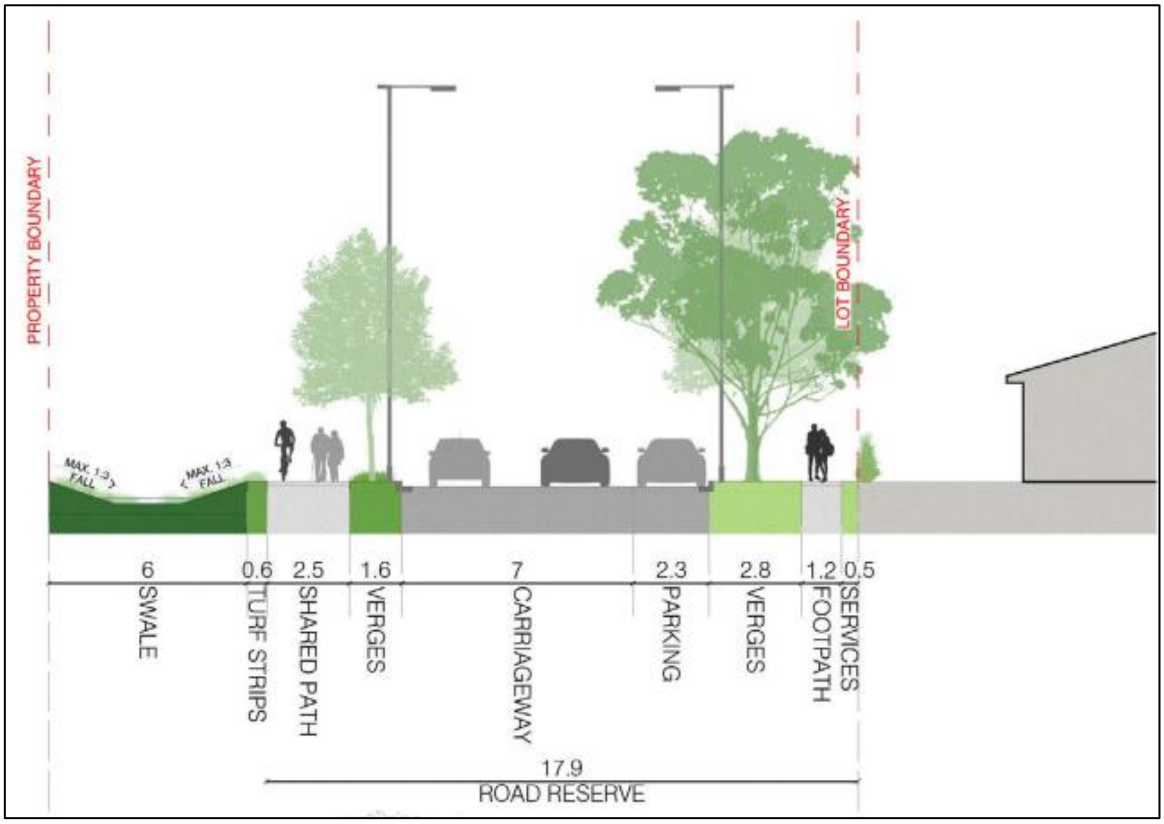

Figure 3.9 Southern Interface Street typology

Source: Oculus - Redmond Place, Orange Concept Options Report

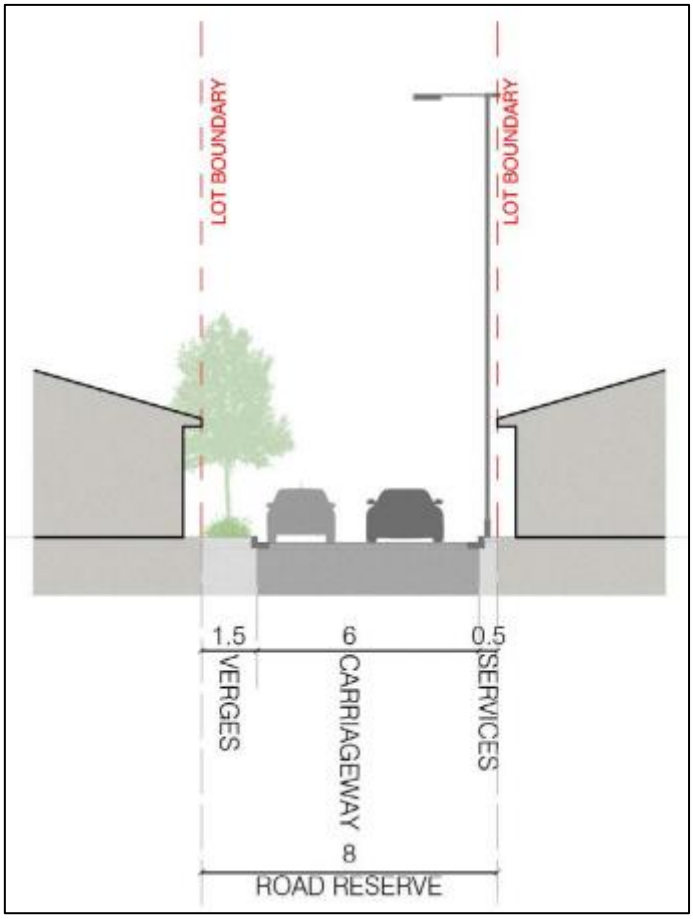

Figure 3.10 Laneway typology

Source: Oculus - Redmond Place, Orange Concept Options Report

The road network features three access and egress points to and from the Site that connect into the surrounding road network. The locations of these are shown in Figure 3.11 and are as follows:

– The existing intersection of Redmond Place and Bathurst Road.
– A new access road onto Lone Pine Avenue between Adina Crescent and Leumeah Road (assumed 70m south of the intersection with the Adina Crescent).
– A new access road onto Dairy Creek Road between Calton Road and Bathurst Road (assumed 340m from the intersection with Bathurst Road).

Figure 3.11 Redmond Place Site proposed access/egress points

Source: Oculus - Redmond Place, Orange Concept Options Report (modified by GHD)

3.2.3 Active and public transport facilities

The masterplan outlines the proposed options for public and active transport facilities, as displayed in Figure 3.12. As detailed in Section 3.2.2, the masterplan proposes shared paths and footpaths on the proposed road network.

The Orange Active Transport Plan identifies Orange as an ideal location for walking and cycling due to the large number of residents living within a 20-minute commute via active transport from local shops, schools and work. In addition to the relative proximity of most residents to the town centre and facilities, the topography is relatively flat, with a range of wide and shaded streets.

Due to the favourable conditions for active transport in Orange, the project is proposed to provide connectivity between active transport facilities and public transport facilities in the surrounding networks.

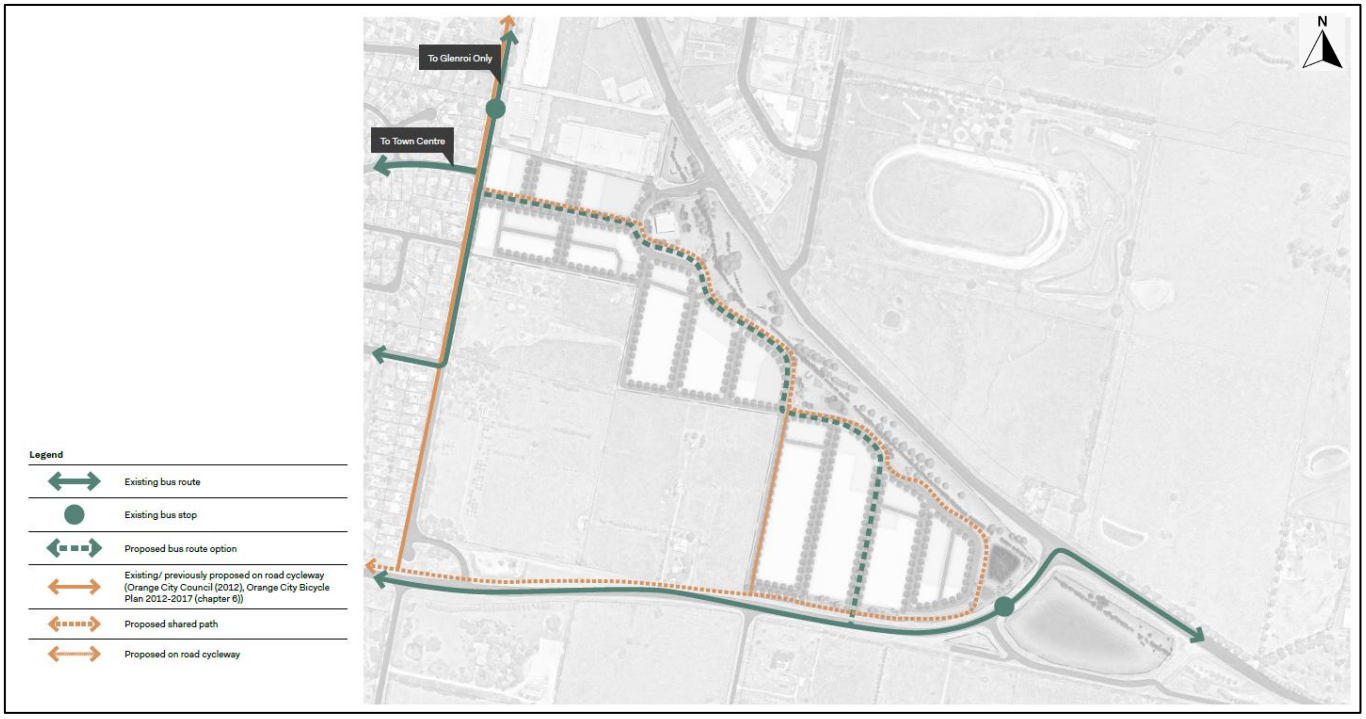

Figure 3.12 Redmond Place Masterplan concept bus and cycle routes

Source: Oculus - Redmond Place, Orange Concept Options Report

The proposed bicycle facilities transport facilities include:

– A shared path that runs along Park Street and links through to Lone Pine Avenue.
– A shared path that runs parallel to Dairy Creek Road
– An on-road cycleway within the southern area of the Site connecting the proposed shared path. This is assumed to be included as a route for cyclists who are commuting between the southern area of the Site and the north to provide a more direct route option.

The proposed active transport facilities provide good connectivity across the Site with the continuous shared path integrating with the green space and providing connections to the surrounding road network. Additionally, the active transport infrastructure proposed does not include access or facilities to Bathurst Road due to the high vehicle speeds and traffic present, posing a potential safety risk to pedestrians and cyclists.

The proposed public transport services in the master plan includes a proposed bus route from the Dairy Creek Road access point through to the Lone Pine Avenue access point via Park Street along the green space/ reserve.

The proposed bus route provides connectivity and service throughout the Site layout and provides access options to Orange City Centre, Glenroi and continuing services to Bathurst via Bathurst Road. Additionally, both Park Street as well as the Northern and Southern entry streets have travel lanes with a width of 3.5 metres and are designed to be bus capable.

3.3 Orange VISSUM model

OCC has provided GHD with forecast traffic volumes for 2028 that have been prepared as part of TfNSW's VISSUM model. The model accounts for proposed changes in land use within Orange and the road network, including the construction and operation of the Southern Feeder Road Stage 4.

The model uses the base year of 2018 for volumes with forecast volumes for 2028 for the road network within Orange Township. These volumes have been analysed to assess background traffic growth rates for the road network that incorporate the changes in volumes, as well as changes in road function with the construction of the Southern Feeder Road.

The analysis of the model included the following:

– Identifying 2018 and 2028 traffic volumes for the road network in the proximity of the Site at:
    - Bathurst Road between Dairy Creek Road and Lone Pine Avenue.
    - Dairy Creek Road between Bathurst Road and Lone Pine Avenue.
    - Lone Pine Avenue between Dairy Creek Road and Bathurst Road.
– Calculations using the volumes were undertaken to identify the following data points:
    - Increase in the traffic volume for each segment from 2018 to 2028.
    - Increase/ growth to 2028 as a percentage of the 2018 volumes.
    - Average traffic growth percentage per year between 2018-2028.

The volumes and calculated growth rates for each segment are presented in Table 3.1, with the average growth rates for both AM and PM peaks for each road and direction of travel outlined in Table 3.2.

Table 3.1 Orange Strategic Transport Model 2018-2028 traffic volumes and growth rates

		AM Peak					PM Peak				
		2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year	2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year
Dairy Creek Road	Eastbound along Dairy Creek Rd (Lone Pine Ave to Calton Rd)	114	248	**134**	**118%**	**12%**	178	214	**36**	**20%**	**2.0%**
	Westbound along Dairy Creek Rd (Lone Pine Ave to Calton Rd)	191	242	**51**	**27%**	**2.7%**	91	187	**96**	**105%**	**11%**
	Eastbound along Dairy Creek Rd (Calton Rd to Mitchell Hwy)	123	255	**132**	**107%**	**11%**	168	202	**34**	**20%**	**2.0%**
	Westbound along Dairy Creek Rd (Calton Rd to Mitchell Hwy)	185	233	**48**	**26%**	**2.6%**	103	197	**94**	**91%**	**9.1%**
Mitchell Hwy	Northbound along Mitchell Hwy (Dairy Creek Rd to Perc Griffith Way)	322	369	**47**	**15%**	**1.5%**	190	198	**8**	**4%**	**0.4%**
	Southbound along Mitchell Hwy (Dairy Creek Rd to Perc Griffith Way)	179	240	**61**	**34%**	**3.4%**	377	356	**-21**	**-6%**	**-0.6%**
	Northbound along Mitchell Hwy (Perc Griffith Way to Retail Centre)	279	286	**7**	**3%**	**0.3%**	247	204	**-43**	**-17%**	**-1.7%**
	Southbound along Mitchell Hwy (Perc Griffith Way to Retail Centre)	288	299	**11**	**4%**	**0.4%**	357	295	**-62**	**-17%**	**-1.7%**
	Northbound along Mitchell Hwy (Retail Centre to Lone Pine Ave)	364	373	**9**	**2%**	**0.2%**	414	359	**-55**	**-13%**	**-1.3%**
	Southbound along Mitchell Hwy (Retail Centre to Lone Pine Ave)	276	283	**7**	**3%**	**0.3%**	338	289	**-49**	**-14%**	**-1.4%**
	Northbound along Mitchell Hwy (Priority Lone Pine Ave intersection)	364	373	**9**	**2%**	**0.2%**	414	359	**-55**	**-13%**	**-1.3%**
	Southbound along Mitchell Hwy (Priority Lone Pine Ave intersection)	276	283	**7**	**3%**	**0.3%**	338	289	**-49**	**-14%**	**-1.4%**

		AM Peak					PM Peak				
		2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year	2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year
	Northbound along Mitchell Hwy (Signalised Lone Pine Ave intersection)	472	517	**45**	**10%**	**1.0%**	499	463	**-36**	**-7%**	**-0.7%**
	Southbound along Mitchell Hwy (Signalised Lone Pine Ave intersection)	428	423	**-5**	**-1%**	**-0.1%**	485	470	**-15**	**-3%**	**-0.3%**
Lone Pine Ave	Southbound along Lone Pine (Mitchell Hwy to Orchard Grove Rd)	172	176	**4**	**2%**	**0.2%**	169	204	**35**	**21%**	**2.1%**
	Northbound along Lone Pine (Mitchell Hwy to Orchard Grove Rd)	129	181	**52**	**40%**	**4.0%**	107	127	**20**	**19%**	**1.9%**
	Southbound along Lone Pine (Orchard Grove Rd to Sir Neville Howse Pl)	172	176	**4**	**2%**	**0.2%**	169	204	**35**	**21%**	**2.1%**
	Northbound along Lone Pine (Orchard Grove Rd to Sir Neville Howse Pl)	129	181	**52**	**40%**	**4.0%**	107	127	**20**	**19%**	**1.9%**
	Southbound along Lone Pine (Sir Neville Howse Pl to Adina Cr)	241	252	**11**	**5%**	**0.5%**	242	312	**70**	**29%**	**2.9%**
	Northbound along Lone Pine (Sir Neville Howse Pl to Adina Cr)	175	247	**72**	**41%**	**4.1%**	177	209	**32**	**18%**	**1.8%**
	Southbound along Lone Pine (Adina Cr to Leumeah Rd)	221	267	**46**	**21%**	**2.1%**	170	249	**79**	**46%**	**4.6%**
	Northbound along Lone Pine (Adina Cr to Leumeah Rd)	116	165	**49**	**42%**	**4.2%**	149	196	**47**	**32%**	**3.2%**
	Southbound along Lone Pine (Leumeah Rd to Kurim Ave)	203	254	**51**	**25%**	**2.5%**	105	191	**86**	**82%**	**8.2%**
	Northbound along Lone Pine (Leumeah Rd to Kurim Ave)	80	127	**47**	**59%**	**5.9%**	135	179	**44**	**33%**	**3.3%**
	Southbound along Lone Pine (Kurim Ave to Dairy Creek Road)	169	227	**58**	**34%**	**3.4%**	49	143	**94**	**192%**	**19.2%**

		AM Peak					PM Peak				
		2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year	2018	2028	Growth (vehicles)	Growth % (2018-28)	Average growth % per year
	Northbound along Lone Pine (Kurim Ave to Dairy Creek Road)	25	34	**9**	**36%**	**3.6%**	57	72	**15**	**26%**	**2.6%**

Table 3.2 Orange strategic traffic model average growth rate per year

Road segment (Direction of travel)	AM Peak	PM Peak
Dairy Creek Rd (eastbound)	11.2%	2.0%
Dairy Creek Rd (westbound)	2.6%	9.8%
Mitchell Hwy (northbound)	0.6%	-0.9%
Mitchell Hwy (southbound)	0.8%	-1.1%
Lone Pine Avenue (northbound)	4.3%	2.4%
Lone Pine Avenue (southbound)	1.5%	6.5%

Using the calculated growth rates and volumes the following observations were made (2018 – 2028):

– Large traffic growth occurs along Dairy Creek Road in the eastbound direction (AM peak) and westbound direction (PM peak). This is assumed to be due to the construction of the Southern Feeder Road Stage 4, which, along with Dairy Creek Road, will provide improved connectivity from housing in the south and west of Orange to/from Bathurst Road.
– Low traffic growth rates (less than one percent) in the AM peak and negative growth rates in the PM peak occurs along Bathurst Road. This is assumed to be due to a large proportion of the existing and future traffic utilising the Southern Feeder Road as a more direct route to residential areas, which decreases the overall traffic along Bathurst Road.
– Steady growth rates occur along Lone Pine Avenue, between one and seven percent, with higher volumes northbound in the AM peak and southbound in the PM peak. Similar to Dairy Creek Road, these tidal flows are expected to occur due to residents commuting to/from work in the Orange City Centre.

3.4 Future background traffic volumes

The future background traffic volumes for the road network surrounding the Site were calculated using the outputs of the VISSUM model. The assumptions and methodology for the calculations are detailed below:

– The future year traffic volumes were calculated for 2040 as the construction of dwellings is expected to be finished by the end of 2030 with a 10-year horizon for modelling post-finalisation of construction required for the modelling.
– In order to forecast the future traffic volumes around the Site, the traffic growth rates were calculated using the VISSUM model from 2018 to 2028 as they incorporate the Southern Feeder Road and increased distribution of traffic along this route.

For most of the roads the calculated average annual growth rates (2018 to 2028) from the Orange Strategic Traffic Model were adopted for the calculations through to the 2040 horizon. However, the annual growth rates for the following roads were adjusted as they were considered to be too high for an accurate forecast over the entire period, through to 2040:

– **Dairy Creek Road (eastbound) –** the high growth rate of 11.2 percent per year in the AM peak that was calculated in the Orange VISSUM model was utilised for the period between 2024 and 2028 however, this rate was halved for the period from 2028 to 2040 as a more reasonable long term growth rate after the completion of the Southern Feeder Road.
– **Dairy Creek Road (westbound) -** the high growth rate of 9.8 percent per year forecast in the Orange VISSUM model for the PM peak was utilised for the period between 2024 and 2028 however, this rate was halved for the period from 2028 to 2040 as a more reasonable long term growth rate after the completion of the Southern Feeder Road.
– **Lone Pine Avenue (northbound) –** the AM peak growth rate of 4.3 percent in the Orange VISSUM model was used for calculations between 2024 and 2028 however, this rate was halved for the period between 2028 and 2040. This was done as it was deemed to be too high for long term growth along a local road despite increased usage as a link between Bathurst Road and the Southern Feeder Road.
– **Lone Pine Avenue (southbound)** – the PM peak growth rate of 6.5 percent in the Orange VISSUM model was used for calculations between 2024 and 2028 however, this rate was halved for the period between 2028 and 2040. This was done as it was deemed to be too high for long term growth along a local road despite increased usage as a link between Bathurst Road and the Southern Feeder Road.

The final adopted annual growth rates used in the calculations for the traffic assessment are presented in Table 3.3.

Table 3.3 Adopted annual traffic growth rates

Road segment (Direction of travel)	AM Peak		PM Peak	
	2024-2028	2028-2040	2024-2028	2028-2040
Dairy Creek Rd (eastbound)	11.2%	5.6%	2.0%	2.0%
Dairy Creek Rd (westbound)	2.6%	2.6%	9.8%	4.9%
Mitchell Hwy (northbound)	0.6%	0.6%	-0.9%	-0.9%
Mitchell Hwy (southbound)	0.8%	0.8%	-1.1%	-1.1%
Lone Pine Avenue (northbound)	4.3%	2.2%	2.4%	2.4%
Lone Pine Avenue (southbound)	1.5%	1.5	6.5%	3.3%

The traffic volumes for the network forecast for 2040 using the above annual growth rates are shown in Appendix A-3 and A-4 for the AM and PM peak, respectively. The volumes presented account for background traffic growth and do not factor in trips generated to the project.

It is noted that the volumes have been rounded to the nearest five vehicles for combined volumes on each turning movement to reflect uncertainty in the forecasts. Volumes travelling between adjacent intersections with no other intersections between have been adjusted to ensure consistency across the network so arrival and departure flows for the intersections are within five vehicles of each other.

4. Trip generation and distribution

4.1 Trip generation

In order to assess the traffic impacts of the project, trip generation was undertaken based on the proposed future land use. The trip generation methodology can be split into four tasks, as shown in Figure 4.1.

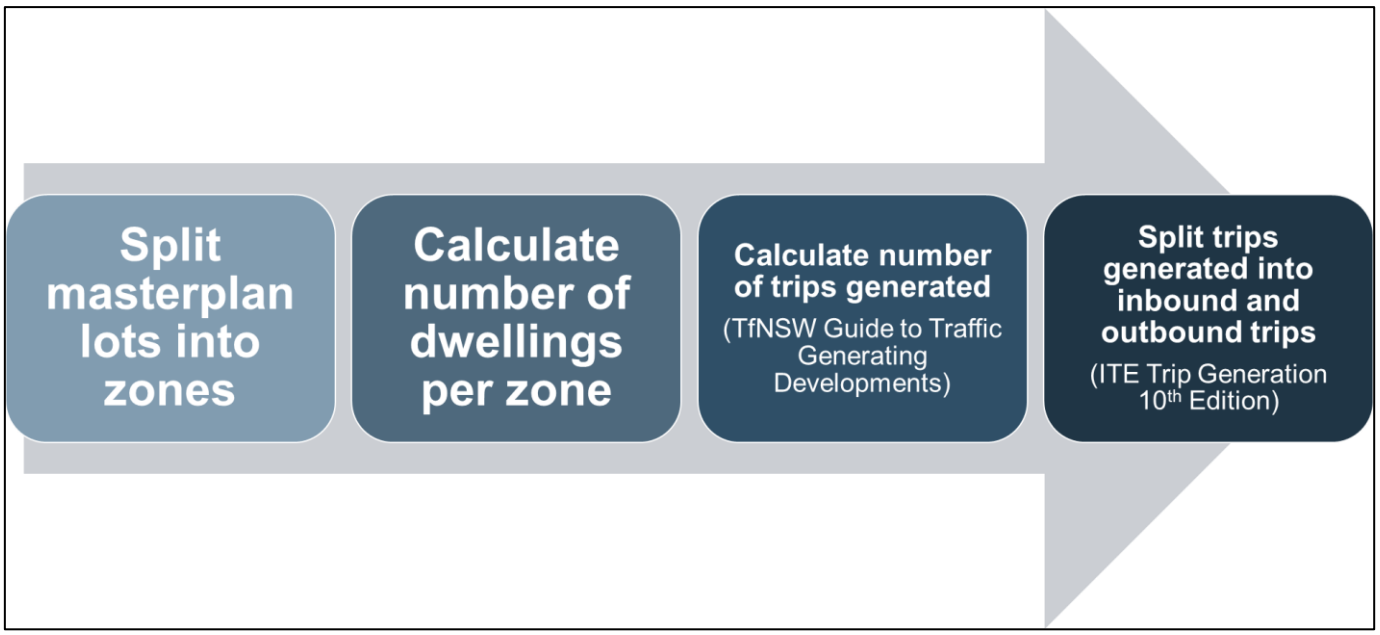

Figure 4.1 Trip generation methodology

4.1.1 Masterplan split

For the purposes of analysis, the masterplan was split into three spatially contiguous smaller zones[1] from which the trip generation and distribution could be better understood (refer to Figure 4.2).

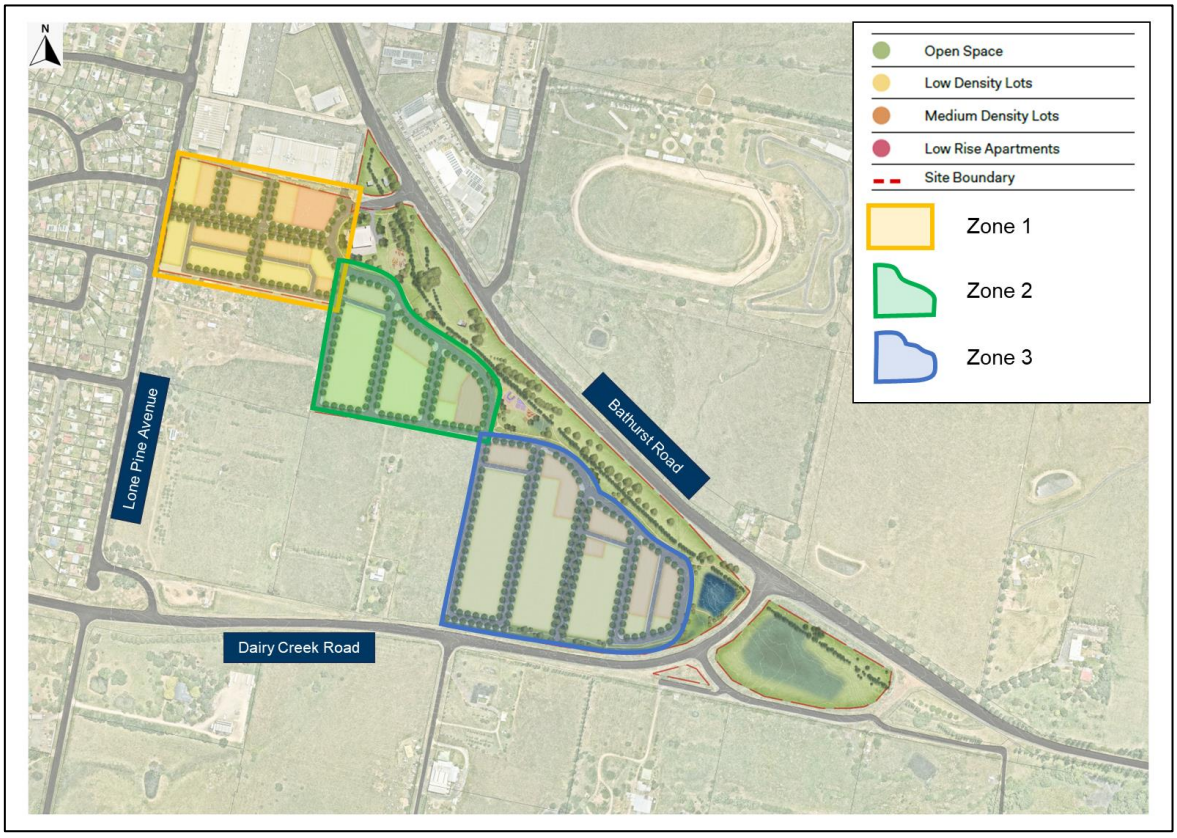

Figure 4.2 ***Redmond Place Masterplan – zones for trip generation***

Source: Oculus - Redmond Place, Orange Concept Options Report modified by GHD

4.1.2 Number of dwellings per zone

The number of dwellings located in each zone was provided by Landcom as per the Masterplan Report. The number of dwellings (by type) in each zone is outlined in Table 4.1.

Table 4.1 ***Number of dwellings by zone and dwelling type***

Zone	Dwelling Type	Number of dwellings (by dwelling type)	Total dwellings per zone
1	Low density	23	111
	Medium density	51	
	Apartments	37	
2	Low density	37	92
	Medium density	26	
	Apartments	29	
3	Low density	74	127
	Medium density	53	
	Apartments	0	

[1] These zones have been identified for the purposes of trip distribution only. They are not indicative of the staging of the proposed subdivision

The highest number of dwellings (127) are located in zone three to the south side of the Site, with most of the dwellings identified as low density. Zone one, on the northern section of the Site, had the next highest number of dwellings (111 in total) with zone two in the central section of the Site having a smaller number of dwellings (92 in total). The high density/ apartments are located within zones one and two, with all zones containing low and medium density dwellings.

4.1.3 Trips generated within each zone

To calculate the number of trips generated by the project, the TfNSW Technical Direction Guide to Traffic Generating Developments (2013) and the Guide to Traffic Generating Developments (2002) were used for each type of dwelling (low density, medium density and apartments).

An outline of each of the trip generation rates for each dwelling type and the review process undertaken for each is provided below. It is noted that the proposed trip rates were presented to OCC and TfNSW in the stakeholder meeting of 3rd April 2024.

Low density dwellings

For the low density dwellings, the TfNSW Technical Direction was used as a guide with the following regional rates/ ranges identified:

- **Average AM peak –** 0.71 trips per dwelling
- **Maximum AM Peak –** 0.85 trips per dwelling
- **Average PM peak –** 0.78 trips per dwelling
- **Maximum PM Peak –** 0.90 trips per dwelling

A review of the rates above was undertaken based on the available survey data used in the 2013 Guide to Traffic Generating Developments, with one of the low-density Sites being located in Calare, Orange. This Site provided rates of 0.85 and 0.79 trips per dwelling for the AM and PM peak periods, respectively.

It is noted that the rates for the Orange Site are slightly higher than the overall regional rates outlined however, due to the date of survey in 2010 and the aim of the masterplan to provide public and active transport connectivity to the Orange City Centre, these rates were considered to be too high for the Redmond Place Site.

As a result, the average overall regional AM and PM peak rates were adopted for the TTA.

Medium density dwellings

For the medium density dwellings, the TfNSW Guide to Traffic Generating Developments (2002) specifies the following rates:

- **Smaller units and flats (up to two bedrooms)**
  - Weekday peak hour vehicle trips – 0.4-0.5 trips per dwelling
- **Larger units and town houses (three or more bedrooms)**
  - Weekday peak hour vehicle trips – 0.5-0.65 trips per dwelling

It is noted:

- The Technical Direction (2013) does not provide rates for medium density dwellings; accordingly the 2002 guide provides the best available rate.
- An assumption has been made that the medium density dwellings are more likely to be similar to townhouses or larger units as the dwellings designated as apartments are identified separately
- As a result, the larger units and townhouses peak hour trip generation rate has been adopted for the medium density residential dwellings at the Site. A value of 0.6 trips per dwelling was chosen as a mid-point of the range between the other dwelling types.

Apartments

For the 66 apartments proposed on the Site the TfNSW Guide to Traffic Generating Developments was used as a guide with the following regional rates/ ranges identified:

- **Average AM peak –** 0.53 trips per dwelling
- **AM Peak Range –** 0.39-0.67 trips per dwelling
- **Average PM peak –** 0.32 trips per dwelling
- **PM Peak Range –** 0.22-0.42 trips per dwelling

A review of the high-density surveys in the 2013 Guide for Traffic Generating Developments was undertaken; however, none of the specific Sites are closely related to the Redmond Place Site in terms of regional context.

The 2002 RTA Guide to Traffic Generating Development rates were examined with high-density residential flat buildings having a rate of 0.29 trips per unit for peak hours. It was noted that this was on the lower end of the PM peak range and out of the AM peak range provided in the 2013 guide.

As a result, the average AM and PM peak trip generation rates were adopted in order to provide a more conservative estimate of trips resulting from the apartments.

Adopted trip generation rates

A summary of the adopted trip rates in accordance with the available TfNSW guidelines is presented in Table 4.2.

Table 4.2 Adopted trip generation rates

Dwelling type	AM peak period	PM peak period
Low density	0.71 trips/dwelling	0.78 trips/dwelling
Medium density	0.6 trips/dwelling	0.6 trips/dwelling
Apartment	0.53 trips/unit	0.32 trips/unit

A summary of the calculated trips generated by zone and dwelling type is presented in Table 4.3, and the total trips generated for both peak hour periods for the whole Site are presented in Table 4.4.

Table 4.3 Trips generated by zone and dwelling type

Zone	Dwelling Type	Number of dwellings	AM Peak			PM Peak		
			Trip Generation Rate	Number of trips generated	Total number of trips	Trip Generation Rate	Number of trips generated	Total number of trips
1	Low density	23	0.71	16	66	0.78	16	58
	Medium density	51	0.60	30		0.60	30	
	Apartment	37	0.53	20		0.32	12	
2	Low density	37	0.71	25	56	0.78	29	54
	Medium density	26	0.60	16		0.60	16	
	Apartment	29	0.53	15		0.32	9	
3	Low density	74	0.71	53	84	0.78	58	90
	Medium density	53	0.60	32		0.60	32	
	Apartment	0	0.53	0		0.32	0	

Table 4.4 Total AM and PM peak hour trips generated

	AM Peak	PM Peak
All zones	206	202

The data Table 4.3 indicates the project will generate 206 trips in the AM peak hour and 202 trips in the PM peak hour.

4.1.4 Inbound and outbound trips

To calculate the split of inbound and outbound trips during peak periods of road network activity, reference has been made to the Institute of Transport Engineers (ITE) Trip Generation Manual 10th Edition. Two different splits were used in the single-family detached housing and multifamily housing (low-rise) residential rates to account for the different dwelling types present at the project site.

The rates outlined in Table 4.5 were identified in the ITE guide and used to calculate the inbound and outbound trip volumes, which are presented in Table 4.6 and Table 4.7.

Table 4.5 Inbound and outbound trip percentages by dwelling type and peak period

Dwelling Type	AM Peak		PM Peak	
	Inbound %	Outbound %	Inbound %	Outbound %
Low density	25%	75%	63%	37%
Medium density	25%	75%	63%	37%
Apartments	23%	77%	63%	37%

Table 4.6 Inbound and outbound trips by dwelling type and zone

Zone	Dwelling Type	AM Peak			PM Peak		
		Number of trips	Inbound trips	Outbound Trips	Number of trips	Inbound trips	Outbound Trips
1	Low density	16	4	12	16	10	6
	Medium density	30	8	22	30	19	11
	Apartment	20	5	15	12	8	4
2	Low density	25	6	19	29	18	11
	Medium density	16	4	12	16	10	6
	Apartment	15	4	11	9	6	3
3	Low density	53	13	40	58	37	21
	Medium density	32	8	24	32	20	12
	Apartment	0	0	0	0	0	0

Table 4.7 Total inbound and outbound trips by zone and peak period

Zone	AM Peak		PM Peak	
	Inbound	Outbound	Inbound	Outbound
1	17	49	37	21
2	13	42	34	20
3	21	64	57	33
Total	**51**	**155**	**128**	**74**

The ITE rates indicate that trips are predominantly outbound in the AM peak and inbound in the PM peak, which is consistent with commuter travel to and from residential dwellings.

4.2 Trip distribution

To distribute the generated trips to the surrounding road network, it was decided that splitting the generated trip volumes distributions would be done by each zone. The assumptions and methodology of the distribution for each zone are outlined below. It is noted that the proposed trip distribution methodology was presented to OCC and TfNSW in the stakeholder meeting of 3rd April 2024.

4.2.1 Zone one

The trips generated from zone one, as detailed in section 4.1.3 were assumed to utilise the two northern access points in Lone Pine Avenue and Redmond Place, as trips entering or leaving via Dairy Creek Road were deemed to be unlikely.

To distribute the trips likely origins and destinations throughout the road network, it was assumed that a majority of trips would be travelling to and from the direction of Orange City Centre in the most direct route available, with most utilising the Redmond Place intersection compared to Lone Pine Avenue.

The split of inbound and outbound trips to their respective turning movements are shown in Figure 4.3 and are as follows:

- **Lone Pine Avenue access –** 80 percent of all trips generated in zone one
  - Inbound trips:
    - 20 percent of trips turning right from the south approach
    - 80 percent of trips turning left from the north approach
  - Outbound trips:
    - 20 percent of trips turning left and heading south along Lone Pine Avenue
    - 80 percent of trips turning right and heading north along Lone Pine Avenue
- **Redmond Place access** – 20 percent of all trips generated in zone one
  - Inbound trips:
    - 80 percent of trips turning right from the northwest approach
    - 20 percent of trips turning left from the southeast approach
  - Outbound trips:
    - 80 percent of trips turning left and heading northwest along Bathurst Road
    - 20 percent of trips turning right and heading southeast along Bathurst Road

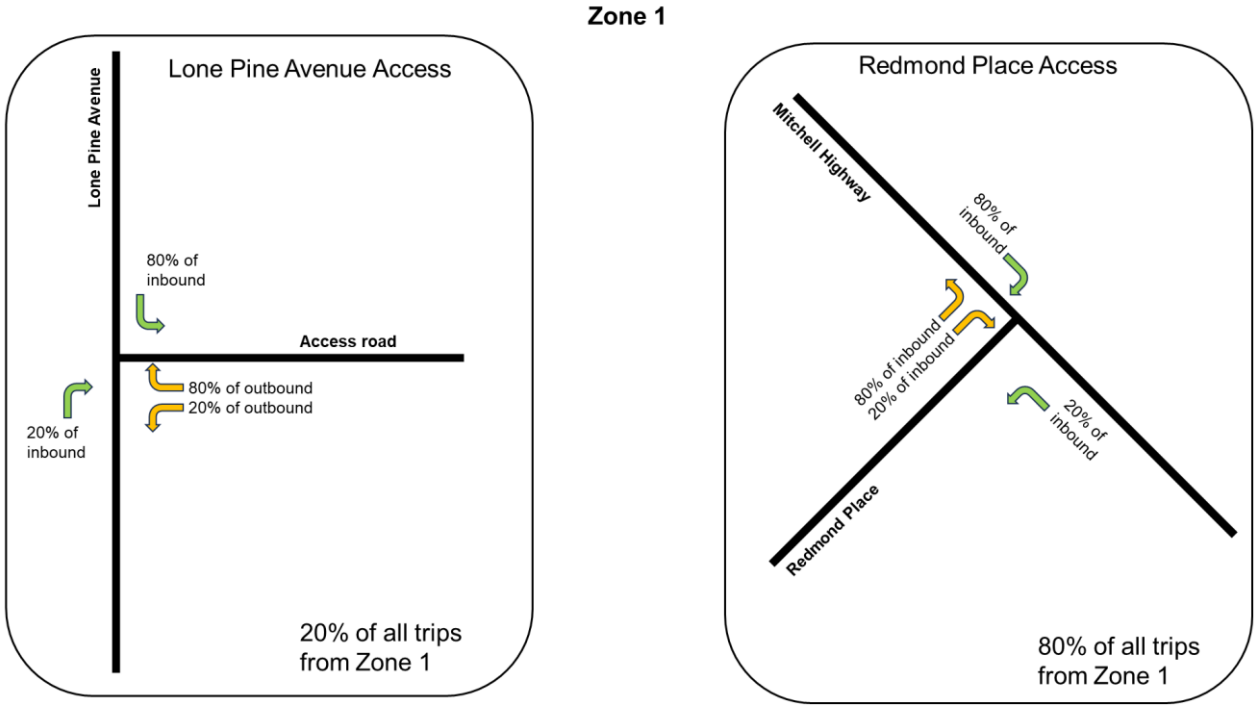

Figure 4.3 Zone one trip distributions for turning movements

4.2.2 Zone two

The trips generated from zone two that were calculated in section 4.1.3 were assumed to travel to and from the Site via all three access points. To distribute the trips likely origins and destinations throughout the road network it was assumed that a majority of trips would be travelling to and from the direction of Orange City Centre in the most direct route available, with a majority of trips utilising the Redmond Place intersection and an equal amount via Lone Pine Avenue and Dairy Creek Road.

The split of inbound and outbound trips to their respective turning movements are shown in Figure 4.4 and are as follows:

- **Lone Pine Avenue access –** 15 percent of all trips generated in zone two
  - Inbound trips:
    - 20 percent of trips turning right from the south approach
    - 80 percent of trips turning left from the north approach
  - Outbound trips:
    - 20 percent of trips turning left and heading south along Lone Pine Avenue
    - 80 percent of trips turning right and heading north along Lone Pine Avenue
- **Redmond Place access** – 70 percent of all trips generated in zone one
  - Inbound trips:
    - 80 percent of trips turning right from the northwest approach
    - 20 percent of trips turning left from the southeast approach
  - Outbound trips:
    - 80 percent of trips turning left and heading northwest along Bathurst Road
    - 20 percent of trips turning right and heading southeast along Bathurst Road
- **Dairy Creek Road access** – 15 percent of all trips generated in zone one
  - Inbound trips:
    - 80 percent of trips turning right from the east approach

- 20 percent of trips turning left from the west approach

- Outbound trips:
  - 80 percent of trips turning left and heading east along Dairy Creek Road (toward Bathurst Road)
  - 20 percent of trips turning right and heading west along Dairy Creek Road

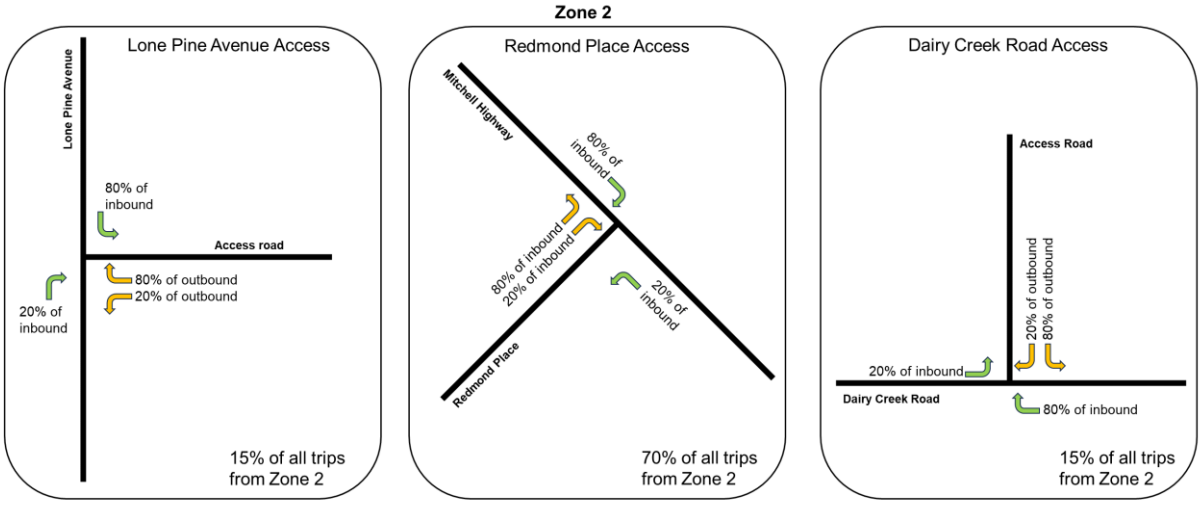

Figure 4.4 Zone two trip distributions for turning movements

4.2.3 Zone three

The trips generated from zone three calculated in section 4.1.3 were assumed to travel to and from the Site via the Dairy Creek Road and Redmond Place access points. To distribute the trips likely origins and destinations throughout the road network it was assumed that a majority of trips would be travelling to and from the direction of Orange City Centre in the most direct route available. A majority of trips were assumed to utilise Dairy Creek Road, with the rest utilising the Redmond Place access points.

The split of inbound and outbound trips to their respective turning movements are shown in Figure 4.5 and are as follows:

– **Redmond Place access** – 10 percent of all trips generated in zone one
  - Inbound trips:
    – 80 percent of trips turning right from the northwest approach
    – 20 percent of trips turning left from the southeast approach
  - Outbound trips:
    – 80 percent of trips turning left and heading northwest along Bathurst Road
    – 20 percent of trips turning right and heading southeast along Bathurst Road
– **Dairy Creek Road access**– 90 percent of all trips generated in zone one
  - Inbound trips:
    – 80 percent of trips turning right from the east approach
    – 20 percent of trips turning left from the west approach
  - Outbound trips:
    – 80 percent of trips turning left and heading east along Dairy Creek Road (toward Bathurst Road)
    – 20 percent of trips turning right and heading west along Dairy Creek Road

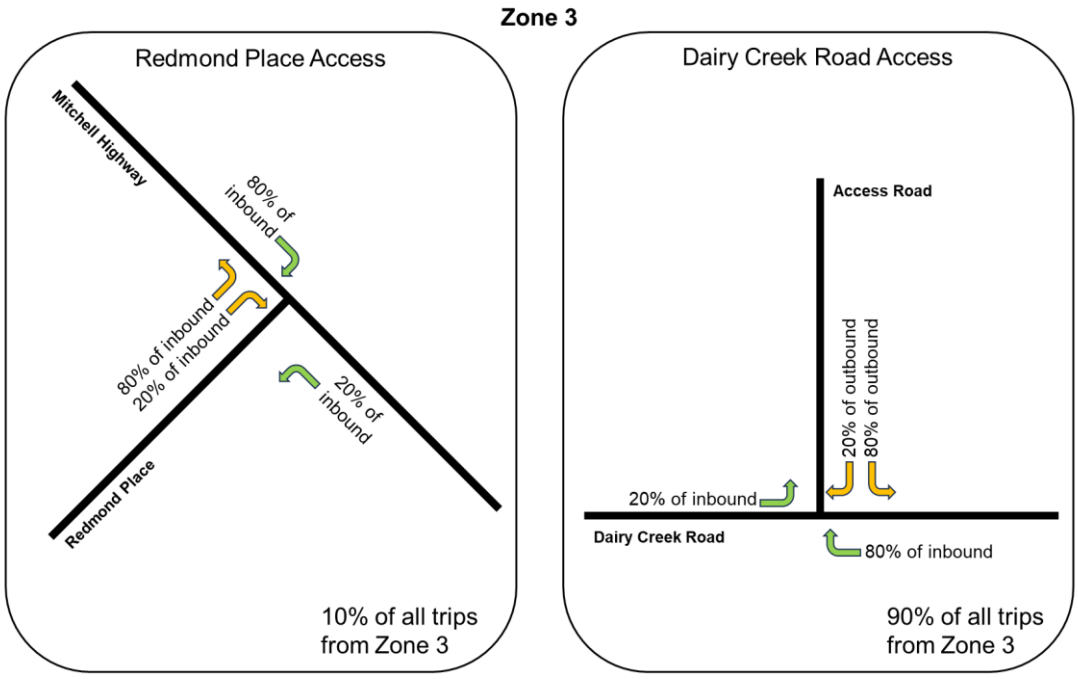

Figure 4.5 Zone three trip distributions for turning movements

4.2.4 Access point volumes

It was assumed that the trips generated travelling to and from the Site would not include any heavy vehicles. The generated vehicle trips for the three access points at the Site are outlined in Table 4.8.

Table 4.8 Redmond Site access points turning movement volumes

Intersection	Approach	Turning Movement	AM Peak (8 am – 9 am)			PM Peak (4:30 pm – 5:30 pm)		
			Total	Light	Heavy	Total	Light	Heavy
Redmond Place / Bathurst Road	Bathurst Road (northwest)	Right turn	20	20	0	47	47	0
	Redmond Place	Left turn	61	61	0	27	27	0
		Right turn	15	15	0	7	7	0
	Bathurst Road (southeast)	Left turn	5	5	0	12	12	0
Dairy Creek Road Access	Dairy Creek Road (west)	Left turn	4	4	0	11	11	0
	Site Access Road	Left turn	51	51	0	26	26	0
		Right turn	13	13	0	7	7	0
	Dairy Creek Road (east)	Right turn	17	17	0	45	45	0
Lone Pine Avenue Access	Lone Pine Avenue (north)	Left turn	4	4	0	10	10	0
	Site Access Road	Left turn	3	3	0	1	1	0
		Right turn	12	12	0	6	6	0
	Lone Pine Avenue (south)	Right turn	1	1	0	3	3	0

The stick figures showing the generated trips at each of the three access points are as follows:

– Lone Pine Avenue Access –Figure 4.6
– Dairy Creek Road Access –Figure 4.7
– Redmond Place Access –Figure 4.8.

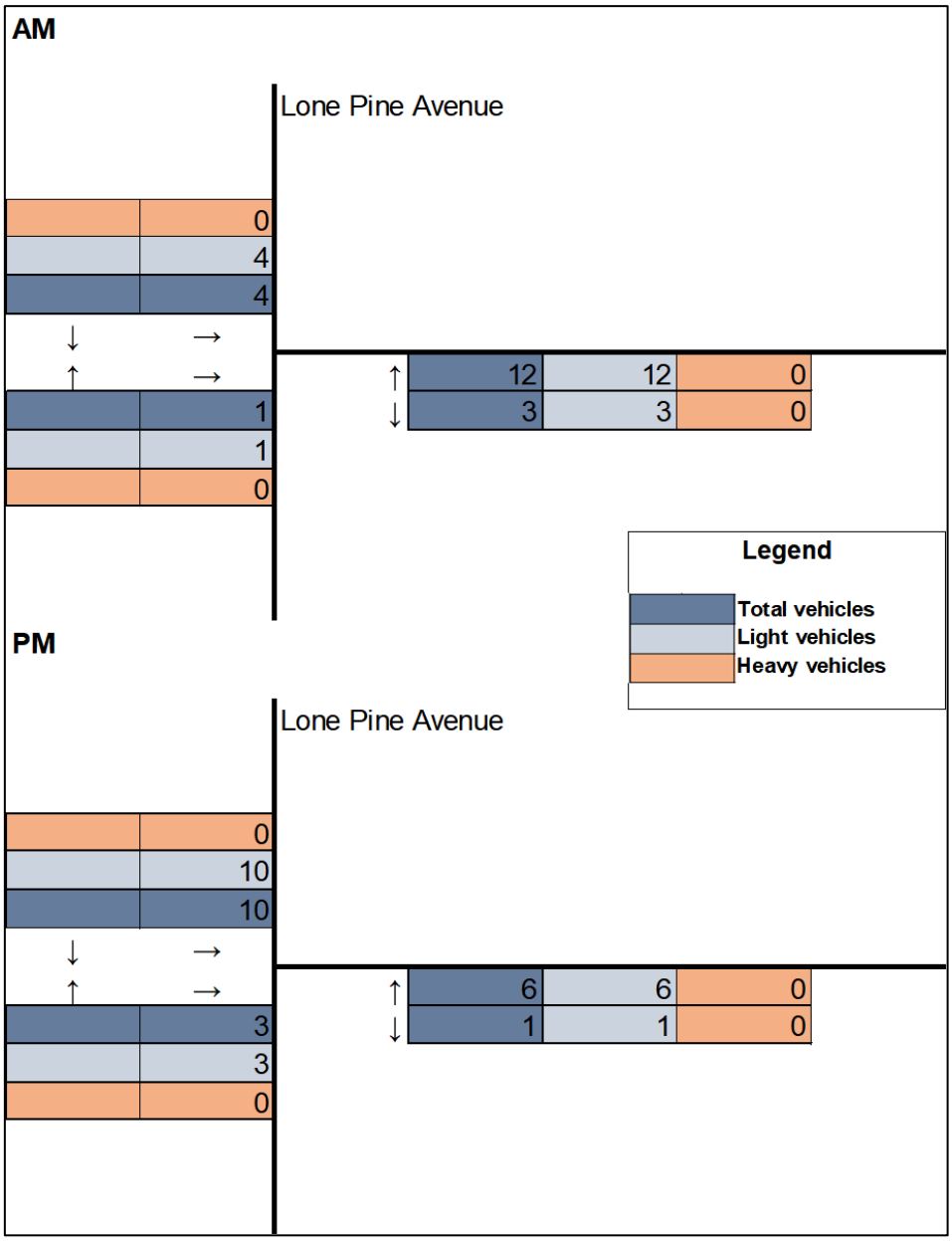

Figure 4.6 Lone Pine Avenue Access vehicle trips

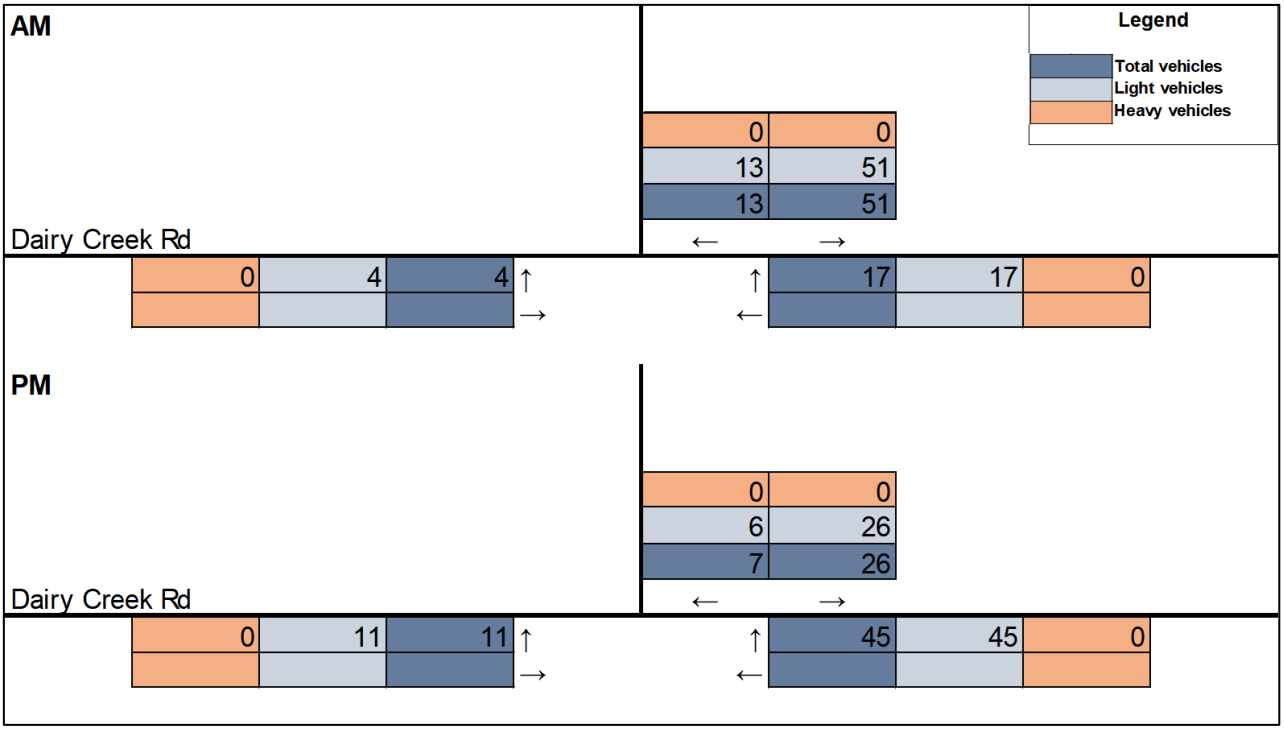

Figure 4.7 Dairy Creek Road Access vehicle trips

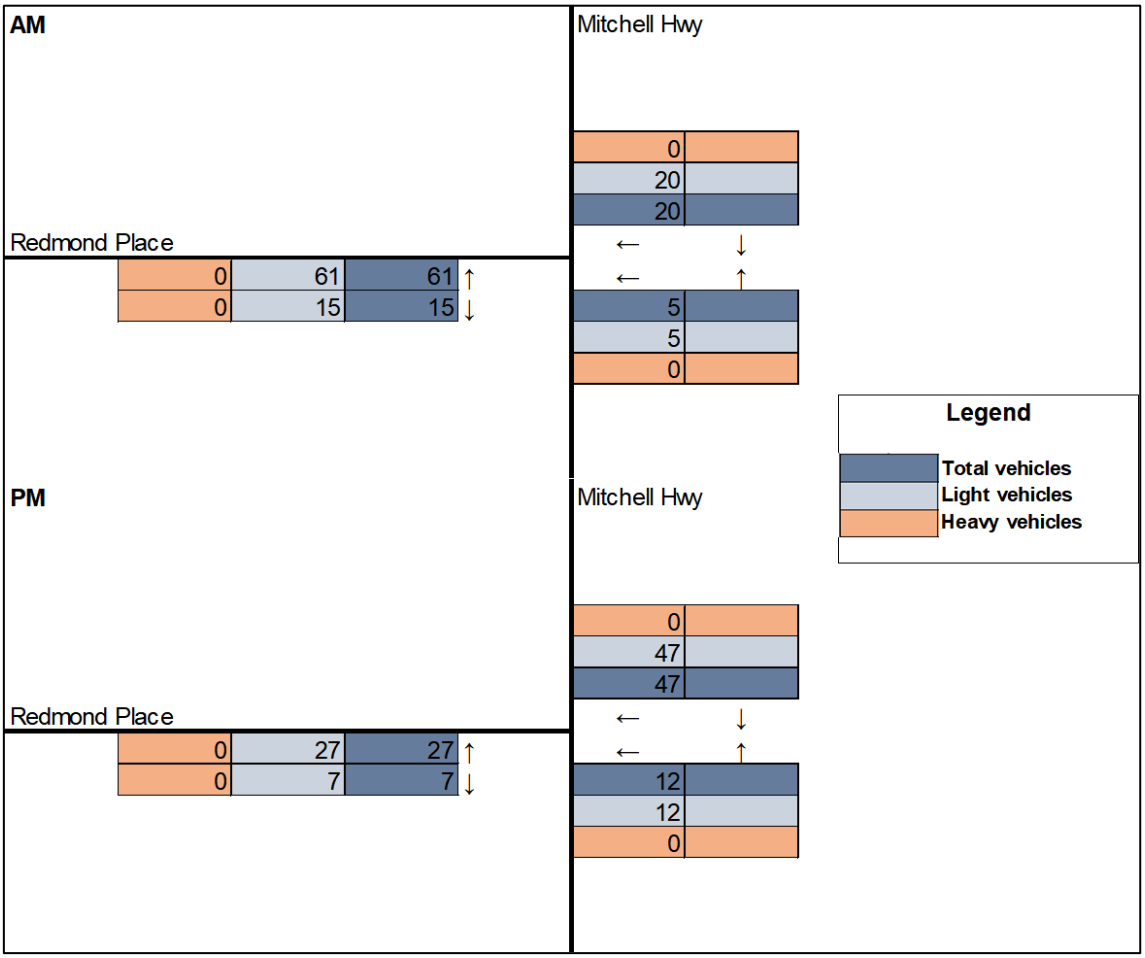

Figure 4.8 Redmond Place / Bathurst Road vehicle trips

Stick figures for the entire network for the 2040 traffic volumes with the Site access points, accounting for the background traffic growth (refer to Section 3.3) and generated traffic, are shown in Appendix A-5 and A-6.

5. Future year SIDRA analysis

To assess the traffic impacts of the project, future year traffic models for the horizon year of 2040 (2030 plus ten years) were prepared. The following three future scenarios were tested as part of this assessment:

– **No Development –** the road network in proximity to the Site with the current layout arrangements and with background traffic growth only.
– **With Development (No Upgrades) –** the road network in proximity to the Site with the current layout arrangements and the site access points on Lone Pine Avenue, Dairy Creek Road and Redmond Place. The traffic volumes include the background growth and the trips associated with the project (refer to Section 4.1**).**
– **With Development (including upgrades) -** the road network in proximity to the Site with upgraded intersection layouts to meet new demand requirements and with the project. This scenario was only modelled for intersections expected to operate with a poor LOS in the 2040 horizon year).

For the With Development scenario, the three proposed Site access points have been added to the SIDRA network, with the Adina Crescent / Lone Pine Avenue intersection and Lone Pine Avenue access point modelled as a separate network. The intersection IDs used in the 2024 SIDRA model are maintained in the 2040 models with the IDs for the proposed access points for the project as follows:

– Redmond Place/ Bathurst Road – SA1
– Dairy Creek Road access – SA2
– Lone Pine Avenue access – SA3

The network models used in the With Development scenarios are shown in Figure 5.1 and Figure 5.2.

Sections 5.1 to 5.3 provide the SIDRA results of each of the scenarios as well as an assessment of the model outputs.

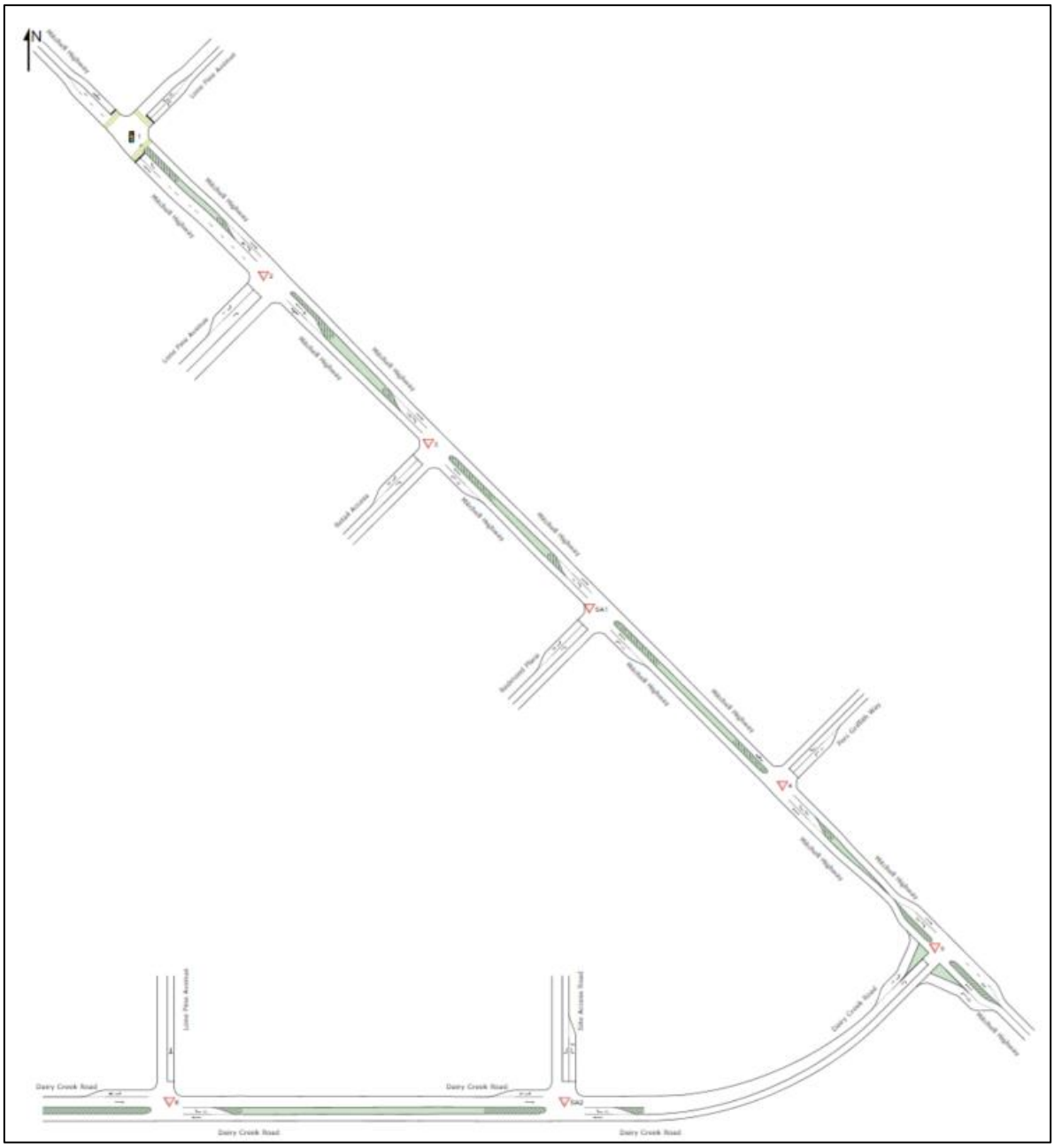

Figure 5.1 2040 SIDRA Network Layout (With development scenarios) – Bathurst Road and Dairy Creek Road

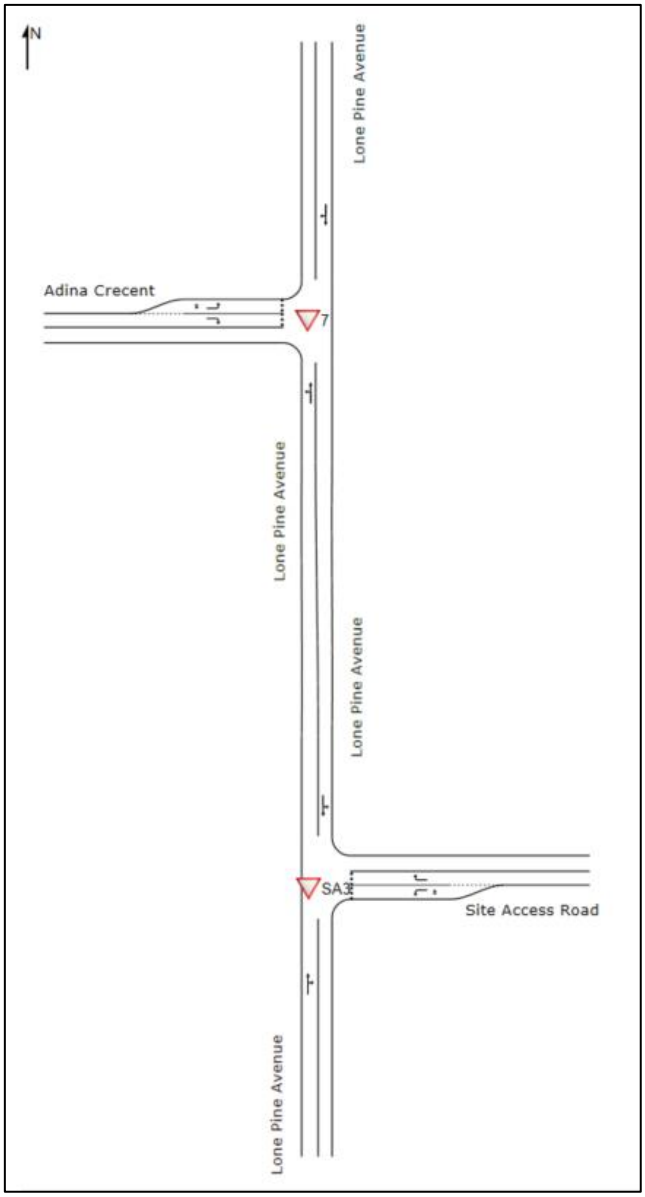

Figure 5.2 2040 SIDRA Network Layout (With development scenarios) – Lone Pine Avenue

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5.1 No development scenario

A summary of the results from the 2040 No Development scenario SIDRA model are presented below in Table 5.1. The full SIDRA outputs, including the network performance and intersection movement summaries, are in Appendix B-2.

Table 5.1 2040 No Development SIDRA results summary

Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:30 – 17:30)			
	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS
Bathurst Road / Lone Pine Avenue (Northwest)	18	B	86	0.72	17	B	73	0.65
Bathurst Road / Lone Pine Avenue (Southeast)	15	B	46	0.77	8.4	A	22	0.47
Bathurst Road / Retail Access	21	C	1.5	0.26	14	B	1.6	0.16
Bathurst Road / Perc Griffith Way	15	B	2.5	0.25	20	C	4.7	0.21
Bathurst Road / Dairy Creek Road	10	B	11	0.34	8.8	A	3.8	0.20
Dairy Creek Road / Lone Pine Avenue	183	F	73	1.01	22	C	8.6	0.35
Lone Pine Avenue / Adina Crescent	6.3	A	3.3	0.14	12	A	4.2	0.18

Notes:

The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.

The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.

Analysis of the 2040 No Development SIDRA results indicate the following:

– Nearly all intersections operate at or above an acceptable level of service (LoS D), with the exception of the Dairy Creek Road / Lone Pine Avenue intersection
– For all intersections except the Dairy Creek Road / Lone Pine Avenue intersection:
  - The degree of saturation for both peak periods is below the target maximum of 0.8 for priority controlled intersections and 0.9 for signal controlled intersections.
  - Other intersections, not including Bathurst Road and Lone Pine Avenue intersections, did not have any observed issues with respect to queue lengths and delays.
– For the Dairy Creek Road / Lone Pine Avenue intersection:
  - It is operating at a level of service F in the AM peak with a level of service C in the PM peak
  - In the AM peak, significant delays (183 seconds) were observed in the model. The delay and queue lengths in the PM peak modelled were within acceptable levels.
  - The degree of saturation in the AM of 1.01 indicates that the forecast demand on the intersection is exceeding the intersection capacity. The capacity is sufficient for the PM peak volumes forecast.

Figure 5.3 and Figure 5.4 show the degree of saturation for the 2040 No Development intersections. While Figure 5.5 and Figure 5.6 show the level of service for each lane for the 2040 No Development intersections.

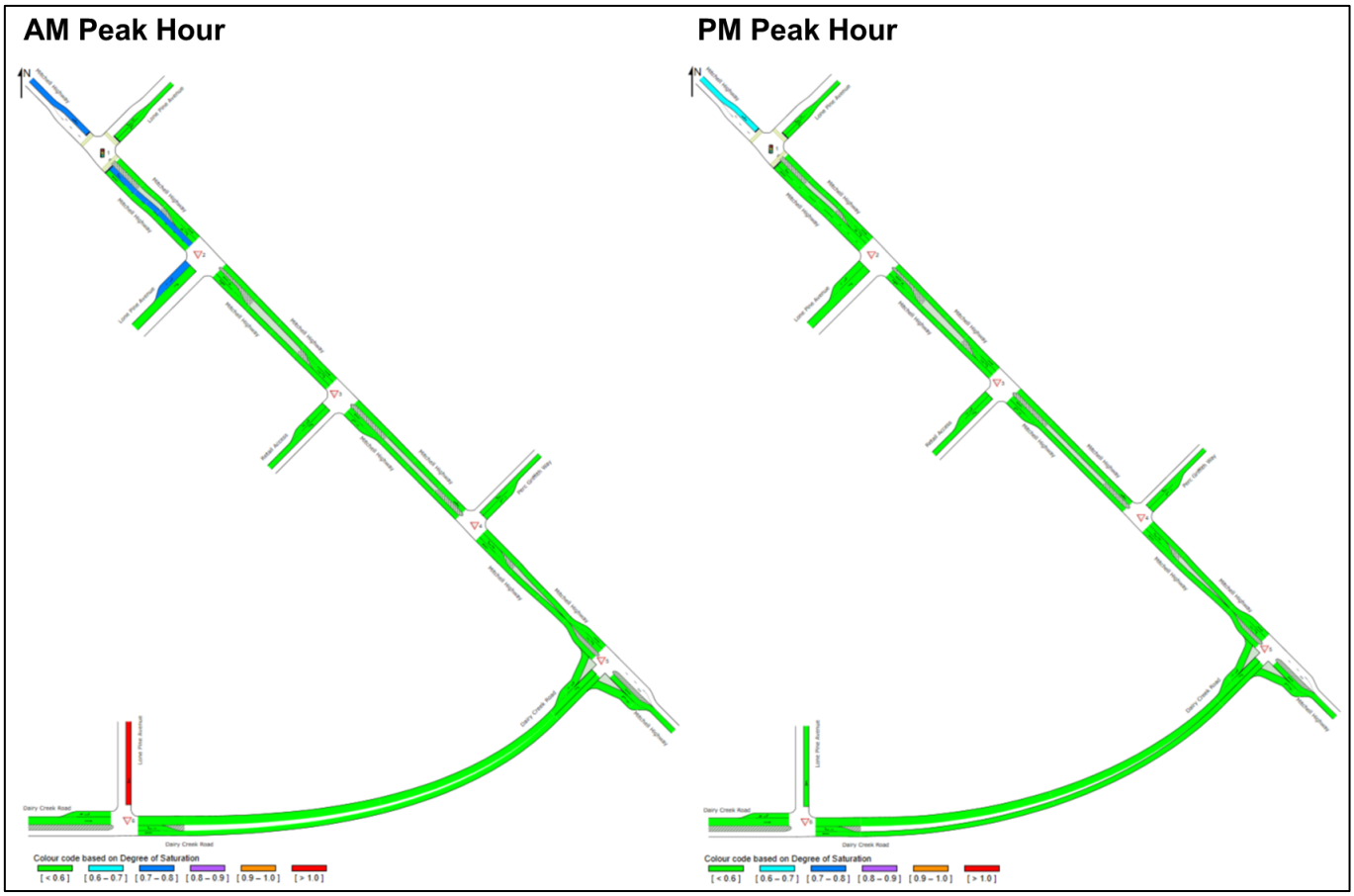


Figure 5.3 2040 No Development SIDRA network output – Degree of saturation

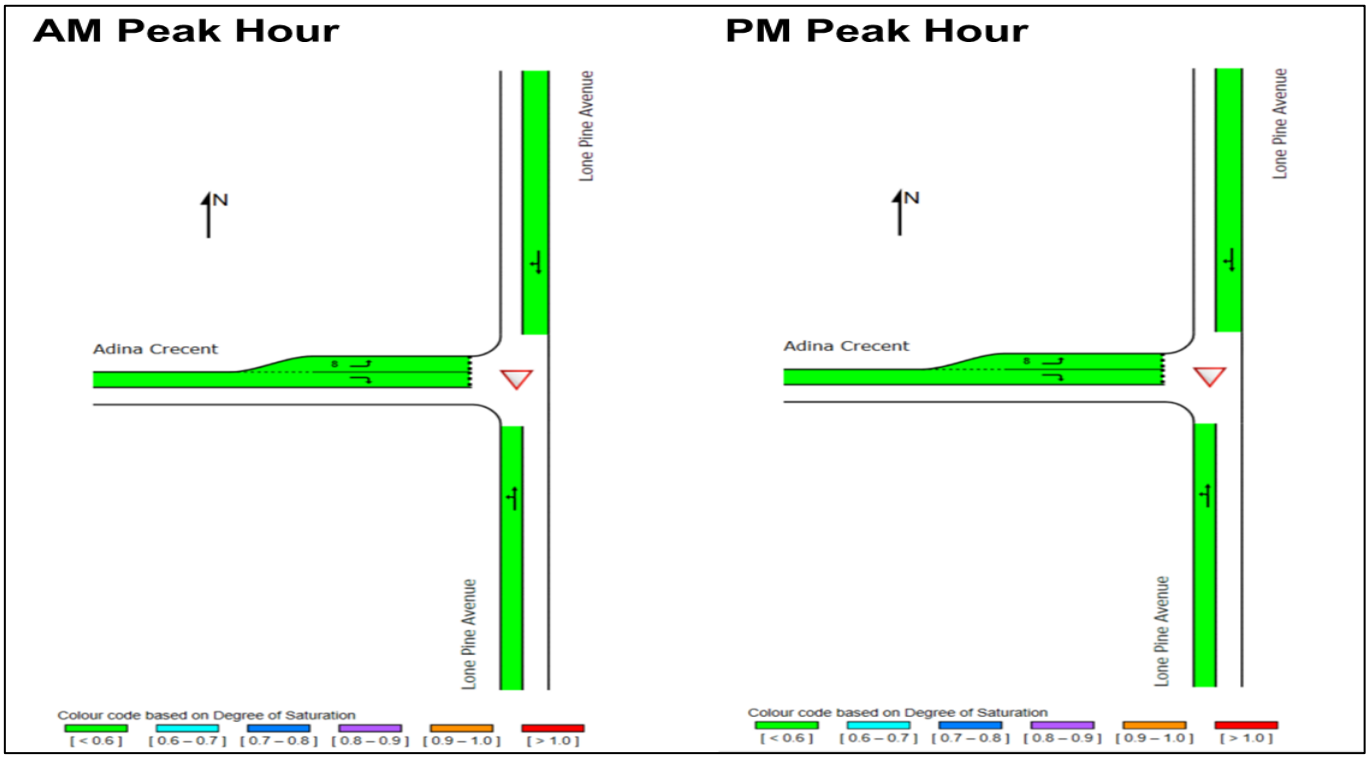


Figure 5.4 2040 No Development SIDRA Lone Pine Avenue/ Adina Crescent output – Degree of saturation

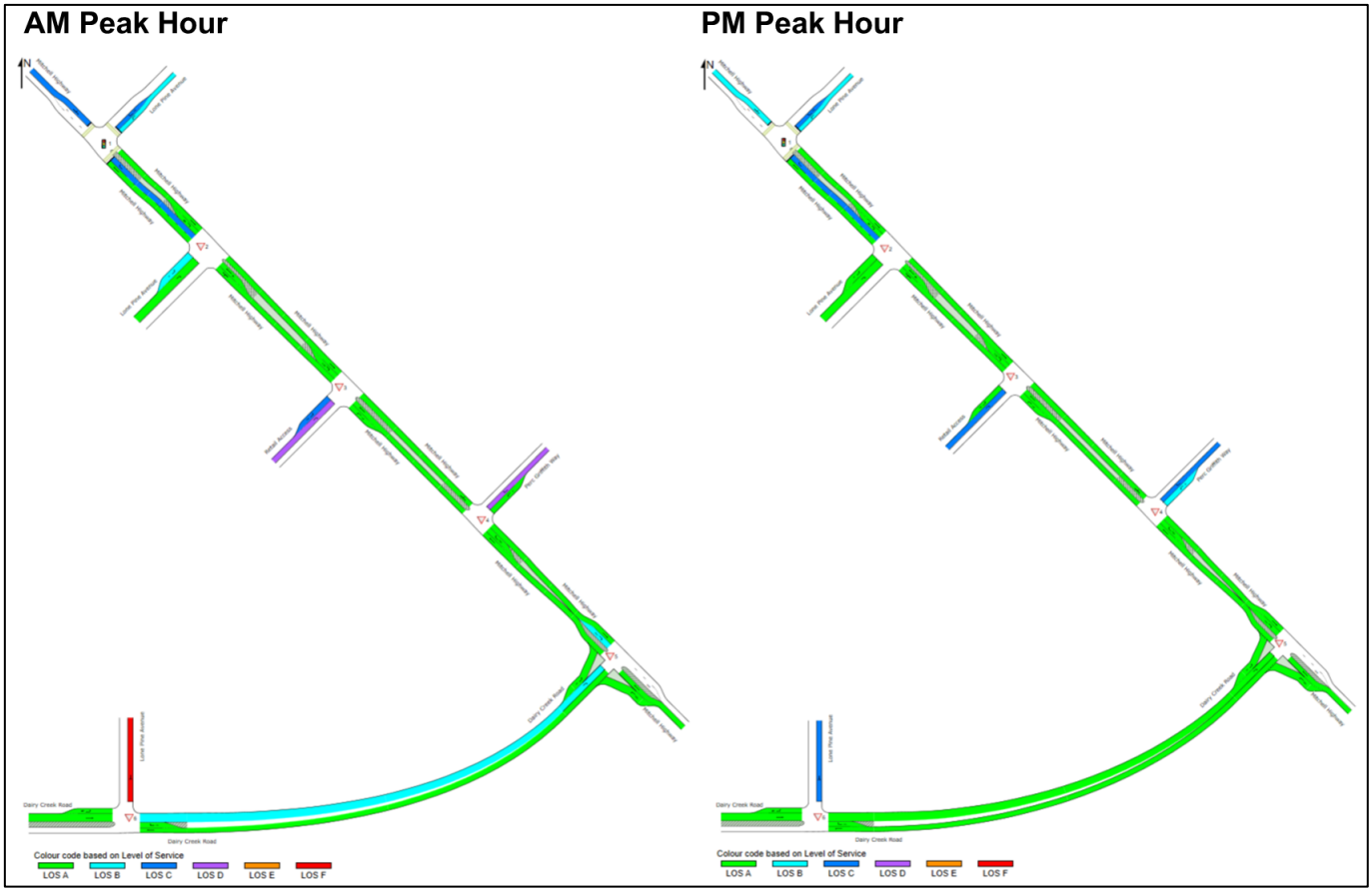


Figure 5.5 2040 No Development SIDRA network output – Level of service

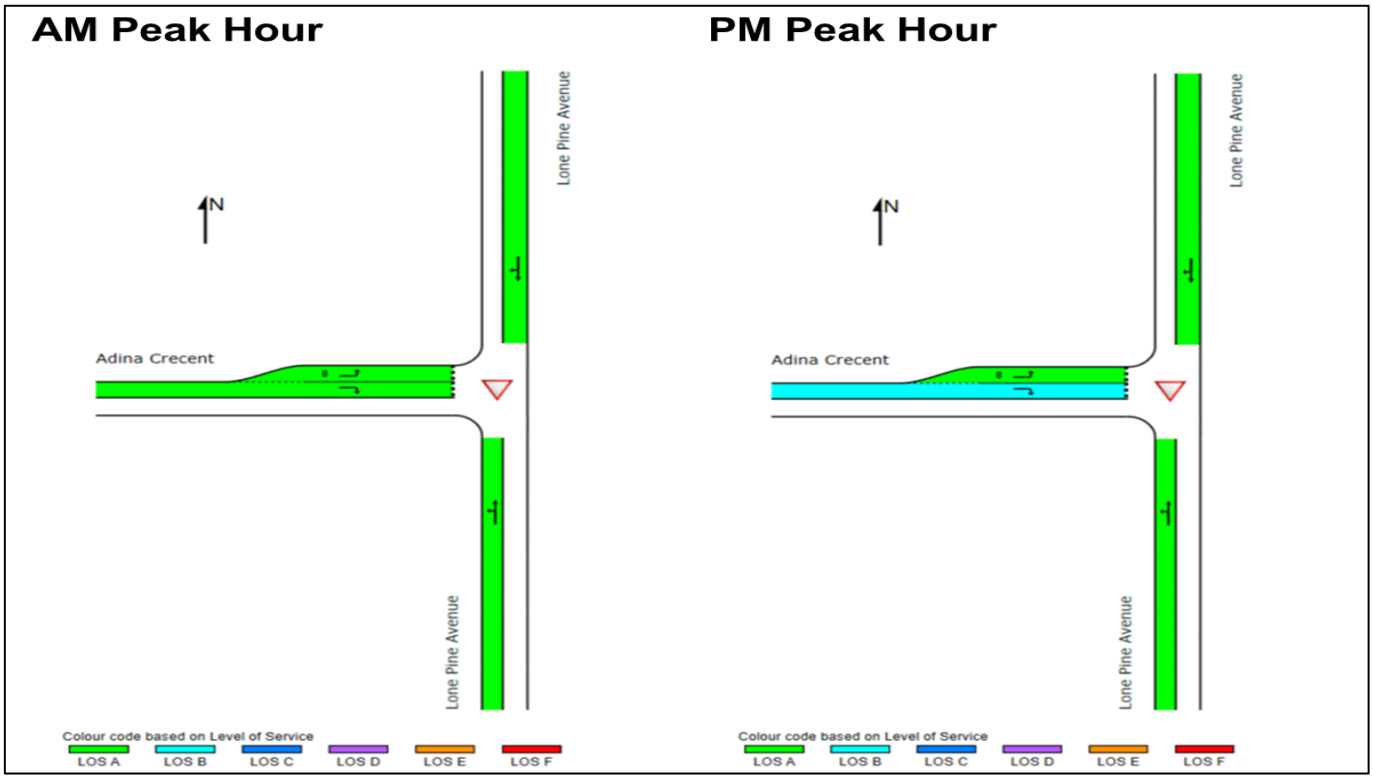


Figure 5.6 2040 No Development SIDRA Lone Pine Avenue/ Adina Crescent output – Level of service

5.2 With development (no upgrades) scenario

A summary of the results from the 2040 With Development (no upgrades) SIDRA model are presented in Table 5.2. The full SIDRA outputs, including the network performance and intersection movement summaries are presented in Appendix B-3.

Table 5.2 2040 With Development (No Upgrades) SIDRA results summary

Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:30 – 17:30)			
	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS
Bathurst Road / Lone Pine Avenue (Northwest)	18	B	97	0.75	17	B	73	0.65
Bathurst Road / Lone Pine Avenue (Southeast)	28	D	90	0.95	9.1	A	25	0.49
Bathurst Road / Retail Access	25	C	1.7	0.29	14	B	1.6	0.16
Bathurst Road / Perc Griffith Way	16	C	2.6	0.26	17	C	4.2	0.19
Bathurst Road / Dairy Creek Road	11	B	12	0.38	7.1	A	4.1	0.22
Dairy Creek Road / Lone Pine Avenue	188	F	75	1.02	20	C	8.1	0.33
Lone Pine Avenue / Adina Crescent	6.4	A	3.4	0.14	12	B	4.2	0.19
Redmond Place / Bathurst Road	7.3	A	2.2	0.27	5.5	A	0.9	0.14
Dairy Creek Road access	6.0	A	1.6	0.21	4.9	A	0.7	0.13
Lone Pine Avenue access	4.2	A	0.1	0.10	4.3	A	0.1	0.12

Notes:

The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.

The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.

Analysis of the SIDRA results indicate the following:

– Nearly all intersections operate at or above an acceptable level of service (LoS D) with the exception of the Dairy Creek Road / Lone Pine Avenue intersection

– For all intersections except the Dairy Creek Road / Lone Pine Avenue intersection:
  - The degree of saturation for both peak periods are mostly below the target maximum of 0.8 for priority controlled intersections and 0.9 for signal controlled intersections. The exception to this is the priority intersection of Lone Pine Avenue and Bathurst Road.
  - Other intersections, not including Bathurst Road and Lone Pine Avenue intersections, did not have any observed issues with queue lengths or delays

– For the Dairy Creek Road / Lone Pine Avenue intersection:
  - It is operating at a level of service F in the AM peak with a level of service C in the PM peak
  - In the AM peak significant delays (187 seconds) were observed in the model. The delay and queue lengths in the PM peak modelled were within acceptable levels.
  - The degree of saturation in the AM of 1.02 indicates that the forecast demand on the intersection is exceeding the intersection capacity. The capacity is sufficient for the PM peak volumes forecast.

When comparing the No Development and With Development (no upgrade) SIDRA results the impact of the project on the surrounding road network can be assessed. The following impacts were identified:

– Performance of Bathurst Road / Lone Pine Avenue (Southeast) intersection in the AM peak has gone from an LoS B to an LoS D, indicating the additional traffic impact delay times at the Site
    - The increase in delay is due to the lower level of service and higher degree of saturation in the left hand turn at this intersection onto Bathurst Road. It is noted that the performance is still at an acceptable level however, the 2040 model forecasts high volumes of traffic utilising the left-hand turn onto Bathurst Road.
– Additional traffic volumes throughout the network along Dairy Creek Road and Lone Pine Avenue are causing increased delay times, degree of saturation and queuing at the intersection of Dairy Creek Road and Lone Pine Avenue in the AM peak period. These observed increases are, however, deemed to be minor with the No Development case already performing at a LoS F for the AM peak.

Accordingly, the intersection of Lone Pine Avenue and Dairy Creek Road may require upgrading whether or not the project is constructed. Upgrades and mitigation measures to address the capacity concerns at this intersection are discussed in sections 5.3 and 5.4.

Figure 5.7 and Figure 5.8 show the degree of saturation for the 2040 With Development intersections. While Figure 5.9 and Figure 5.10 show the level of service for each lane for the 2040 With Development intersections.

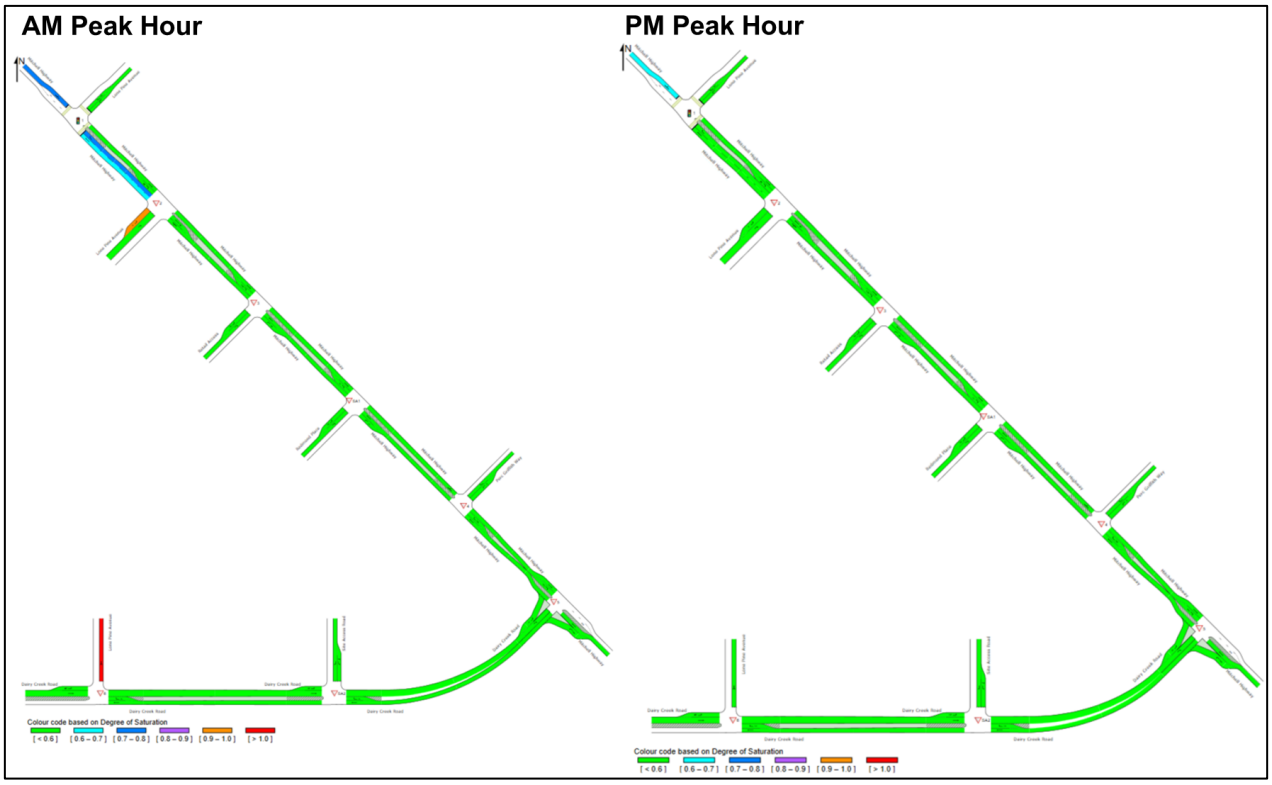


Figure 5.7 *2040 With Development (no upgrades) SIDRA Bathurst Road/ Dairy Creek Road network output – Degree of saturation*

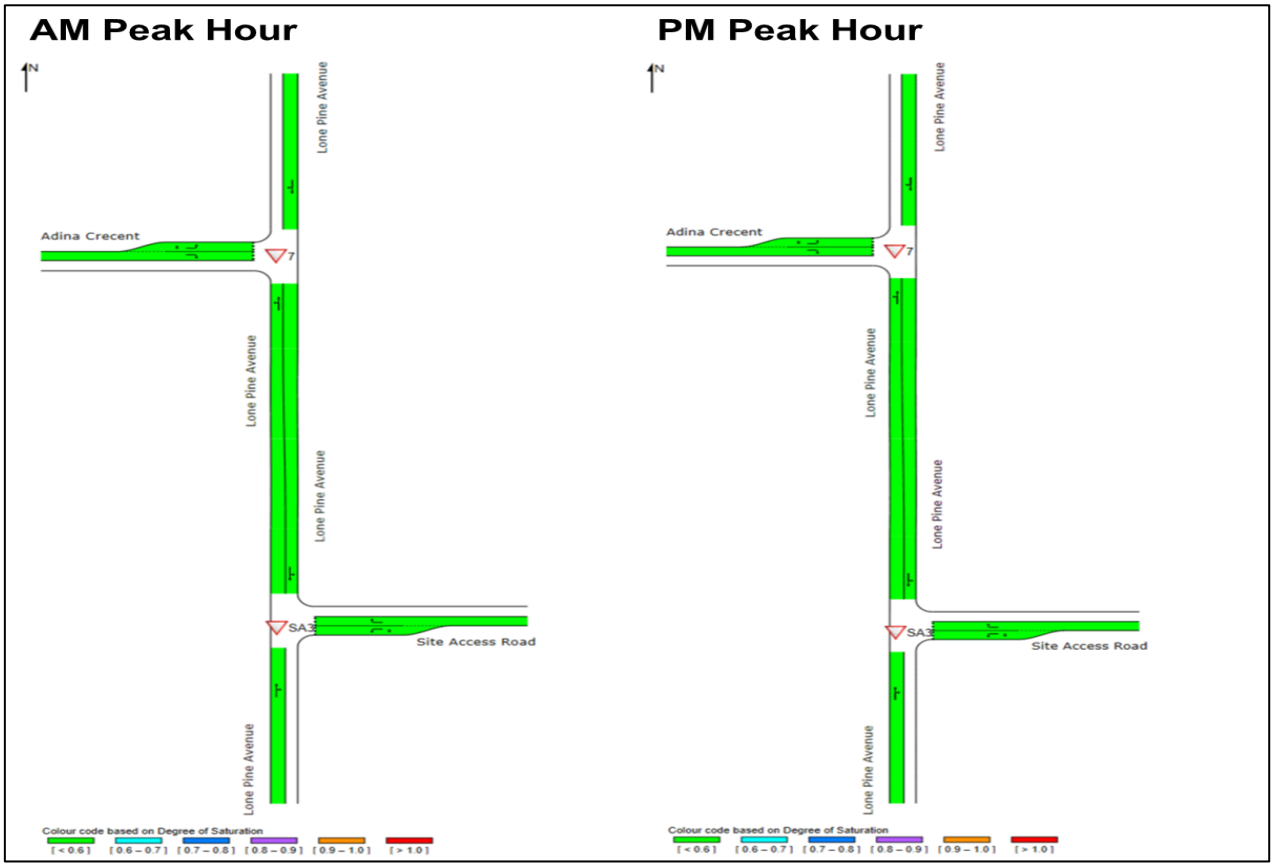


Figure 5.8 *2040 With Development (no upgrades) SIDRA Lone Pine Avenue network output – Degree of saturation*

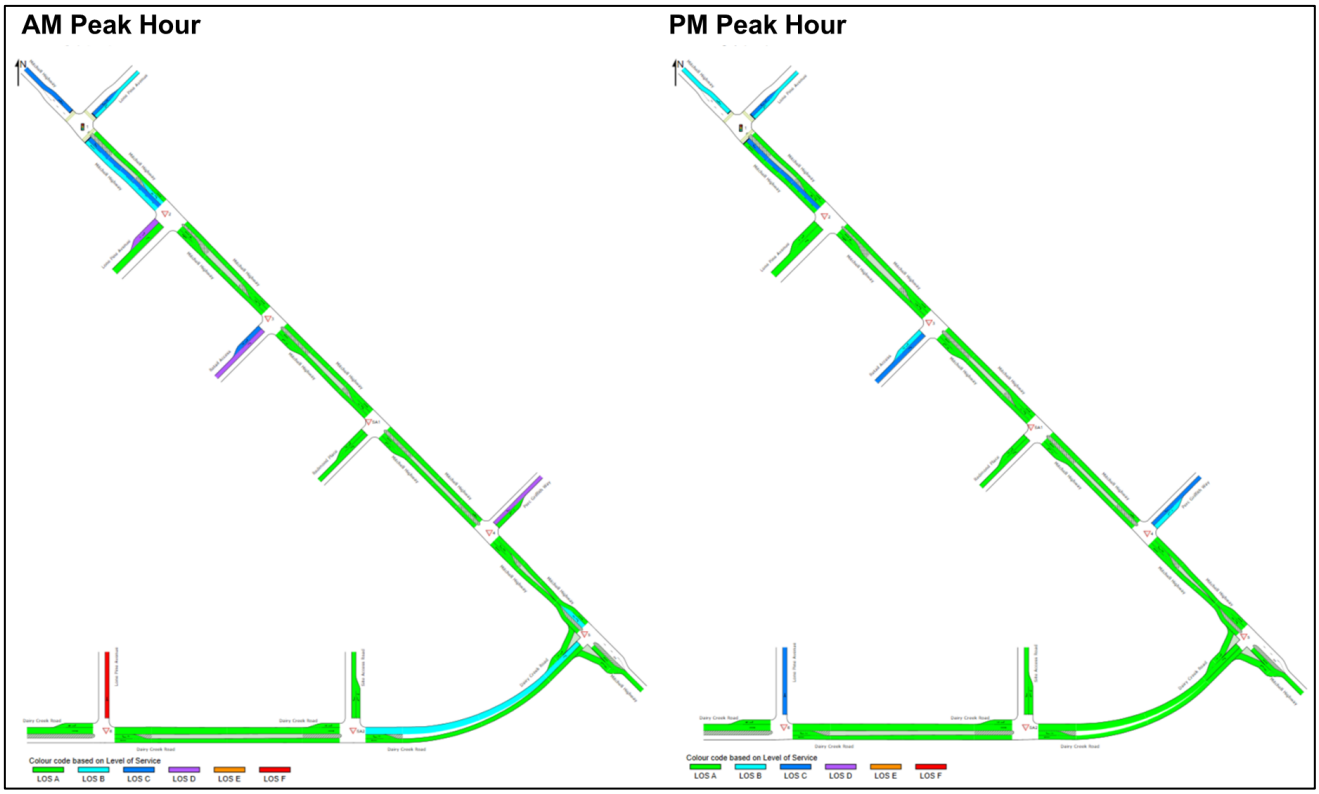


Figure 5.9 2040 With Development (no upgrades) SIDRA Bathurst Road/ Dairy Creek Road network output – Level of service

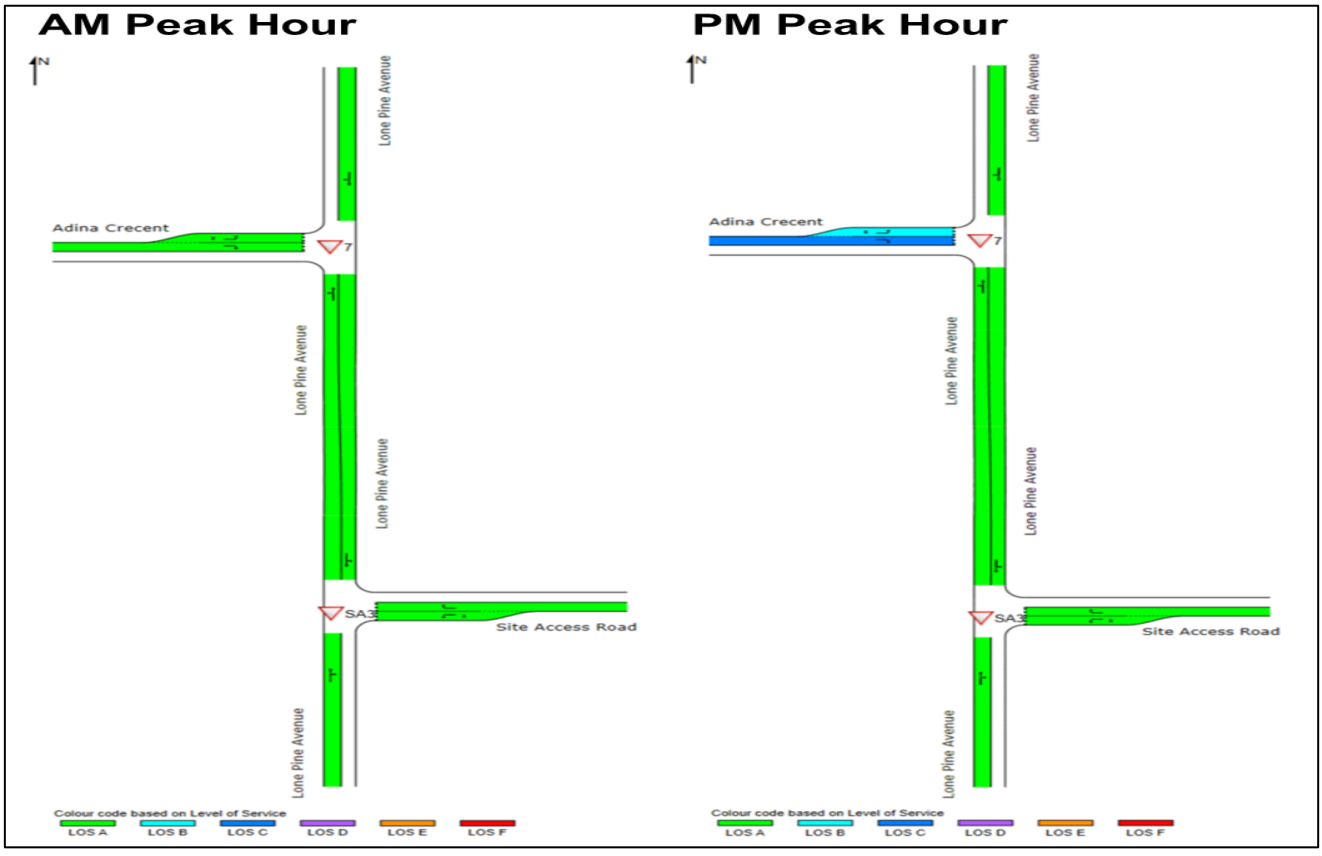


Figure 5.10 2040 With Development (no upgrades) SIDRA Lone Pine Avenue network output – Level of service

5.3 With development (including upgrades) scenario

Based on the analysis of the No Development and With Development (no upgrades) SIDRA results outlined above in sections 5.1 and 5.2, the following intersections were identified as requiring an upgrade to meet performance requirements:

– Dairy Creek Road/ Lone Pine Avenue

While lower performance at Bathurst Road/ Lone Pine Avenue (southeast) intersection was observed, the performance of the intersection was still at an acceptable level. All of the other intersections were operating above a level of service of D for the case With Development traffic.

To address the observed queuing, delay and capacity issues at the Dairy Creek Road and Lone Pine Avenue intersection, the following changes to the intersection layout have been modelled:

– A dedicated left hand turn lane on the Lone Pine Avenue approach with a length of 20 metres to allow simultaneous left and right-hand turns out of Lone Pine Avenue
– A 50 metre hold lane on the west approach has been added in the area where the median road markings are currently. This has been added to reduce the gap required for vehicles turning right out of Lone Pine Avenue, as the movement is no longer required to wait for a gap in the through movement from the east approach during the peak periods. [2]

In order to reflect the change in the proposed intersection configuration, the gap acceptance values for Lone Pine Avenue were lowered. This is because the right turning vehicles on Lone Pine are only required to give way to vehicles travelling in an easterly direction and can merge into westbound traffic. The amended gap acceptance values are the same as those at Bathurst Road and Dairy Creek Road intersection.

This was done as similar conditions were observed to the upgraded layout with the same posted speed limits (80 kilometres per hour), with the site also having a hold lane for the right hand turns out of Dairy Creek Road.

A comparison of the existing and upgraded SIDRA intersection layouts is presented in Figure 5.11.

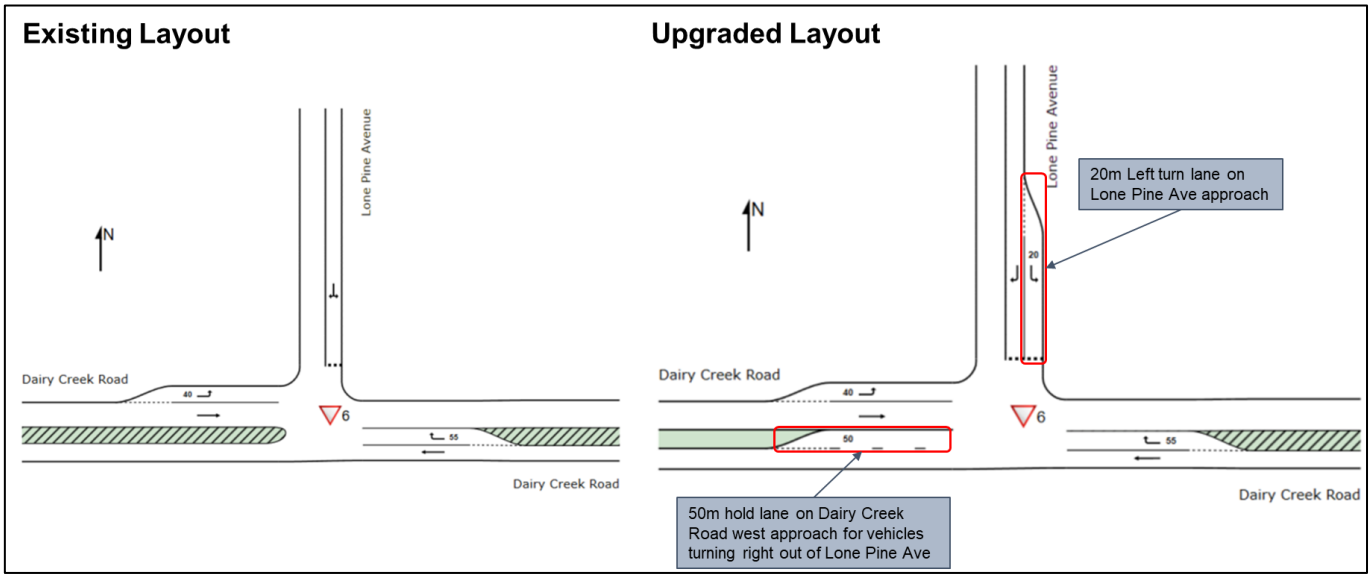


Figure 5.11 Dairy Creek Road / Lone Pine Avenue existing and upgraded layouts

The results for the upgraded intersection layout are presented below in Table 5.3. They demonstrate that the upgrades made to the layout address the identified issues with a level of service of A for both peak periods with low average delay, queue lengths and degree of saturation values modelled.

[2] Hold lane length for the right turn out of Lone Pine Avenue is indicative only. The required length is to be determined through the design process accounting for safe merging distance and distance from the adjoining intersections.

Table 5.3 Dairy Creek Road / Lone Pine Avenue With Development (including upgrades) SIDRA results summary

Intersection Name	AM Peak Hour (08:00 - 09:00)				PM Peak Hour (16:30 – 17:30)			
	Ave Delay (s)	LoS	95th % Queue (m)	DoS	Ave Delay (s)	LoS	95th % Queue (m)	DoS
Dairy Creek Road / Lone Pine Avenue	6.9	A	1.8	0.21	5.5	A	0.8	0.12

Notes:

The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.

The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement

The results of other intersections in the network remain the same as the With Development (no upgrade) scenario as outlined in section 5.2. The lane degree of saturation and level of service for both peak periods is shown in Figure 5.12 and Figure 5.13 respectively.

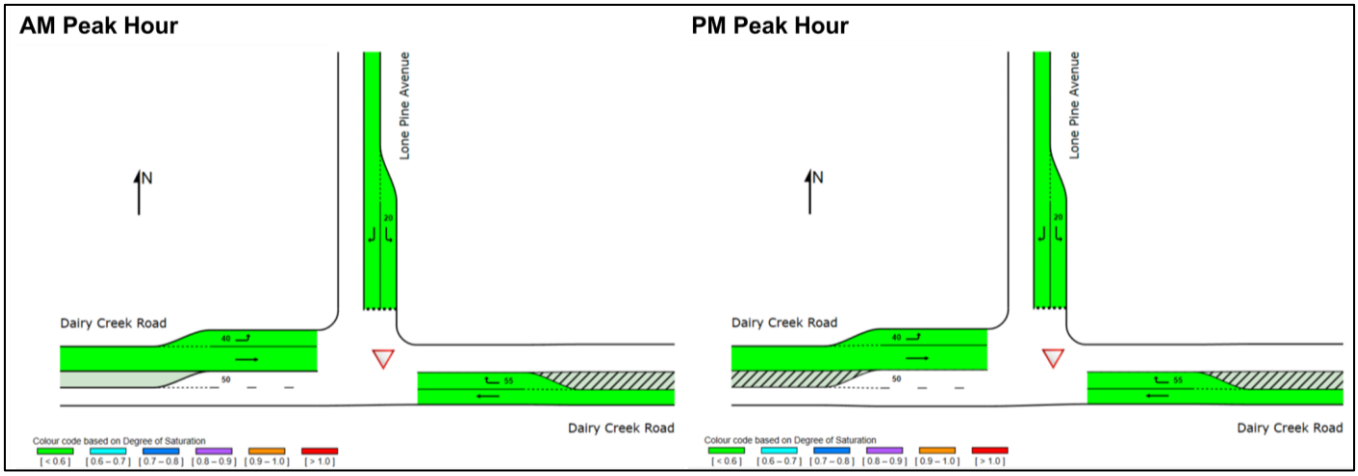


Figure 5.12 Upgraded Dairy Creek Road / Lone Pine Avenue intersection – Lane degree of saturation

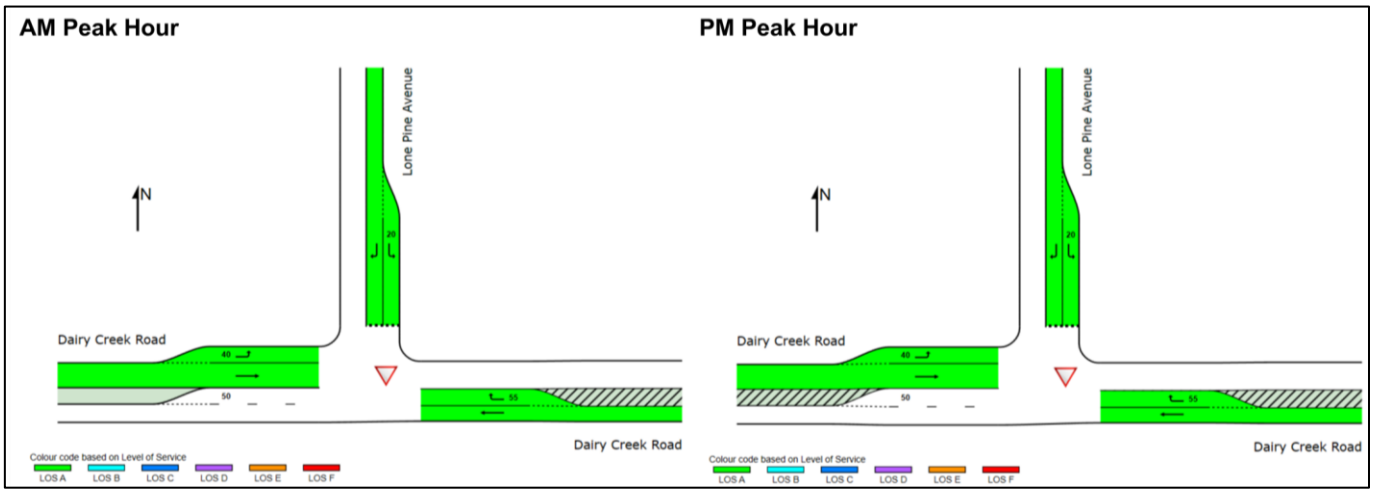


Figure 5.13 Upgraded Dairy Creek Road / Lone Pine Avenue intersection – Lane level of service

5.4 Key findings

Analysis of the 2040 SIDRA results identified the following key findings in relation to the impact of the development at the Redmond Place Site:

– The following intersections still operated above an acceptable level of performance (LoS C or better) with the additional generated traffic:
  - Bathurst Road and Lone Pine Avenue (northwest)
  - Bathurst Road and Perc Griffith Way
  - Bathurst Road and Dairy Creek Road
  - Lone Pine Avenue and Adina Crescent
– The following intersections were impacted by the additional traffic volumes however still operate at an acceptable level of performance (LoS D):
  - Bathurst Road and Lone Pine Avenue (southeast)
  - Bathurst Road and the Retail Access road (northwest of Redmond Place)
– The intersection of Dairy Creek Road and Lone Pine Avenue was operating at an LoS F in the AM peak period for both the with and without development scenarios, indicating requirements for upgrades to the existing intersection to meet forecast demands.

Based on the analysis of the prepared SIDRA model two suggested upgrades have been tested for the Dairy Creek Road and Lone Pine Avenue intersection with a dedicated left hand turning lane out of Lone Pine Avenue and a hold lane for vehicles turning right out of Lone Pine Avenue located along the west exit.

While lower performance at both the Bathurst Road/ Lone Pine Avenue (southeast) and Bathurst Road/ Retail Access intersections was observed, the performance of these intersections was still at an acceptable level. As a result, no changes to the current intersection layouts are required; however, monitoring these intersections to ensure that performance does not further decrease is recommended.

For the new proposed Redmond Place Site access points priority controlled intersections were modelled in line with nearby intersection locations. The Redmond Place and Bathurst Road intersection has been modelled as per the existing layout. The SIDRA results show that the assumed arrangements for these access points are sufficient, with a good performance indicated by the results. The layouts of these access points from the SIDRA model are shown in Figure 5.14

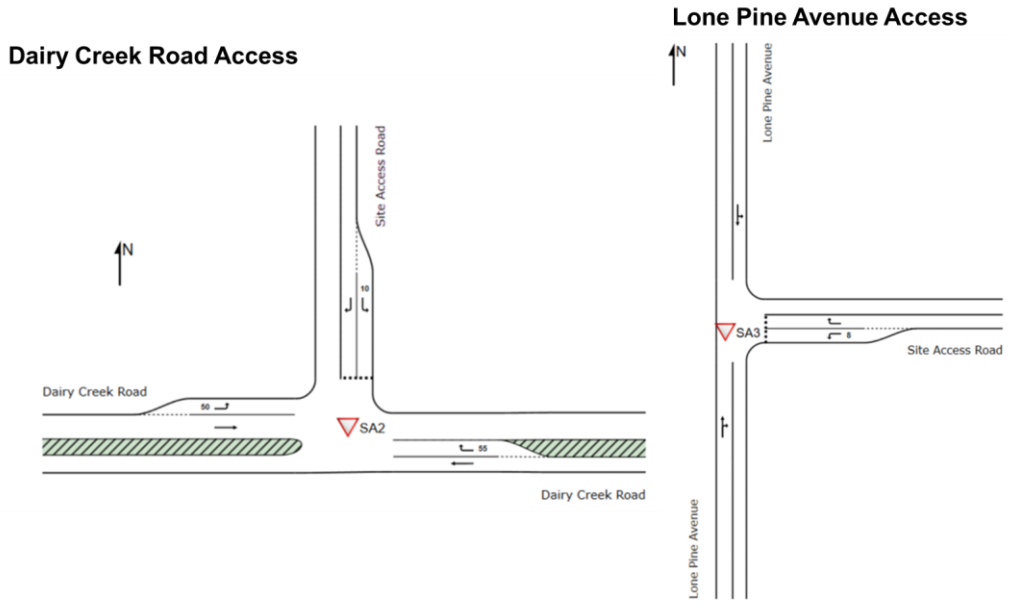


Figure 5.14 Dairy Creek Road and Lone Pine Avenue access layouts

6. Summary and recommendations

6.1 Summary of assessment

Landcom and OCC have signed a Project Delivery Agreement for the purposes of delivering the Redmond Place project. The Site is owned by OCC, and Landcom are taking the lead in preparing a planning proposal to amend the Orange Local Environmental Plan 2011 (LEP) to rezone the Site for residential uses. The Site is located on the southeast fringe of Orange and lies on the southern side of Redmond Place, bounded by Bathurst Road (on the northeast), Lone Pine Avenue (on the west) and Dairy Creek Road to the south.

GHD has been commissioned by Landcom to conduct a TTA for the project, including modelling the potential impacts of the development of the road network after the completion of construction.

Existing conditions assessment

The traffic and transport assessment undertaken included an assessment of the existing conditions at and around the Redmond Place Site. This assessment included a desktop investigation using Google Maps, Nearmap, Google Street View and other aerial imagery as well as online information such as the TfNSW Cycleway Finder, TfNSW Centre for Road Safety and TfNSW Trip Planner. Additionally, a base year SIDRA model for 2024 was constructed using data provided from traffic surveys.

The desktop assessment identified the current conditions of the road network, active transport facilities, public transport services and heavy vehicle permissions on adjacent roads, as well as current traffic volumes (including the peak hours) at key intersections around the Site location.

The 2024 base year SIDRA results demonstrate the following performance:

– All intersections were at or above an acceptable level of service in a LoS D based on average delay
– Queue lengths were all contained within the approach distances, with the exception of the signalised intersection of Lone Pine Avenue and Bathurst Road. Queues on the southeast approach are close to the approach distance in the AM peak.
– The degree of saturation for each intersection was less than the target 0.8 for priority-controlled intersections and 0.9 for signalised intersections, indicating they are operating within capacity.

Future transport and land use

A review of any known changes to land use as well as transport facilities and infrastructure in proximity to the Site was undertaken to understand if future scenario modelling would have to account for extra traffic generation or transport functionality. The review identified the construction of Stage 4 of the Southern Feeder Road on the southern boundary of the Site and the proposed development at the Redmond Place Site. Additionally, a review of traffic growth rates from the Orange VISSUM model data provided to GHD was undertaken.

Based on the above review, traffic growth rates between 2024 and 2040 were calculated with the rates from the Orange VISSUM model rates largely adopted and some adjustments made where growth rates were deemed too high for the entire forecast period.

Trip generation and distribution

To calculate the number of trips generated by the project a trip generation methodology using the TfNSW Guide to Traffic Generating Developments (2013) was undertaken. The methodology can be split into four steps, which can be summarised as:

1. Split the proposed subdivision into smaller zones
2. Calculate the number of dwellings per zone
3. Calculate the number of trips generated by zone
4. Split the trips generated into inbound and outbound volumes

The calculated trips generated through this process were then distributed through the surrounding road network through the proposed access and egress points, with volumes added to adjacent intersections where possible. Trips were distributed so that a majority of trips would either be travelling to or from Orange City Centre via the most direct route, as this was assumed to be the destination and direction most likely to be travelled in.

Future year SIDRA analysis

SIDRA analysis of the surrounding road network was conducted for the horizon year of 2040 for three scenarios in the following:

– **No Development –** with only background traffic growth
– **With Development (no upgrades) –** with background traffic growth and generated trips but no changes to intersection layouts or function
– **With Development (including upgrades) –** with background traffic growth, generated trips and proposed changes to intersection layouts or function

Analysis of the results was conducted from the SIDRA model and the following key findings were identified:

– The road network around the Site largely performed to an above level of service above an acceptable level (LoS C or better)
– In the With Development case the performance of the priority-controlled intersection of Lone Pine Avenue and Bathurst Road lowers to the minimum acceptable level (LoS D).
– The intersection of Dairy Creek Road and Lone Pine Avenue was operating at a LoS F for both the No Development and With Development (no upgrade) scenarios. To address this layout, upgrades have been made in the With Development (including upgrades) scenario for this intersection to reduce queue lengths and delays on the Lone Pine Avenue approach.

6.2 Recommendations

6.2.1 Road network upgrades

The traffic and transport assessment of the Redmond Place Masterplan has examined the current road network and the forecast impact of the proposed development at the Site on the surrounding road network.

The proposed subdivision development on the Redmond Place Masterplan is not expected to have a significant impact on the performance of the surrounding road network, with most of the intersections included in the SIDRA model operating at or above an acceptable level (LoS D or better).

The intersection of Dairy Creek Road and Lone Pine Avenue is operating below an acceptable level of service (LoS F) in the AM peak for both the No Development and With Development (no upgrade) scenarios. This is due to significant queuing and, therefore delays on the Lone Pine Avenue approach, in particular for the right hand turn.

To address these issues, upgrades to the intersection layout have been tested to increase intersection capacity and allow vehicles turning right out of Lone Pine Avenue more opportunities. These changes are:

– A dedicated left hand turn lane (20 metres in length) on the Lone Pine Avenue approach to allow the left hand turn to operate at the same time as the right hand turn
– A hold lane on the west exit for vehicles turning right out of Lone Pine Avenue to utilise before merging into traffic along Dairy Creek Road to reduce the opposing vehicles for the turn, especially during peak periods

It is noted that the priority-controlled intersection of Bathurst Road and Lone Pine Avenue is operating at the acceptable level of service (LoS D) for the With Development scenarios. While no upgrades are deemed to be required at this intersection due to the overall performance operating at an acceptable level continued monitoring of traffic performance is recommended.

6.2.2 Active transport integration

The masterplan proposed for the Redmond Place Site includes shared path connections throughout the site that connect to the surrounding road network. The proposed shared path is 2.5 metres wide and located off-road in the provided street typologies and route. As the shared path is located off road the physical separation from vehicular traffic makes it suitable for riders of a variety of abilities and ages.

The proposed width of 2.5 meters meets the required Austroads standard (*Guide to Road Design Part 6a*) for a local access shared path.

The proposed on-road cycling facility is expected to meet the requirements for mixed conditions as low traffic volumes and speeds are expected along the identified segment as it is a local road with an assumed 50 km/h speed limit and local traffic only.

The footpaths along the street typologies were also assessed with footpath widths of 1.2 to 1.5 metres identified. This meets the Austroads standards (*Guide to Road Design 6a*) where a 1.2 metre minimum width is suggested for general low volume paths.

6.2.3 Public transport services

The Redmond Place Masterplan proposes one bus route connecting the site to the existing road network and public transport services.

The proposed bus route is identified as travelling along the Northern Entry Street, Southern Entry Street and Park Street when travelling through the Site. TfNSW provides the minimum lane width of 3.2 metres wide for roads with signposted speed limits up to 50 kilometres per hour and 3.5 metres where posted speed limits are 60 kilometres per hour or above. The Northern Entry Street, Southern Entry Street and Park Street on which the proposed bus route travels along have lane widths of 3.5 metres in either direction and are suitable for use by bus services.

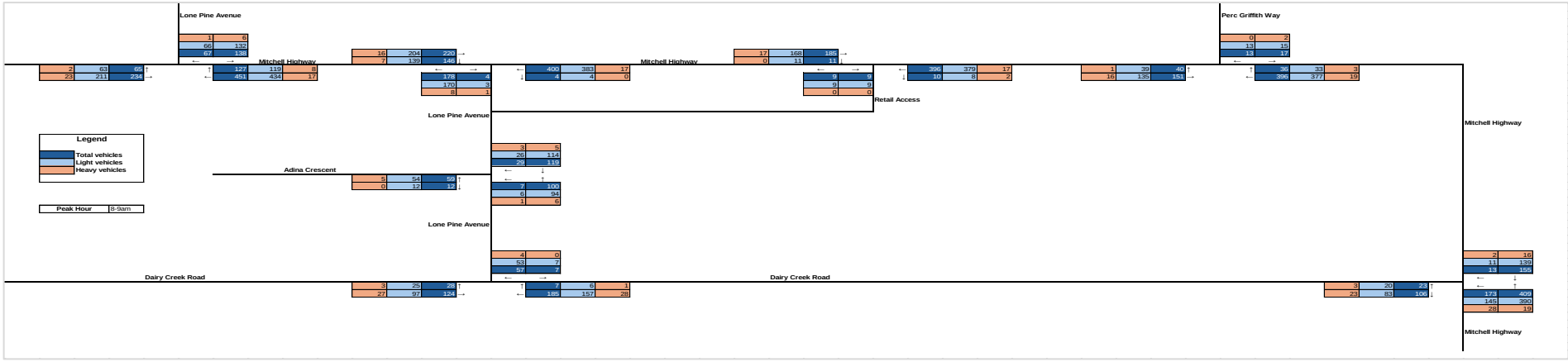
Further considerations of bus facilities may include clearance for the bus turning movements, specific access requirements and additional sight line distances that may be required. The Austroads Guide to Traffic Management provides guidance on the suitability of different traffic calming facilities and bus stop locations which is recommended to be assessed in the planning of details for the proposed bus route.

Appendices

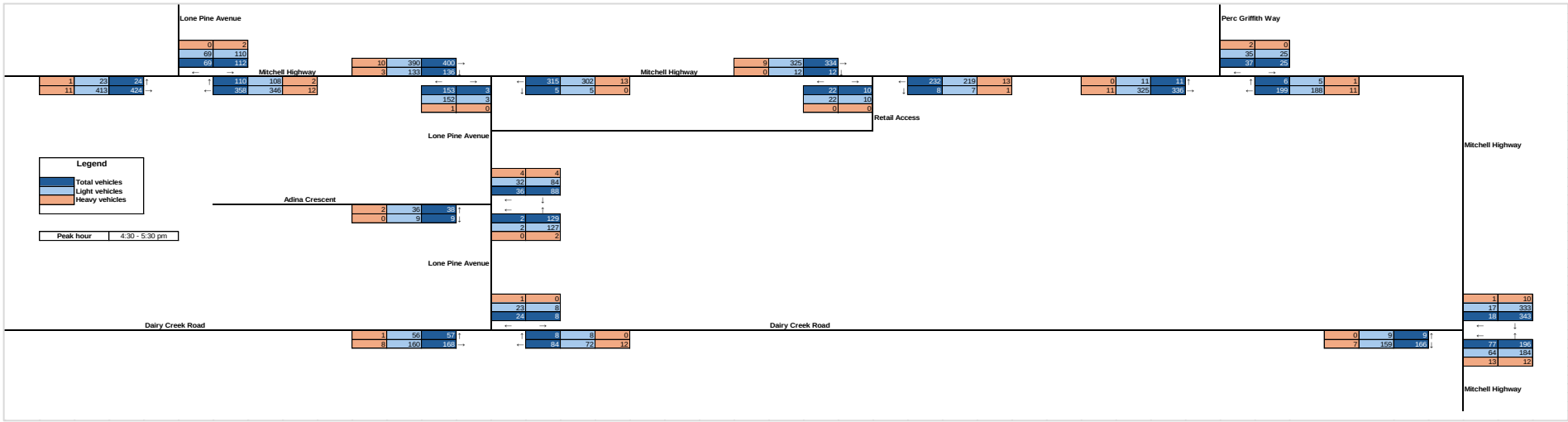
Appendix A

Traffic Volumes

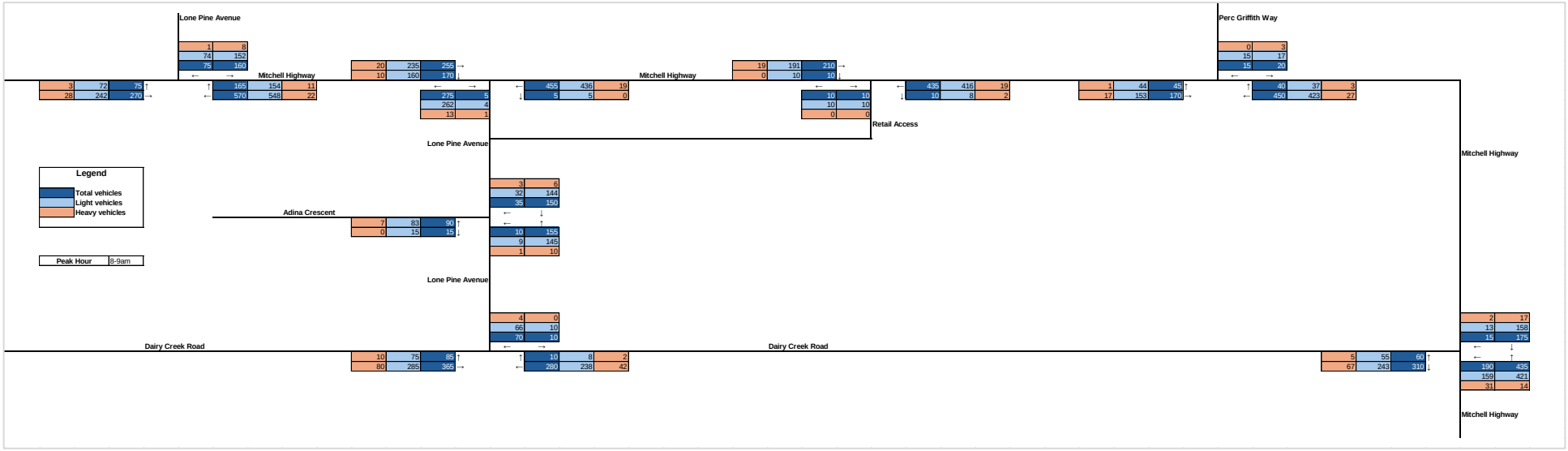
A-1 2024 AM Peak Traffic Volumes



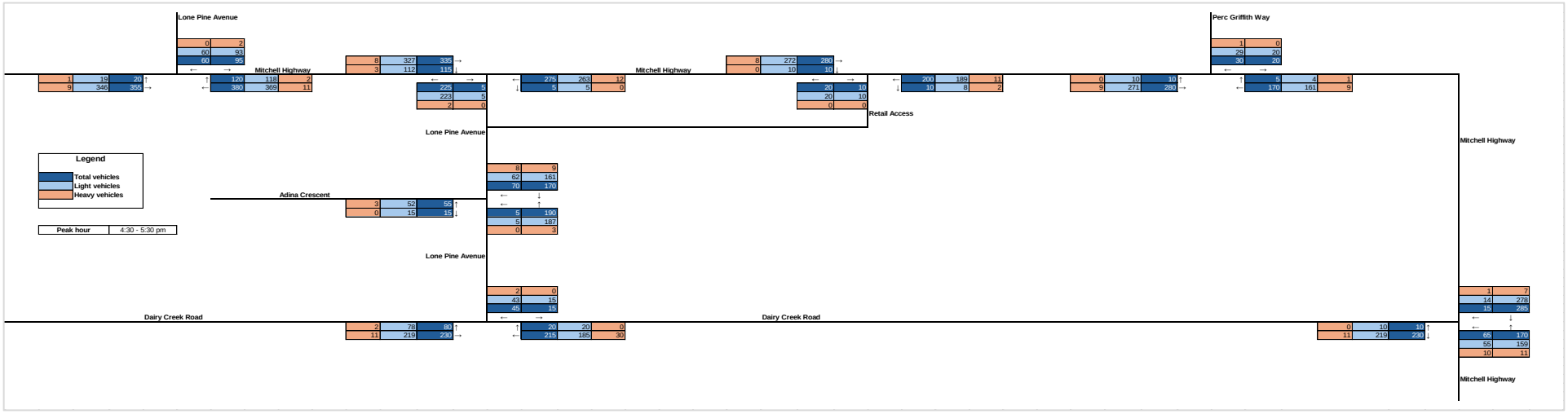
A-2 2024 PM Peak Traffic Volumes



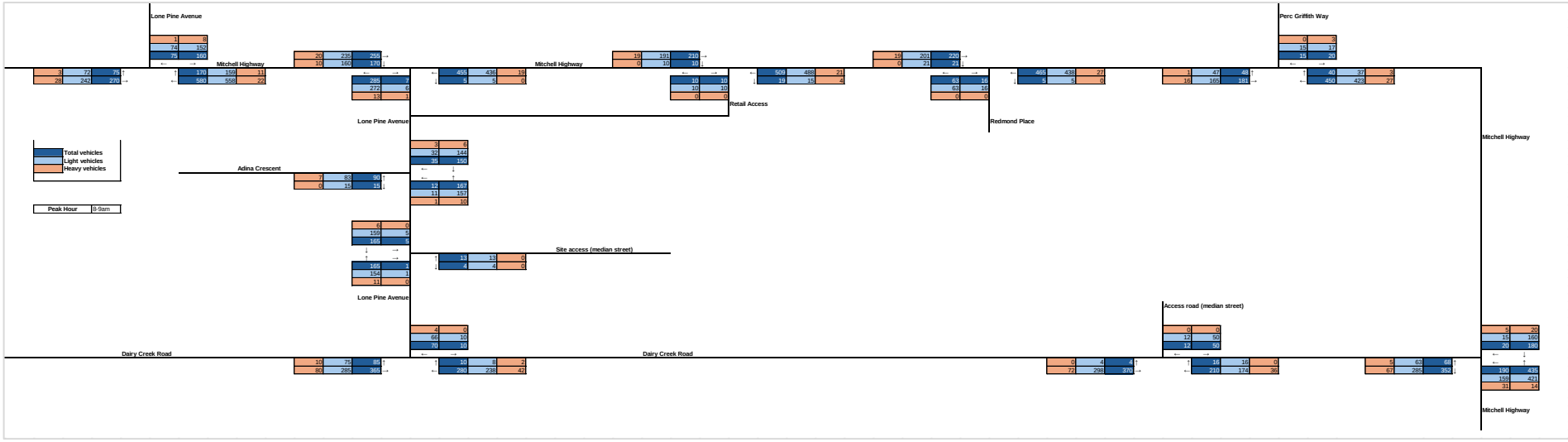
A-3 2040 AM Peak Traffic Volumes – No Development



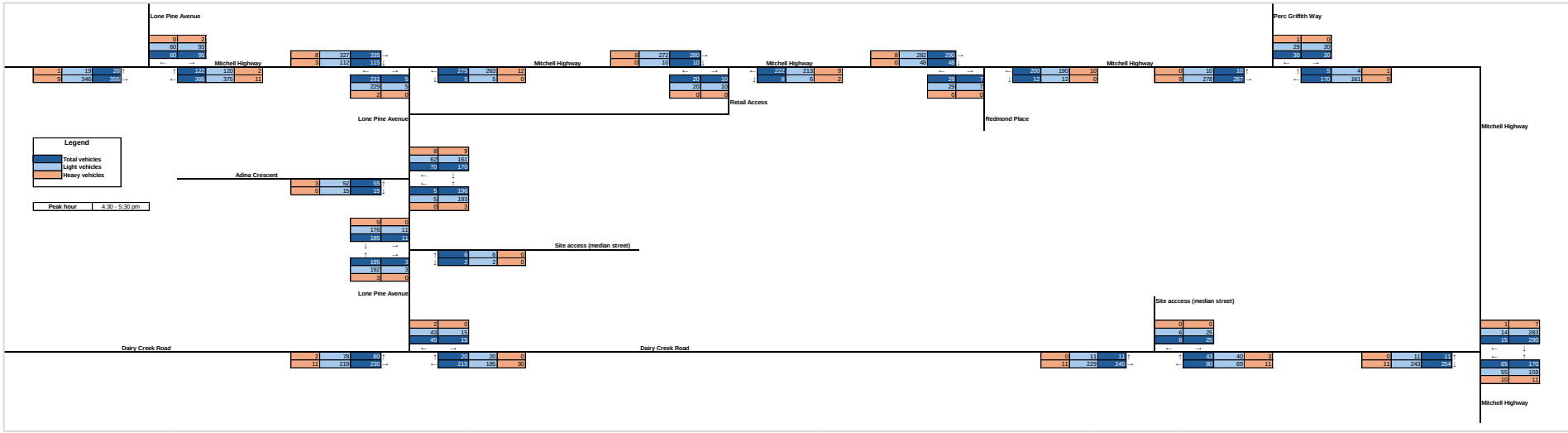
A-4 2040 PM Peak Traffic Volumes – No Development



A-5 2040 AM Peak Traffic Volumes – With Development



A-6 2040 PM Peak Traffic Volumes – With Development



Appendix B

SIDRA Outputs

B-1 2024 Base Year

MOVEMENT SUMMARY

Site: 1 [2024_AM_Mitchell Highway & Lone Pine Avenue (North) (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	475	3.8	483	3.7	0.469	8.9	LOS A	5.3	38.3	0.65	0.57	0.65	41.2
6	R2	All MCs	134	6.3	136	6.3	*0.560	32.0	LOS C	2.4	18.0	0.97	0.80	1.00	12.8
Approach			608	4.3	620	4.3	0.560	13.9	LOS B	5.3	38.3	0.72	0.62	0.73	35.5
NorthEast: Lone Pine Avenue															
7	L2	All MCs	145	4.3	145	4.3	0.186	14.7	LOS B	1.5	11.2	0.62	0.71	0.62	15.9
9	R2	All MCs	71	1.5	71	1.5	*0.203	27.2	LOS C	1.1	7.7	0.86	0.74	0.86	30.2
Approach			216	3.4	216	3.4	0.203	18.8	LOS B	1.5	11.2	0.69	0.72	0.69	24.7
NorthWest: Mitchell Highway															
10	L2	All MCs	68	3.1	68	3.1	*0.610	26.1	LOS C	5.0	37.6	0.91	0.78	0.91	32.5
11	T1	All MCs	246	9.8	246	9.8	0.610	19.6	LOS B	5.0	37.6	0.91	0.78	0.91	31.9
Approach			315	8.4	315	8.4	0.610	21.1	LOS C	5.0	37.6	0.91	0.78	0.91	32.0
All Vehicles			1139	5.3	1150	5.2	0.610	16.8	LOS B	5.3	38.3	0.77	0.68	0.77	32.8

MOVEMENT SUMMARY

Site: 1 [2024_PM_Mitchell Highway & Lone Pine Avenue (North) (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	377	3.4	325	3.7	0.315	7.9	LOS A	3.2	23.0	0.58	0.50	0.58	42.0
6	R2	All MCs	116	1.8	100	2.0	*0.598	35.4	LOS D	1.9	13.5	1.00	0.82	1.10	11.9
Approach			493	3.0	425	3.3	0.598	14.4	LOS B	3.2	23.0	0.68	0.57	0.70	35.0
NorthEast: Lone Pine Avenue															
7	L2	All MCs	118	1.8	118	1.8	0.166	16.5	LOS B	1.3	9.5	0.66	0.71	0.66	14.7
9	R2	All MCs	73	0.0	73	0.0	*0.207	26.8	LOS C	1.1	7.8	0.86	0.74	0.86	30.2
Approach			191	1.1	191	1.1	0.207	20.4	LOS C	1.3	9.5	0.73	0.72	0.73	24.8
NorthWest: Mitchell Highway															
10	L2	All MCs	25	4.2	25	4.2	*0.735	27.0	LOS C	8.0	57.4	0.93	0.87	1.01	32.7
11	T1	All MCs	446	2.6	446	2.6	0.735	20.4	LOS C	8.0	57.4	0.93	0.87	1.01	32.1
Approach			472	2.7	472	2.7	0.735	20.7	LOS C	8.0	57.4	0.93	0.87	1.01	32.1
All Vehicles			1155	2.6	1087	2.7	0.735	18.2	LOS B	8.0	57.4	0.80	0.73	0.84	32.2

MOVEMENT SUMMARY

▽ Site: 2 [2024_AM_Mitchell Highway & Lone Pine Avenue (South) (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	4	0.0	4	0.0	0.118	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	42.1
5	T1	All MCs	421	4.3	430	4.2	0.118	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach			425	4.2	434	4.2	0.118	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.8
NorthWest: Mitchell Highway															
11	T1	All MCs	232	7.3	232	7.3	0.128	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	154	4.8	154	4.8	0.248	8.1	LOS A	0.3	2.3	0.47	0.73	0.48	26.8
Approach			385	6.3	385	6.3	0.248	3.2	NA	0.3	2.3	0.19	0.29	0.19	33.9
SouthWest: Lone Pine Avenue															
1	L2	All MCs	187	4.5	189	4.5	0.358	8.7	LOS A	0.7	5.2	0.50	0.69	0.56	20.7
3	R2	All MCs	4	25.0	4	25.0	0.007	7.6	LOS A	0.0	0.1	0.47	0.62	0.47	23.1
Approach			192	4.9	194	4.9	0.358	8.7	LOS A	0.7	5.2	0.50	0.69	0.56	20.8
All Vehicles			1002	5.1	1013	5.1	0.358	2.9	NA	0.7	5.2	0.17	0.24	0.18	42.2

MOVEMENT SUMMARY

▽ Site: 2 [2024_PM_Mitchell Highway & Lone Pine Avenue (South) (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	4	0.0	0.072	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	42.1
5	T1	All MCs	332	4.1	262	4.9	0.072	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach			337	4.1	266	4.8	0.072	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
NorthWest: Mitchell Highway															
11	T1	All MCs	421	2.5	421	2.5	0.225	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	143	2.2	144	2.2	0.337	11.1	LOS B	0.6	4.2	0.51	0.76	0.58	23.5
Approach			564	2.4	565	2.4	0.337	2.9	NA	0.6	4.2	0.13	0.19	0.15	34.8
SouthWest: Lone Pine Avenue															
1	L2	All MCs	161	0.7	163	0.7	0.330	7.7	LOS A	0.6	4.3	0.43	0.60	0.43	22.3
3	R2	All MCs	3	0.0	3	0.0	0.003	6.7	LOS A	0.0	0.0	0.50	0.57	0.50	24.4
Approach			164	0.6	166	0.6	0.330	7.7	LOS A	0.6	4.3	0.43	0.60	0.43	22.3
All Vehicles			1065	2.7	998	2.8	0.337	2.9	NA	0.6	4.3	0.15	0.21	0.16	40.5

MOVEMENT SUMMARY

Site: 3 [2024_AM_Mitchell Highway & Retail Access (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	11	20.0	11	19.9	0.007	4.7	LOS A	0.0	0.0	0.00	0.52	0.00	42.9
5	T1	All MCs	417	4.3	422	4.3	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			427	4.7	433	4.6	0.227	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.5
NorthWest: Mitchell Highway															
11	T1	All MCs	195	9.2	195	9.2	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	All MCs	12	0.0	12	0.0	0.013	6.5	LOS A	0.0	0.1	0.46	0.59	0.46	42.6
Approach			206	8.7	206	8.7	0.107	0.4	NA	0.0	0.1	0.03	0.03	0.03	49.2
SouthWest: Retail Access															
1	L2	All MCs	9	0.0	9	0.0	0.033	13.6	LOS B	0.0	0.3	0.60	0.76	0.60	29.6
3	R2	All MCs	9	0.0	9	0.0	0.051	20.5	LOS C	0.1	0.4	0.74	0.87	0.74	24.7
Approach			19	0.0	19	0.0	0.051	17.1	LOS C	0.1	0.4	0.67	0.82	0.67	26.9
All Vehicles			653	5.8	658	5.8	0.227	0.7	NA	0.1	0.4	0.03	0.04	0.03	48.5

MOVEMENT SUMMARY

Site: 3 [2024_PM_Mitchell Highway & Retail Access (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	8	12.5	8	11.8	0.005	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	43.0
5	T1	All MCs	244	5.6	242	5.3	0.131	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			253	5.8	250	5.5	0.131	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.5
NorthWest: Mitchell Highway															
11	T1	All MCs	352	2.7	352	2.7	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	13	0.0	13	0.0	0.019	6.4	LOS A	0.0	0.2	0.35	0.58	0.35	42.7
Approach			364	2.6	364	2.6	0.185	0.3	NA	0.0	0.2	0.01	0.02	0.01	49.5
SouthWest: Retail Access															
1	L2	All MCs	23	0.0	24	0.0	0.075	11.3	LOS B	0.1	0.8	0.51	0.70	0.51	31.9
3	R2	All MCs	11	0.0	12	0.0	0.080	27.4	LOS D	0.1	0.7	0.78	0.90	0.78	21.1
Approach			34	0.0	36	0.0	0.080	16.5	LOS C	0.1	0.8	0.60	0.76	0.60	27.5
All Vehicles			651	3.7	650	3.7	0.185	1.1	NA	0.1	0.8	0.04	0.06	0.04	48.0

MOVEMENT SUMMARY

▽ Site: 4 [2024_AM_Mitchell Highway & Perc Griffith Way (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	417	4.8	418	4.8	0.223	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	38	8.3	38	8.4	0.050	8.4	LOS A	0.1	0.5	0.32	0.64	0.32	54.9
Approach			455	5.1	456	5.1	0.223	3.7	NA	0.1	0.5	0.03	0.43	0.03	69.2
NorthEast: Perc Griffith Way															
7	L2	All MCs	18	11.8	19	11.8	0.025	7.1	LOS A	0.1	0.4	0.46	0.53	0.46	31.2
9	R2	All MCs	14	0.0	15	0.0	0.053	20.5	LOS C	0.1	0.7	0.78	0.83	0.78	17.9
Approach			32	6.7	34	6.6	0.053	13.0	LOS B	0.1	0.7	0.60	0.67	0.60	23.6
NorthWest: Mitchell Highway															
10	L2	All MCs	42	2.5	42	2.5	0.115	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	45.7
11	T1	All MCs	159	10.6	159	10.6	0.115	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	47.8
Approach			201	8.9	201	8.9	0.115	1.0	NA	0.0	0.0	0.00	0.11	0.00	47.2
All Vehicles			687	6.3	691	6.2	0.223	3.3	NA	0.1	0.7	0.05	0.35	0.05	61.6

MOVEMENT SUMMARY

▽ Site: 4 [2024_PM_Mitchell Highway & Perc Griffith Way (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	209	5.5	209	5.5	0.112	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	6	16.7	6	16.7	0.010	10.3	LOS B	0.0	0.1	0.48	0.65	0.48	52.3
Approach			216	5.9	216	5.9	0.112	3.4	NA	0.0	0.1	0.01	0.42	0.01	70.4
NorthEast: Perc Griffith Way															
7	L2	All MCs	26	0.0	27	0.0	0.129	16.8	LOS C	0.2	1.1	0.61	0.82	0.61	20.4
9	R2	All MCs	39	5.4	41	5.4	0.342	36.1	LOS E	0.5	3.4	0.82	0.98	1.02	12.1
Approach			65	3.2	68	3.2	0.342	28.4	LOS D	0.5	3.4	0.74	0.91	0.86	14.5
NorthWest: Mitchell Highway															
10	L2	All MCs	12	0.0	12	0.0	0.200	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
11	T1	All MCs	354	3.3	354	3.3	0.200	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach			365	3.2	365	3.2	0.200	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.5
All Vehicles			646	4.1	649	4.1	0.342	4.1	NA	0.5	3.4	0.08	0.24	0.09	52.0

MOVEMENT SUMMARY

▽ Site: 5 [2024_AM_Mitchell Highway & Dairy Creek Road (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	182	16.2	182	16.2	0.093	7.6	LOS A	0.1	0.7	0.03	0.60	0.03	60.8
11	T1	All MCs	431	4.6	431	4.6	0.230	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			613	8.1	613	8.1	0.230	2.3	LOS A	0.1	0.7	0.01	0.18	0.01	73.0
NorthWest: Mitchell Highway															
5	T1	All MCs	163	10.3	164	10.3	0.091	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	14	15.4	14	15.4	0.027	11.4	LOS B	0.0	0.3	0.49	0.72	0.49	56.1
Approach			177	10.7	178	10.7	0.091	0.9	NA	0.0	0.3	0.04	0.06	0.04	78.5
SouthWest: Dairy Creek Road															
7	L2	All MCs	24	13.0	25	12.9	0.025	9.1	LOS A	0.0	0.3	0.41	0.65	0.41	65.9
9	R2	All MCs	112	21.7	115	21.5	0.114	9.6	LOS A	0.1	1.1	0.42	0.75	0.42	62.0
Approach			136	20.2	140	19.9	0.114	9.5	LOS A	0.1	1.1	0.42	0.73	0.42	62.5
All Vehicles			925	10.4	931	10.3	0.230	3.1	NA	0.1	1.1	0.08	0.24	0.08	71.1

MOVEMENT SUMMARY

▽ Site: 5 [2024_PM_Mitchell Highway & Dairy Creek Road (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	81	16.9	81	16.9	0.044	7.6	LOS A	0.0	0.4	0.05	0.59	0.05	60.7
11	T1	All MCs	206	6.1	206	6.1	0.111	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			287	9.2	287	9.2	0.111	2.2	LOS A	0.0	0.4	0.01	0.17	0.01	73.3
NorthWest: Mitchell Highway															
5	T1	All MCs	361	2.9	362	2.9	0.192	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	19	5.6	19	5.5	0.010	6.1	LOS A	0.0	0.1	0.32	0.51	0.32	50.1
Approach			380	3.0	381	3.0	0.192	0.4	NA	0.0	0.1	0.02	0.03	0.02	59.6
SouthWest: Dairy Creek Road															
7	L2	All MCs	9	0.0	9	0.0	0.007	6.1	LOS A	0.0	0.1	0.24	0.52	0.24	53.7
9	R2	All MCs	175	4.2	178	4.2	0.155	7.6	LOS A	0.2	1.1	0.34	0.68	0.34	54.0
Approach			184	4.0	187	4.0	0.155	7.5	LOS A	0.2	1.1	0.34	0.67	0.34	54.0
All Vehicles			852	5.3	856	5.3	0.192	2.5	NA	0.2	1.1	0.09	0.21	0.09	59.6

MOVEMENT SUMMARY

▽ Site: 6 [2024_AM_Dairy Creek Road & Lone Pine Avenue (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_AM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	195	15.1	189	16.2	0.110	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	7	14.3	7	15.3	0.005	7.8	LOS A	0.0	0.1	0.28	0.56	0.28	59.6
Approach			202	15.1	196	16.1	0.110	0.3	NA	0.0	0.1	0.01	0.02	0.01	78.7
North: Lone Pine Avenue															
7	L2	All MCs	7	0.0	8	0.0	0.306	8.6	LOS A	0.5	3.6	0.62	0.86	0.75	30.2
9	R2	All MCs	60	7.0	62	7.0	0.306	20.1	LOS C	0.5	3.6	0.62	0.86	0.75	19.2
Approach			67	6.3	69	6.3	0.306	18.8	LOS C	0.5	3.6	0.62	0.86	0.75	19.9
West: Dairy Creek Road															
10	L2	All MCs	29	10.7	29	10.7	0.018	4.7	LOS A	0.0	0.0	0.00	0.59	0.00	52.5
11	T1	All MCs	131	21.8	131	21.8	0.072	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			160	19.7	160	19.7	0.072	0.9	NA	0.0	0.0	0.00	0.11	0.00	62.5
All Vehicles			429	15.4	425	15.6	0.306	3.4	NA	0.5	3.6	0.11	0.19	0.13	56.9

MOVEMENT SUMMARY

▽ Site: 6 [2024_PM_Dairy Creek Road & Lone Pine Avenue (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2024_PM_Base Model (Network Folder: 2024_Base Model)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	88	14.3	89	14.1	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	All MCs	8	0.0	9	0.0	0.006	7.7	LOS A	0.0	0.1	0.33	0.57	0.33	59.7
Approach			97	13.0	98	12.9	0.051	0.7	NA	0.0	0.1	0.03	0.05	0.03	77.1
North: Lone Pine Avenue															
7	L2	All MCs	8	0.0	8	0.0	0.145	8.3	LOS A	0.2	1.2	0.48	0.74	0.48	33.9
9	R2	All MCs	25	4.2	25	4.2	0.145	15.3	LOS C	0.2	1.2	0.48	0.74	0.48	20.4
Approach			34	3.1	34	3.1	0.145	13.5	LOS B	0.2	1.2	0.48	0.74	0.48	22.3
West: Dairy Creek Road															
10	L2	All MCs	60	1.8	60	1.8	0.034	4.7	LOS A	0.0	0.0	0.00	0.60	0.00	56.0
11	T1	All MCs	177	4.8	177	4.8	0.088	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
Approach			237	4.0	237	4.0	0.088	1.2	NA	0.0	0.0	0.00	0.15	0.00	62.9
All Vehicles			367	6.3	368	6.3	0.145	2.2	NA	0.2	1.2	0.05	0.18	0.05	59.7

MOVEMENT SUMMARY

▽ Site: 7 [2024_AM_Lone Pine Avenue & Adina Crescent (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	7	14.3	7	14.3	0.064	4.7	LOS A	0.0	0.0	0.00	0.04	0.00	42.2
2	T1	All MCs	105	6.0	105	6.0	0.064	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.2
Approach			113	6.5	113	6.5	0.064	0.3	NA	0.0	0.0	0.00	0.04	0.00	48.8
North: Lone Pine Avenue															
8	T1	All MCs	125	4.2	125	4.2	0.088	0.0	LOS A	0.2	1.3	0.09	0.13	0.09	46.8
9	R2	All MCs	31	10.3	31	10.3	0.088	5.3	LOS A	0.2	1.3	0.09	0.13	0.09	41.4
Approach			156	5.4	156	5.4	0.088	1.0	NA	0.2	1.3	0.09	0.13	0.09	45.6
West: Adina Crecent															
10	L2	All MCs	62	8.5	62	8.5	0.086	5.5	LOS A	0.3	1.9	0.22	0.54	0.22	34.9
12	R2	All MCs	13	0.0	13	0.0	0.022	6.4	LOS A	0.1	0.4	0.30	0.60	0.30	32.3
Approach			75	7.0	75	7.0	0.086	5.6	LOS A	0.3	1.9	0.24	0.55	0.24	34.5
All Vehicles			343	6.1	343	6.1	0.088	1.8	NA	0.3	1.9	0.09	0.19	0.09	43.4

MOVEMENT SUMMARY

▽ Site: 7 [2024_PM_Lone Pine Avenue & Adina Crescent (Site Folder: 2024_Base Models)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	2	0.0	2	0.0	0.076	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	44.5
2	T1	All MCs	136	1.6	136	1.6	0.076	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			138	1.5	138	1.5	0.076	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
North: Lone Pine Avenue															
8	T1	All MCs	93	4.5	93	4.5	0.073	0.0	LOS A	0.2	1.5	0.14	0.19	0.14	45.3
9	R2	All MCs	38	11.1	38	11.1	0.073	5.4	LOS A	0.2	1.5	0.14	0.19	0.14	40.2
Approach			131	6.5	131	6.5	0.073	1.6	NA	0.2	1.5	0.14	0.19	0.14	43.7
West: Adina Crecent															
10	L2	All MCs	40	5.3	40	5.3	0.108	7.8	LOS A	0.3	2.4	0.33	0.61	0.33	32.4
12	R2	All MCs	9	0.0	9	0.0	0.033	9.8	LOS A	0.1	0.6	0.39	0.68	0.39	28.3
Approach			49	4.3	49	4.3	0.108	8.2	LOS A	0.3	2.4	0.34	0.62	0.34	31.6
All Vehicles			318	4.0	318	4.0	0.108	1.9	NA	0.3	2.4	0.11	0.18	0.11	43.4

B-2 2040 No Development

MOVEMENT SUMMARY

Site: 1 [2040_AM_Mitchell Highway & Lone Pine Avenue (North)_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	600	3.9	609	3.3	0.589	9.8	LOS A	7.3	52.8	0.72	0.64	0.72	40.5
6	R2	All MCs	174	6.7	176	5.7	*0.720	34.3	LOS C	3.4	24.8	1.00	0.90	1.19	12.2
Approach			774	4.5	785	3.9	0.720	15.3	LOS B	7.3	52.8	0.78	0.70	0.82	34.5
NorthEast: Lone Pine Avenue															
7	L2	All MCs	168	5.0	168	5.0	0.217	14.9	LOS B	1.8	13.2	0.63	0.71	0.63	15.8
9	R2	All MCs	79	1.3	79	1.3	*0.227	27.7	LOS C	1.2	8.6	0.86	0.74	0.86	30.1
Approach			247	3.8	247	3.8	0.227	19.0	LOS B	1.8	13.2	0.70	0.72	0.70	24.5
NorthWest: Mitchell Highway															
10	L2	All MCs	79	4.0	79	4.0	*0.706	28.2	LOS C	6.2	47.1	0.94	0.87	1.02	31.5
11	T1	All MCs	284	10.4	284	10.4	0.706	21.6	LOS C	6.2	47.1	0.94	0.87	1.02	30.8
Approach			363	9.0	363	9.0	0.706	23.1	LOS C	6.2	47.1	0.94	0.87	1.02	31.0
All Vehicles			1384	5.6	1395	5.5	0.720	18.0	LOS B	7.3	52.8	0.81	0.75	0.85	32.1

MOVEMENT SUMMARY

Site: 1 [2040_PM_Mitchell Highway & Lone Pine Avenue (North)_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	400	2.9	349	2.7	0.336	8.1	LOS A	3.5	24.9	0.59	0.51	0.59	41.9
6	R2	All MCs	126	1.7	110	1.5	*0.565	34.0	LOS C	2.0	14.5	0.99	0.80	1.04	12.3
Approach			526	2.6	460	2.4	0.565	14.3	LOS B	3.5	24.9	0.68	0.58	0.70	35.0
NorthEast: Lone Pine Avenue															
7	L2	All MCs	100	2.1	100	2.1	0.136	15.7	LOS B	1.1	7.8	0.63	0.70	0.63	15.3
9	R2	All MCs	63	0.0	63	0.0	*0.180	26.6	LOS C	1.0	6.7	0.85	0.73	0.85	30.3
Approach			163	1.3	163	1.3	0.180	19.9	LOS B	1.1	7.8	0.72	0.71	0.72	25.2
NorthWest: Mitchell Highway															
10	L2	All MCs	21	5.0	21	5.0	*0.646	25.4	LOS C	6.2	44.5	0.90	0.79	0.91	33.4
11	T1	All MCs	374	2.5	374	2.5	0.646	18.8	LOS B	6.2	44.5	0.90	0.79	0.91	33.0
Approach			395	2.7	395	2.7	0.646	19.2	LOS B	6.2	44.5	0.90	0.79	0.91	33.0
All Vehicles			1084	2.4	1017	2.6	0.646	17.1	LOS B	6.2	44.5	0.78	0.68	0.78	32.9

MOVEMENT SUMMARY

▽ Site: 2 [2040_AM_Mitchell Highway & Lone Pine Avenue (South)_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	6	0.0	0.158	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	42.1
5	T1	All MCs	479	4.2	493	3.3	0.158	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			484	4.1	499	3.3	0.158	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
NorthWest: Mitchell Highway															
11	T1	All MCs	268	7.8	268	7.8	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	179	5.9	179	5.9	0.319	9.4	LOS A	0.5	3.3	0.55	0.81	0.63	25.2
Approach			447	7.1	447	7.1	0.319	3.8	NA	0.5	3.3	0.22	0.32	0.25	32.4
SouthWest: Lone Pine Avenue															
1	L2	All MCs	289	4.7	291	4.7	0.768	14.7	LOS B	2.5	18.4	0.79	0.99	1.34	14.9
3	R2	All MCs	5	20.0	5	20.0	0.009	8.0	LOS A	0.0	0.1	0.51	0.66	0.51	22.3
Approach			295	5.0	297	5.0	0.768	14.6	LOS B	2.5	18.4	0.79	0.98	1.32	15.0
All Vehicles			1226	5.4	1243	5.3	0.768	4.9	NA	2.5	18.4	0.27	0.35	0.41	38.3

MOVEMENT SUMMARY

▽ Site: 2 [2040_PM_Mitchell Highway & Lone Pine Avenue (South)_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	4	0.0	0.061	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	42.1
5	T1	All MCs	289	4.4	221	4.1	0.061	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			295	4.3	225	4.0	0.061	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
NorthWest: Mitchell Highway															
11	T1	All MCs	353	2.4	353	2.4	0.188	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	121	2.6	122	2.6	0.263	9.2	LOS A	0.4	2.8	0.43	0.66	0.43	25.5
Approach			474	2.4	475	2.4	0.263	2.4	NA	0.4	2.8	0.11	0.17	0.11	36.4
SouthWest: Lone Pine Avenue															
1	L2	All MCs	237	0.9	239	0.9	0.465	8.4	LOS A	1.2	8.8	0.46	0.62	0.52	21.2
3	R2	All MCs	5	0.0	5	0.0	0.005	6.3	LOS A	0.0	0.1	0.46	0.56	0.46	24.8
Approach			242	0.9	244	0.9	0.465	8.4	LOS A	1.2	8.8	0.46	0.62	0.52	21.2
All Vehicles			1011	2.6	944	2.8	0.465	3.4	NA	1.2	8.8	0.17	0.25	0.19	38.9

MOVEMENT SUMMARY

Site: 3 [2040_AM_Mitchell Highway & Retail Access_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	11	20.0	11	16.0	0.007	4.7	LOS A	0.0	0.0	0.00	0.52	0.00	42.9
5	T1	All MCs	458	4.4	485	3.4	0.260	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			468	4.7	496	3.6	0.260	0.2	NA	0.0	0.0	0.00	0.01	0.00	49.6
NorthWest: Mitchell Highway															
11	T1	All MCs	221	9.0	221	9.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	All MCs	11	0.0	11	0.0	0.013	7.0	LOS A	0.0	0.1	0.49	0.62	0.49	42.3
Approach			232	8.6	232	8.6	0.121	0.3	NA	0.0	0.1	0.02	0.03	0.02	49.3
SouthWest: Retail Access															
1	L2	All MCs	11	0.0	11	0.0	0.044	16.2	LOS C	0.1	0.4	0.66	0.84	0.66	27.5
3	R2	All MCs	11	0.0	11	0.0	0.071	25.7	LOS D	0.1	0.6	0.79	0.90	0.79	21.9
Approach			21	0.0	21	0.0	0.071	21.0	LOS C	0.1	0.6	0.73	0.87	0.73	24.4
All Vehicles			721	5.8	749	5.6	0.260	0.8	NA	0.1	0.6	0.03	0.04	0.03	48.4

MOVEMENT SUMMARY

Site: 3 [2040_PM_Mitchell Highway & Retail Access_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	11	20.0	10	16.6	0.006	4.7	LOS A	0.0	0.0	0.00	0.52	0.00	42.9
5	T1	All MCs	211	5.5	203	4.4	0.109	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			221	6.2	213	5.0	0.109	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.3
NorthWest: Mitchell Highway															
11	T1	All MCs	295	2.9	295	2.9	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	11	0.0	11	0.0	0.015	6.1	LOS A	0.0	0.1	0.32	0.56	0.32	43.0
Approach			305	2.8	305	2.8	0.156	0.2	NA	0.0	0.1	0.01	0.02	0.01	49.5
SouthWest: Retail Access															
1	L2	All MCs	21	0.0	22	0.0	0.061	9.7	LOS A	0.1	0.6	0.46	0.65	0.46	33.5
3	R2	All MCs	11	0.0	12	0.0	0.061	20.7	LOS C	0.1	0.6	0.71	0.86	0.71	24.6
Approach			32	0.0	34	0.0	0.061	13.5	LOS B	0.1	0.6	0.55	0.72	0.55	29.9
All Vehicles			558	4.0	551	4.0	0.156	1.0	NA	0.1	0.6	0.04	0.06	0.04	48.1

MOVEMENT SUMMARY

▽ Site: 4 [2040_AM_Mitchell Highway & Perc Griffith Way_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	474	6.0	479	3.8	0.254	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	42	7.5	42	4.7	0.056	8.5	LOS A	0.1	0.5	0.34	0.65	0.34	55.1
Approach			516	6.1	521	3.9	0.254	3.7	NA	0.1	0.5	0.03	0.43	0.03	69.3
NorthEast: Perc Griffith Way															
7	L2	All MCs	21	15.0	22	15.0	0.032	7.6	LOS A	0.1	0.6	0.49	0.55	0.49	30.3
9	R2	All MCs	16	0.0	17	0.0	0.077	25.5	LOS D	0.1	1.0	0.83	0.92	0.83	15.5
Approach			37	8.6	39	8.5	0.077	15.4	LOS B	0.1	1.0	0.64	0.71	0.64	21.5
NorthWest: Mitchell Highway															
10	L2	All MCs	47	2.2	47	2.2	0.129	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	45.7
11	T1	All MCs	179	10.0	179	10.0	0.129	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	47.8
Approach			226	8.4	226	8.4	0.129	1.0	NA	0.0	0.0	0.00	0.11	0.00	47.2
All Vehicles			779	6.9	787	6.8	0.254	3.4	NA	0.1	1.0	0.05	0.35	0.05	61.5

MOVEMENT SUMMARY

▽ Site: 4 [2040_PM_Mitchell Highway & Perc Griffith Way_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	179	5.3	179	5.3	0.096	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	5	20.0	5	20.0	0.008	9.7	LOS A	0.0	0.1	0.44	0.62	0.44	52.6
Approach			184	5.7	184	5.7	0.096	3.4	NA	0.0	0.1	0.01	0.42	0.01	70.4
NorthEast: Perc Griffith Way															
7	L2	All MCs	21	0.0	22	0.0	0.089	13.6	LOS B	0.1	0.8	0.53	0.77	0.53	23.0
9	R2	All MCs	32	3.3	34	3.3	0.207	23.7	LOS C	0.3	1.9	0.72	0.89	0.77	16.4
Approach			53	2.0	56	2.0	0.207	19.7	LOS C	0.3	1.9	0.64	0.84	0.67	18.5
NorthWest: Mitchell Highway															
10	L2	All MCs	11	0.0	11	0.0	0.168	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
11	T1	All MCs	295	3.2	297	3.2	0.168	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach			305	3.1	307	3.1	0.168	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.4
All Vehicles			542	3.9	547	3.8	0.207	3.1	NA	0.3	1.9	0.07	0.23	0.07	54.0

MOVEMENT SUMMARY

▽ Site: 5 [2040_AM_Mitchell Highway & Dairy Creek Road_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	200	16.3	200	16.3	0.103	7.6	LOS A	0.1	0.7	0.03	0.60	0.03	60.8
11	T1	All MCs	458	3.2	458	3.2	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach			658	7.2	658	7.2	0.242	2.3	LOS A	0.1	0.7	0.01	0.18	0.01	72.8
NorthWest: Mitchell Highway															
5	T1	All MCs	184	9.7	185	10.2	0.103	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	16	13.3	16	14.0	0.033	11.7	LOS B	0.0	0.3	0.50	0.74	0.50	55.6
Approach			200	10.0	201	10.5	0.103	0.9	NA	0.0	0.3	0.04	0.06	0.04	78.4
SouthWest: Dairy Creek Road															
7	L2	All MCs	63	8.3	64	8.4	0.063	9.1	LOS A	0.1	0.7	0.43	0.68	0.43	65.8
9	R2	All MCs	326	21.6	326	21.8	0.342	10.7	LOS B	0.5	4.2	0.50	0.84	0.62	61.3
Approach			389	19.5	389	19.6	0.342	10.4	LOS B	0.5	4.2	0.49	0.82	0.59	61.8
All Vehicles			1247	11.5	1248	11.5	0.342	4.6	NA	0.5	4.2	0.16	0.36	0.20	67.8

MOVEMENT SUMMARY

▽ Site: 5 [2040_PM_Mitchell Highway & Dairy Creek Road_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	68	15.4	68	15.4	0.037	7.6	LOS A	0.0	0.3	0.04	0.59	0.04	60.7
11	T1	All MCs	179	6.5	179	6.5	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			247	8.9	247	8.9	0.097	2.1	LOS A	0.0	0.3	0.01	0.16	0.01	73.4
NorthWest: Mitchell Highway															
5	T1	All MCs	300	2.5	302	2.4	0.160	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	16	6.7	16	6.6	0.008	7.6	LOS A	0.0	0.1	0.29	0.55	0.29	60.8
Approach			316	2.7	318	2.7	0.160	0.4	NA	0.0	0.1	0.01	0.03	0.01	79.2
SouthWest: Dairy Creek Road															
7	L2	All MCs	11	0.0	11	0.0	0.007	7.7	LOS A	0.0	0.1	0.22	0.57	0.22	67.1
9	R2	All MCs	242	4.8	245	4.8	0.202	8.8	LOS A	0.2	1.5	0.32	0.70	0.32	66.1
Approach			253	4.6	256	4.6	0.202	8.8	LOS A	0.2	1.5	0.32	0.70	0.32	66.1
All Vehicles			816	5.2	821	5.1	0.202	3.5	NA	0.2	1.5	0.11	0.27	0.11	72.1

MOVEMENT SUMMARY

▽ Site: 6 [2040_AM_Dairy Creek Road & Lone Pine Avenue_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	295	15.0	208	16.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	11	20.0	7	21.2	0.008	9.8	LOS A	0.0	0.1	0.52	0.64	0.52	58.5
Approach			305	15.2	216	16.1	0.121	0.4	NA	0.0	0.1	0.02	0.02	0.02	78.7
North: Lone Pine Avenue															
7	L2	All MCs	11	0.0	11	0.0	1.013	132.1	LOS F	4.0	29.3	1.00	1.78	3.71	7.5
9	R2	All MCs	74	5.7	75	5.7	1.013	189.7	LOS F	4.0	29.3	1.00	1.78	3.71	7.4
Approach			84	5.0	86	5.0	1.013	182.5	LOS F	4.0	29.3	1.00	1.78	3.71	7.4
West: Dairy Creek Road															
10	L2	All MCs	89	11.8	89	11.8	0.054	4.7	LOS A	0.0	0.0	0.00	0.59	0.00	52.1
11	T1	All MCs	384	21.9	384	21.9	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			474	20.0	474	20.0	0.212	0.9	NA	0.0	0.0	0.00	0.11	0.00	62.0
All Vehicles			863	16.8	776	18.7	1.013	20.5	NA	4.0	29.3	0.12	0.27	0.42	36.3

MOVEMENT SUMMARY

▽ Site: 6 [2040_PM_Dairy Creek Road & Lone Pine Avenue_No Development (Site Folder: 2040_Future Year Model (No Development))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_No Development (Network Folder: 2040_No Development)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	226	14.0	97	32.5	0.062	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	All MCs	21	0.0	7	0.0	0.005	8.0	LOS A	0.0	0.1	0.39	0.58	0.39	59.5
Approach			247	12.8	104	30.3	0.062	0.6	NA	0.0	0.1	0.03	0.04	0.03	77.7
North: Lone Pine Avenue															
7	L2	All MCs	16	0.0	16	0.0	0.346	12.6	LOS B	0.5	3.5	0.66	0.89	0.84	28.4
9	R2	All MCs	47	4.4	47	4.4	0.346	24.6	LOS C	0.5	3.5	0.66	0.89	0.84	18.6
Approach			63	3.3	63	3.3	0.346	21.6	LOS C	0.5	3.5	0.66	0.89	0.84	20.1
West: Dairy Creek Road															
10	L2	All MCs	84	2.5	84	2.5	0.048	4.7	LOS A	0.0	0.0	0.00	0.60	0.00	55.7
11	T1	All MCs	242	4.8	242	4.8	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			326	4.2	326	4.2	0.121	1.2	NA	0.0	0.0	0.00	0.15	0.00	62.5
All Vehicles			637	7.4	494	9.6	0.346	3.7	NA	0.5	3.5	0.09	0.22	0.11	52.2

MOVEMENT SUMMARY

▽ **Site: 7 [2040_AM_Lone Pine Avenue & Adina Crescent_No Development (Site Folder: 2040_Future Year Model (No Development))]**

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	11	10.0	11	10.0	0.099	4.7	LOS A	0.0	0.0	0.00	0.03	0.00	42.7
2	T1	All MCs	163	6.5	163	6.5	0.099	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.2
Approach			174	6.7	174	6.7	0.099	0.3	NA	0.0	0.0	0.00	0.03	0.00	48.8
North: Lone Pine Avenue															
8	T1	All MCs	158	4.0	158	4.0	0.110	0.0	LOS A	0.2	1.6	0.11	0.14	0.11	46.6
9	R2	All MCs	37	8.6	37	8.6	0.110	5.7	LOS A	0.2	1.6	0.11	0.14	0.11	41.4
Approach			195	4.9	195	4.9	0.110	1.1	NA	0.2	1.6	0.11	0.14	0.11	45.5
West: Adina Crecent															
10	L2	All MCs	95	7.8	95	7.8	0.142	6.1	LOS A	0.4	3.3	0.30	0.58	0.30	34.2
12	R2	All MCs	16	0.0	16	0.0	0.032	7.3	LOS A	0.1	0.5	0.36	0.65	0.36	31.1
Approach			111	6.7	111	6.7	0.142	6.3	LOS A	0.4	3.3	0.31	0.59	0.31	33.8
All Vehicles			479	5.9	479	5.9	0.142	2.0	NA	0.4	3.3	0.12	0.21	0.12	43.1

MOVEMENT SUMMARY

▽ **Site: 7 [2040_PM_Lone Pine Avenue & Adina Crescent_No Development (Site Folder: 2040_Future Year Model (No Development))]**

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	5	0.0	5	0.0	0.113	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	44.4
2	T1	All MCs	200	1.6	200	1.6	0.113	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.6
Approach			205	1.5	205	1.5	0.113	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.5
North: Lone Pine Avenue															
8	T1	All MCs	179	5.3	179	5.3	0.145	0.0	LOS A	0.5	3.3	0.19	0.22	0.19	44.8
9	R2	All MCs	74	11.4	74	11.4	0.145	5.9	LOS A	0.5	3.3	0.19	0.22	0.19	39.8
Approach			253	7.1	253	7.1	0.145	1.7	NA	0.5	3.3	0.19	0.22	0.19	43.2
West: Adina Crecent															
10	L2	All MCs	58	5.5	58	5.5	0.182	10.1	LOS A	0.6	4.2	0.43	0.69	0.43	30.0
12	R2	All MCs	16	0.0	16	0.0	0.083	16.7	LOS B	0.2	1.5	0.61	0.83	0.61	22.6
Approach			74	4.3	74	4.3	0.182	11.5	LOS A	0.6	4.2	0.47	0.72	0.47	28.2
All Vehicles			532	4.6	532	4.6	0.182	2.5	NA	0.6	4.2	0.15	0.21	0.15	42.2

B-3 2040 With Development (No Upgrades)

MOVEMENT SUMMARY

Site: 1 [2040_AM_Mitchell Highway & Lone Pine Avenue (North)_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	611	3.8	661	2.9	0.638	10.2	LOS B	8.3	59.6	0.75	0.67	0.75	40.2
6	R2	All MCs	179	6.5	193	5.0	*0.707	33.2	LOS C	3.6	26.5	0.99	0.89	1.15	12.5
Approach			789	4.4	854	3.4	0.707	15.4	LOS B	8.3	59.6	0.80	0.72	0.84	34.4
NorthEast: Lone Pine Avenue															
7	L2	All MCs	168	5.0	168	5.0	0.209	14.3	LOS B	1.8	12.8	0.61	0.71	0.61	16.3
9	R2	All MCs	79	1.3	79	1.3	*0.227	27.9	LOS C	1.2	8.6	0.86	0.74	0.86	30.1
Approach			247	3.8	247	3.8	0.227	18.6	LOS B	1.8	12.8	0.69	0.72	0.69	24.8
NorthWest: Mitchell Highway															
10	L2	All MCs	79	4.0	79	4.0	*0.749	30.4	LOS C	6.6	49.6	0.97	0.92	1.10	30.6
11	T1	All MCs	284	10.4	284	10.4	0.749	23.7	LOS C	6.6	49.6	0.97	0.92	1.10	29.8
Approach			363	9.0	363	9.0	0.749	25.2	LOS C	6.6	49.6	0.97	0.92	1.10	29.9
All Vehicles			1400	5.5	1465	5.2	0.749	18.3	LOS B	8.3	59.6	0.82	0.77	0.88	31.9

MOVEMENT SUMMARY

Site: 1 [2040_PM_Mitchell Highway & Lone Pine Avenue (North)_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	406	2.8	369	2.5	0.355	8.2	LOS A	3.7	26.6	0.60	0.52	0.60	41.8
6	R2	All MCs	128	1.6	117	1.4	*0.598	34.3	LOS C	2.2	15.5	0.99	0.82	1.07	12.2
Approach			535	2.6	486	2.2	0.598	14.5	LOS B	3.7	26.6	0.69	0.59	0.71	34.9
NorthEast: Lone Pine Avenue															
7	L2	All MCs	100	2.1	100	2.1	0.136	15.7	LOS B	1.1	7.8	0.63	0.70	0.63	15.3
9	R2	All MCs	63	0.0	63	0.0	*0.180	26.7	LOS C	1.0	6.7	0.85	0.73	0.85	30.3
Approach			163	1.3	163	1.3	0.180	19.9	LOS B	1.1	7.8	0.72	0.71	0.72	25.2
NorthWest: Mitchell Highway															
10	L2	All MCs	21	5.0	21	5.0	*0.646	25.4	LOS C	6.2	44.5	0.90	0.79	0.91	33.4
11	T1	All MCs	374	2.5	374	2.5	0.646	18.8	LOS B	6.2	44.5	0.90	0.79	0.91	33.0
Approach			395	2.7	395	2.7	0.646	19.2	LOS B	6.2	44.5	0.90	0.79	0.91	33.0
All Vehicles			1093	2.4	1044	2.5	0.646	17.1	LOS B	6.2	44.5	0.78	0.68	0.79	32.9

MOVEMENT SUMMARY

Site: 2 [2040_AM_Mitchell Highway & Lone Pine Avenue (South)_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	6	0.0	0.188	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	42.0
5	T1	All MCs	479	4.2	552	2.8	0.188	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			484	4.1	558	2.7	0.188	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
NorthWest: Mitchell Highway															
11	T1	All MCs	268	7.8	268	7.8	0.148	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	179	5.9	179	5.9	0.346	10.4	LOS B	0.5	3.7	0.61	0.84	0.72	24.1
Approach			447	7.1	447	7.1	0.346	4.2	NA	0.5	3.7	0.24	0.34	0.29	31.4
SouthWest: Lone Pine Avenue															
1	L2	All MCs	300	4.6	302	4.6	0.948	28.5	LOS D	5.0	36.0	1.00	1.58	2.48	9.1
3	R2	All MCs	7	14.3	7	14.3	0.012	8.2	LOS A	0.0	0.1	0.53	0.69	0.53	22.1
Approach			307	4.8	309	4.8	0.948	28.0	LOS D	5.0	36.0	0.99	1.56	2.43	9.2
All Vehicles			1239	5.4	1315	5.0	0.948	8.0	NA	5.0	36.0	0.32	0.48	0.67	33.9

MOVEMENT SUMMARY

Site: 2 [2040_PM_Mitchell Highway & Lone Pine Avenue (South)_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	4	0.0	0.066	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	42.1
5	T1	All MCs	289	4.4	241	3.6	0.066	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach			295	4.3	245	3.5	0.066	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.6
NorthWest: Mitchell Highway															
11	T1	All MCs	353	2.4	353	2.4	0.188	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	121	2.6	122	2.6	0.273	9.8	LOS A	0.4	3.0	0.46	0.69	0.47	24.9
Approach			474	2.4	475	2.4	0.273	2.5	NA	0.4	3.0	0.12	0.18	0.12	35.9
SouthWest: Lone Pine Avenue															
1	L2	All MCs	243	0.9	245	0.9	0.486	9.2	LOS A	1.4	9.9	0.49	0.65	0.58	20.2
3	R2	All MCs	5	0.0	5	0.0	0.005	6.4	LOS A	0.0	0.1	0.47	0.57	0.47	24.7
Approach			248	0.8	250	0.8	0.486	9.1	LOS A	1.4	9.9	0.49	0.65	0.58	20.3
All Vehicles			1017	2.6	970	2.7	0.486	3.6	NA	1.4	9.9	0.18	0.25	0.21	38.6

MOVEMENT SUMMARY

▽ Site: 3 [2040_AM_Mitchell Highway & Retail Access_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	20	21.1	19	15.1	0.012	4.7	LOS A	0.0	0.0	0.00	0.52	0.00	40.0
5	T1	All MCs	536	4.1	545	2.8	0.290	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			556	4.7	564	3.2	0.290	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.6
NorthWest: Mitchell Highway															
11	T1	All MCs	221	9.0	221	9.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	All MCs	11	0.0	11	0.0	0.014	7.5	LOS A	0.0	0.1	0.52	0.64	0.52	42.0
Approach			232	8.6	232	8.6	0.121	0.4	NA	0.0	0.1	0.02	0.03	0.02	49.3
SouthWest: Retail Access															
1	L2	All MCs	11	0.0	11	0.0	0.052	19.3	LOS C	0.1	0.5	0.72	0.87	0.72	25.4
3	R2	All MCs	11	0.0	11	0.0	0.084	30.5	LOS D	0.1	0.7	0.83	0.92	0.83	19.8
Approach			21	0.0	21	0.0	0.084	24.9	LOS C	0.1	0.7	0.77	0.89	0.77	22.2
All Vehicles			808	5.7	816	5.7	0.290	0.9	NA	0.1	0.7	0.03	0.04	0.03	47.1

MOVEMENT SUMMARY

▽ Site: 3 [2040_PM_Mitchell Highway & Retail Access_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	8	25.0	8	24.2	0.005	4.8	LOS A	0.0	0.0	0.00	0.52	0.00	39.7
5	T1	All MCs	234	4.1	223	3.9	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			242	4.8	231	4.6	0.120	0.2	NA	0.0	0.0	0.00	0.02	0.00	48.6
NorthWest: Mitchell Highway															
11	T1	All MCs	295	2.9	295	2.9	0.156	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	11	0.0	11	0.0	0.016	6.2	LOS A	0.0	0.1	0.33	0.56	0.33	42.9
Approach			305	2.8	305	2.8	0.156	0.3	NA	0.0	0.1	0.01	0.02	0.01	49.5
SouthWest: Retail Access															
1	L2	All MCs	21	0.0	22	0.0	0.065	10.4	LOS B	0.1	0.7	0.48	0.67	0.48	32.8
3	R2	All MCs	11	0.0	12	0.0	0.064	21.8	LOS C	0.1	0.6	0.72	0.87	0.72	23.9
Approach			32	0.0	34	0.0	0.065	14.3	LOS B	0.1	0.7	0.57	0.74	0.57	29.2
All Vehicles			579	3.5	570	3.5	0.156	1.0	NA	0.1	0.7	0.04	0.06	0.04	47.6

MOVEMENT SUMMARY

Site: 4 [2040_AM_Mitchell Highway & Perc Griffith Way_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	474	6.0	486	3.7	0.258	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	42	7.5	43	4.7	0.058	8.6	LOS A	0.1	0.6	0.36	0.66	0.36	55.0
Approach			516	6.1	529	3.8	0.258	3.7	NA	0.1	0.6	0.03	0.43	0.03	69.2
NorthEast: Perc Griffith Way															
7	L2	All MCs	21	15.0	22	15.0	0.032	7.9	LOS A	0.1	0.6	0.51	0.56	0.51	30.0
9	R2	All MCs	16	0.0	17	0.0	0.081	26.8	LOS D	0.1	1.0	0.84	0.93	0.84	15.0
Approach			37	8.6	39	8.5	0.081	16.0	LOS C	0.1	1.0	0.65	0.72	0.65	21.0
NorthWest: Mitchell Highway															
10	L2	All MCs	51	2.1	51	2.1	0.137	4.6	LOS A	0.0	0.0	0.00	0.11	0.00	44.4
11	T1	All MCs	191	8.8	191	8.8	0.137	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	46.6
Approach			241	7.4	241	7.4	0.137	1.0	NA	0.0	0.0	0.00	0.11	0.00	45.9
All Vehicles			794	6.6	809	6.5	0.258	3.4	NA	0.1	1.0	0.05	0.35	0.05	62.4

MOVEMENT SUMMARY

Site: 4 [2040_PM_Mitchell Highway & Perc Griffith Way_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
5	T1	All MCs	179	5.3	179	5.3	0.096	3.2	LOS A	0.0	0.0	0.00	0.41	0.00	71.3
6	R2	All MCs	5	20.0	5	20.0	0.007	9.4	LOS A	0.0	0.1	0.42	0.61	0.42	53.0
Approach			184	5.7	184	5.7	0.096	3.4	NA	0.0	0.1	0.01	0.42	0.01	70.5
NorthEast: Perc Griffith Way															
7	L2	All MCs	21	0.0	22	0.0	0.081	12.0	LOS B	0.1	0.7	0.48	0.73	0.48	24.5
9	R2	All MCs	32	3.3	34	3.3	0.187	20.9	LOS C	0.2	1.7	0.69	0.86	0.70	17.8
Approach			53	2.0	56	2.0	0.187	17.4	LOS C	0.2	1.7	0.61	0.81	0.62	20.0
NorthWest: Mitchell Highway															
10	L2	All MCs	11	0.0	9	0.0	0.149	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	46.2
11	T1	All MCs	302	3.1	262	3.6	0.149	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.4
Approach			313	3.0	271	3.5	0.149	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.2
All Vehicles			549	3.8	511	4.1	0.187	3.1	NA	0.2	1.7	0.07	0.25	0.07	55.8

MOVEMENT SUMMARY

Site: 5 [2040_AM_Mitchell Highway & Dairy Creek Road_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	200	16.3	200	16.3	0.103	7.6	LOS A	0.1	0.7	0.04	0.59	0.04	60.7
11	T1	All MCs	458	3.2	458	3.2	0.242	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
Approach			658	7.2	658	7.2	0.242	2.3	LOS A	0.1	0.7	0.01	0.18	0.01	72.8
NorthWest: Mitchell Highway															
5	T1	All MCs	189	11.1	192	8.4	0.105	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	21	25.0	21	19.6	0.044	12.2	LOS B	0.1	0.4	0.51	0.76	0.51	55.0
Approach			211	12.5	213	9.5	0.105	1.2	NA	0.1	0.4	0.05	0.07	0.05	78.0
SouthWest: Dairy Creek Road															
7	L2	All MCs	72	7.4	71	7.5	0.070	9.1	LOS A	0.1	0.7	0.43	0.69	0.43	51.0
9	R2	All MCs	371	19.0	367	19.3	0.380	10.8	LOS B	0.6	4.9	0.52	0.86	0.67	53.3
Approach			442	17.1	438	17.4	0.380	10.5	LOS B	0.6	4.9	0.50	0.83	0.63	53.1
All Vehicles			1311	11.4	1308	11.4	0.380	4.9	NA	0.6	4.9	0.18	0.38	0.23	64.8

MOVEMENT SUMMARY

Site: 5 [2040_PM_Mitchell Highway & Dairy Creek Road_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
10	L2	All MCs	68	15.4	68	15.4	0.037	7.6	LOS A	0.0	0.3	0.04	0.59	0.04	60.7
11	T1	All MCs	179	6.5	179	6.5	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			247	8.9	247	8.9	0.097	2.1	LOS A	0.0	0.3	0.01	0.16	0.01	73.4
NorthWest: Mitchell Highway															
5	T1	All MCs	305	2.4	269	2.7	0.143	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	16	6.7	14	7.5	0.007	6.1	LOS A	0.0	0.1	0.30	0.51	0.30	50.2
Approach			321	2.6	283	3.0	0.143	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.6
SouthWest: Dairy Creek Road															
7	L2	All MCs	12	0.0	12	0.0	0.008	6.0	LOS A	0.0	0.1	0.22	0.52	0.22	46.0
9	R2	All MCs	267	4.3	270	4.3	0.217	7.1	LOS A	0.2	1.7	0.31	0.65	0.31	50.6
Approach			279	4.2	282	4.2	0.217	7.1	LOS A	0.2	1.7	0.31	0.65	0.31	50.5
All Vehicles			847	5.0	813	5.2	0.217	3.2	NA	0.2	1.7	0.12	0.28	0.12	58.0

MOVEMENT SUMMARY

▽ Site: 6 [2040_AM_Dairy Creek Road & Lone Pine Avenue_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	295	15.0	210	16.7	0.123	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	11	20.0	8	22.1	0.008	9.9	LOS A	0.0	0.1	0.52	0.64	0.52	53.5
Approach			305	15.2	218	16.8	0.123	0.4	NA	0.0	0.1	0.02	0.02	0.02	78.0
North: Lone Pine Avenue															
7	L2	All MCs	11	0.0	11	0.0	1.022	137.0	LOS F	4.1	30.0	1.00	1.81	3.78	7.3
9	R2	All MCs	74	5.7	75	5.7	1.022	195.1	LOS F	4.1	30.0	1.00	1.81	3.78	7.7
Approach			84	5.0	86	5.0	1.022	187.9	LOS F	4.1	30.0	1.00	1.81	3.78	7.7
West: Dairy Creek Road															
10	L2	All MCs	89	11.8	89	11.8	0.054	4.7	LOS A	0.0	0.0	0.00	0.59	0.00	52.1
11	T1	All MCs	384	21.9	384	21.9	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			474	20.0	474	20.0	0.212	0.9	NA	0.0	0.0	0.00	0.11	0.00	62.0
All Vehicles			863	16.8	778	18.7	1.022	21.0	NA	4.1	30.0	0.12	0.27	0.42	32.3

MOVEMENT SUMMARY

▽ Site: 6 [2040_PM_Dairy Creek Road & Lone Pine Avenue_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	226	14.0	77	41.2	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	All MCs	21	0.0	5	0.0	0.004	8.0	LOS A	0.0	0.0	0.39	0.57	0.39	54.6
Approach			247	12.8	82	38.7	0.051	0.5	NA	0.0	0.0	0.02	0.03	0.02	77.0
North: Lone Pine Avenue															
7	L2	All MCs	16	0.0	16	0.0	0.329	12.3	LOS B	0.5	3.3	0.63	0.87	0.79	29.3
9	R2	All MCs	47	4.4	47	4.4	0.329	22.7	LOS C	0.5	3.3	0.63	0.87	0.79	22.8
Approach			63	3.3	63	3.3	0.329	20.1	LOS C	0.5	3.3	0.63	0.87	0.79	24.0
West: Dairy Creek Road															
10	L2	All MCs	84	2.5	84	2.5	0.048	4.7	LOS A	0.0	0.0	0.00	0.60	0.00	55.7
11	T1	All MCs	242	4.8	242	4.8	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			326	4.2	326	4.2	0.121	1.2	NA	0.0	0.0	0.00	0.15	0.00	62.5
All Vehicles			637	7.4	471	10.1	0.329	3.6	NA	0.5	3.3	0.09	0.23	0.11	50.4

MOVEMENT SUMMARY

▽ Site: 7 [2040_AM_Lone Pine Avenue & Adina Crescent_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_Lone Pine Avenue_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	13	8.3	13	8.3	0.107	3.0	LOS A	0.0	0.0	0.00	0.03	0.00	40.5
2	T1	All MCs	176	6.0	176	6.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.2
Approach			188	6.1	188	6.1	0.107	0.2	NA	0.0	0.0	0.00	0.03	0.00	48.6
North: Lone Pine Avenue															
8	T1	All MCs	158	4.0	158	4.0	0.111	0.0	LOS A	0.1	0.7	0.12	0.14	0.12	44.4
9	R2	All MCs	37	8.6	37	8.6	0.111	5.8	LOS A	0.1	0.7	0.12	0.14	0.12	41.4
Approach			195	4.9	195	4.9	0.111	1.1	NA	0.1	0.7	0.12	0.14	0.12	43.5
West: Adina Crecent															
10	L2	All MCs	95	7.8	95	7.8	0.144	6.2	LOS A	0.2	1.4	0.31	0.59	0.31	34.0
12	R2	All MCs	16	0.0	16	0.0	0.032	7.4	LOS A	0.0	0.2	0.37	0.66	0.37	26.5
Approach			111	6.7	111	6.7	0.144	6.4	LOS A	0.2	1.4	0.32	0.60	0.32	33.4
All Vehicles			494	5.8	494	5.8	0.144	1.9	NA	0.2	1.4	0.12	0.20	0.12	41.5

MOVEMENT SUMMARY

▽ Site: 7 [2040_PM_Lone Pine Avenue & Adina Crescent_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_Lone Pine Avenue_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
1	L2	All MCs	5	0.0	5	0.0	0.116	3.0	LOS A	0.0	0.0	0.00	0.01	0.00	42.3
2	T1	All MCs	206	1.5	206	1.5	0.116	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.7
Approach			212	1.5	212	1.5	0.116	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.5
North: Lone Pine Avenue															
8	T1	All MCs	179	5.3	179	5.3	0.145	0.0	LOS A	0.2	1.4	0.19	0.22	0.19	41.9
9	R2	All MCs	74	11.4	74	11.4	0.145	6.0	LOS A	0.2	1.4	0.19	0.22	0.19	39.7
Approach			253	7.1	253	7.1	0.145	1.7	NA	0.2	1.4	0.19	0.22	0.19	41.0
West: Adina Crecent															
10	L2	All MCs	58	5.5	58	5.5	0.185	10.3	LOS B	0.2	1.7	0.44	0.69	0.44	29.7
12	R2	All MCs	16	0.0	16	0.0	0.084	16.9	LOS C	0.1	0.6	0.62	0.83	0.62	16.5
Approach			74	4.3	74	4.3	0.185	11.7	LOS B	0.2	1.7	0.48	0.72	0.48	27.3
All Vehicles			538	4.5	538	4.5	0.185	2.5	NA	0.2	1.7	0.16	0.21	0.16	40.2

MOVEMENT SUMMARY

▽ Site: SA1 [2040_AM_Mitchell Highway & Redmond Place_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	5	0.0	5	0.0	0.003	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	42.8
5	T1	All MCs	489	5.8	498	3.6	0.267	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			495	5.7	503	3.6	0.267	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.6
NorthWest: Mitchell Highway															
11	T1	All MCs	232	8.6	232	8.6	0.127	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	22	0.0	22	0.0	0.021	6.5	LOS A	0.0	0.2	0.50	0.61	0.50	39.5
Approach			254	7.9	254	7.9	0.127	0.6	NA	0.0	0.2	0.04	0.05	0.04	46.6
SouthWest: Redmond Place															
1	L2	All MCs	66	0.0	66	0.0	0.073	7.2	LOS A	0.1	0.9	0.54	0.68	0.54	38.8
3	R2	All MCs	17	0.0	17	0.0	0.022	7.4	LOS A	0.0	0.2	0.52	0.68	0.52	38.6
Approach			83	0.0	83	0.0	0.073	7.3	LOS A	0.1	0.9	0.54	0.68	0.54	38.7
All Vehicles			832	5.8	840	5.8	0.267	0.9	NA	0.1	0.9	0.07	0.09	0.07	46.7

MOVEMENT SUMMARY

▽ Site: SA1 [2040_PM_Mitchell Highway & Redmond Place_With Development (no upgrades) (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
SouthEast: Mitchell Highway															
4	L2	All MCs	13	0.0	12	0.0	0.007	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	42.8
5	T1	All MCs	211	5.0	201	5.3	0.109	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach			223	4.7	213	5.0	0.109	0.3	NA	0.0	0.0	0.00	0.03	0.00	48.8
NorthWest: Mitchell Highway															
11	T1	All MCs	305	2.8	263	3.2	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	51	0.0	43	0.0	0.029	5.2	LOS A	0.1	0.4	0.31	0.52	0.31	40.3
Approach			356	2.4	306	2.7	0.139	0.7	NA	0.1	0.4	0.04	0.07	0.04	45.7
SouthWest: Redmond Place															
1	L2	All MCs	31	0.0	31	0.0	0.023	5.3	LOS A	0.0	0.3	0.33	0.52	0.33	40.4
3	R2	All MCs	7	0.0	7	0.0	0.007	6.1	LOS A	0.0	0.1	0.42	0.57	0.42	39.9
Approach			38	0.0	38	0.0	0.023	5.5	LOS A	0.0	0.3	0.35	0.53	0.35	40.3
All Vehicles			617	3.1	557	3.4	0.139	0.9	NA	0.1	0.4	0.05	0.09	0.05	46.2

MOVEMENT SUMMARY

▽ Site: SA2 [2040_AM_Dairy Creek Road Access_With Development (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	221	17.1	205	17.9	0.120	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
6	R2	All MCs	17	0.0	15	0.0	0.013	7.0	LOS A	0.0	0.2	0.45	0.58	0.45	43.0
Approach			238	15.9	221	16.6	0.120	0.5	NA	0.0	0.2	0.03	0.04	0.03	58.1
North: Site Access Road															
7	L2	All MCs	53	0.0	53	0.0	0.052	5.9	LOS A	0.1	0.6	0.49	0.64	0.49	24.0
9	R2	All MCs	13	0.0	13	0.0	0.014	6.3	LOS A	0.0	0.1	0.48	0.64	0.48	24.4
Approach			65	0.0	65	0.0	0.052	6.0	LOS A	0.1	0.6	0.49	0.64	0.49	24.1
West: Dairy Creek Road															
10	L2	All MCs	4	0.0	4	0.0	0.002	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	50.0
11	T1	All MCs	389	19.5	382	19.8	0.209	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			394	19.3	386	19.6	0.209	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			697	16.3	672	16.9	0.209	0.8	NA	0.1	0.6	0.06	0.08	0.06	58.2

MOVEMENT SUMMARY

▽ Site: SA2 [2040_PM_Dairy Creek Road Access_With Development (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	84	13.8	55	21.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	All MCs	45	0.0	27	0.0	0.019	6.4	LOS A	0.0	0.2	0.35	0.55	0.35	43.5
Approach			129	8.9	82	14.0	0.033	2.1	NA	0.0	0.2	0.12	0.18	0.12	52.8
North: Site Access Road															
7	L2	All MCs	26	0.0	26	0.0	0.021	4.9	LOS A	0.0	0.3	0.37	0.55	0.37	26.1
9	R2	All MCs	6	0.0	6	0.0	0.005	5.0	LOS A	0.0	0.1	0.34	0.53	0.34	27.1
Approach			33	0.0	33	0.0	0.021	4.9	LOS A	0.0	0.3	0.37	0.54	0.37	26.3
West: Dairy Creek Road															
10	L2	All MCs	12	0.0	12	0.0	0.007	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	50.0
11	T1	All MCs	253	4.6	253	4.6	0.126	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach			264	4.4	264	4.4	0.126	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.4
All Vehicles			426	5.4	379	6.1	0.126	1.1	NA	0.0	0.3	0.06	0.10	0.06	57.4

MOVEMENT SUMMARY

▽ Site: SA3 [2040_AM_Lone Pine Avenue Access_With Development (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_Lone Pine Avenue_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
8	T1	All MCs	174	6.7	174	6.7	0.101	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
9	R2	All MCs	1	0.0	1	0.0	0.101	4.8	LOS A	0.0	0.0	0.00	0.00	0.00	45.6
Approach			175	6.6	175	6.6	0.101	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.3
East: Site Access Road															
10	L2	All MCs	4	0.0	4	0.0	0.002	4.4	LOS A	0.0	0.0	0.30	0.49	0.30	31.3
12	R2	All MCs	14	0.0	14	0.0	0.008	4.1	LOS A	0.0	0.1	0.21	0.55	0.21	27.2
Approach			18	0.0	18	0.0	0.008	4.2	LOS A	0.0	0.1	0.23	0.54	0.23	28.7
North: Lone Pine Avenue															
1	L2	All MCs	5	0.0	5	0.0	0.100	3.1	LOS A	0.0	0.0	0.00	0.02	0.00	27.4
2	T1	All MCs	174	3.6	174	3.6	0.100	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.1
Approach			179	3.5	179	3.5	0.100	0.1	NA	0.0	0.0	0.00	0.02	0.00	57.5
All Vehicles			372	4.8	372	4.8	0.101	0.3	NA	0.0	0.1	0.01	0.04	0.01	56.0

MOVEMENT SUMMARY

▽ Site: SA3 [2040_PM_Lone Pine Avenue Access_With Development (Site Folder: 2040_Future Year Model (With Development, no upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_Lone Pine Avenue_With Development (no upgrades) (Network Folder: 2040_With Development (No Upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Lone Pine Avenue															
8	T1	All MCs	205	1.5	205	1.5	0.117	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	58.7
9	R2	All MCs	3	0.0	3	0.0	0.117	5.0	LOS A	0.0	0.1	0.01	0.01	0.01	45.3
Approach			208	1.5	208	1.5	0.117	0.1	NA	0.0	0.1	0.01	0.01	0.01	58.3
East: Site Access Road															
10	L2	All MCs	2	0.0	2	0.0	0.001	4.5	LOS A	0.0	0.0	0.33	0.48	0.33	31.1
12	R2	All MCs	6	0.0	6	0.0	0.004	4.2	LOS A	0.0	0.0	0.23	0.55	0.23	27.1
Approach			8	0.0	8	0.0	0.004	4.3	LOS A	0.0	0.0	0.26	0.53	0.26	28.7
North: Lone Pine Avenue															
1	L2	All MCs	12	0.0	12	0.0	0.116	3.1	LOS A	0.0	0.0	0.00	0.03	0.00	27.2
2	T1	All MCs	195	4.9	195	4.9	0.116	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	58.4
Approach			206	4.6	206	4.6	0.116	0.2	NA	0.0	0.0	0.00	0.03	0.00	55.4
All Vehicles			423	3.0	423	3.0	0.117	0.2	NA	0.0	0.1	0.01	0.03	0.01	55.7

B-4 2040 With Development (Including Upgrades)

MOVEMENT SUMMARY

▽ Site: 6 [2040_AM_Dairy Creek Road & Lone Pine Avenue_With Development and upgrades (Site Folder: 2040_Future Year Model (With Development and upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_AM_With Development (including upgrades) (Network Folder: 2040_With Development (Including upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	295	15.0	210	16.3	0.122	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
6	R2	All MCs	11	20.0	8	21.7	0.008	10.0	LOS A	0.0	0.1	0.52	0.63	0.52	53.5
Approach			305	15.2	218	16.5	0.122	0.4	NA	0.0	0.1	0.02	0.02	0.02	78.0
North: Lone Pine Avenue															
7	L2	All MCs	11	0.0	13	0.0	0.014	6.2	LOS A	0.0	0.1	0.40	0.59	0.40	41.0
9	R2	All MCs	74	5.7	76	5.7	0.083	7.0	LOS A	0.1	0.7	0.44	0.69	0.44	40.4
Approach			84	5.0	88	4.9	0.083	6.9	LOS A	0.1	0.7	0.43	0.67	0.43	40.5
West: Dairy Creek Road															
10	L2	All MCs	89	11.8	89	11.8	0.054	4.7	LOS A	0.0	0.0	0.00	0.59	0.00	52.1
11	T1	All MCs	384	21.9	384	21.9	0.212	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			474	20.0	474	20.0	0.212	0.9	NA	0.0	0.0	0.00	0.11	0.00	62.2
All Vehicles			863	16.8	780	18.6	0.212	1.4	NA	0.1	0.7	0.05	0.15	0.05	64.6

MOVEMENT SUMMARY

▽ Site: 6 [2040_PM_Dairy Creek Road & Lone Pine Avenue_With Development and upgrades (Site Folder: 2040_Future Year Model (With Development and upgrades))]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [2040_PM_With Development (including upgrades) (Network Folder: 2040_With Development (Including upgrades))]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Dairy Creek Road															
5	T1	All MCs	226	14.0	78	40.6	0.052	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	80.0
6	R2	All MCs	21	0.0	5	0.0	0.004	8.1	LOS A	0.0	0.0	0.39	0.57	0.39	54.6
Approach			247	12.8	83	38.1	0.052	0.5	NA	0.0	0.0	0.02	0.03	0.02	76.9
North: Lone Pine Avenue															
7	L2	All MCs	16	0.0	16	0.0	0.014	5.3	LOS A	0.0	0.1	0.27	0.53	0.27	41.6
9	R2	All MCs	47	4.4	47	4.4	0.039	5.5	LOS A	0.0	0.3	0.29	0.56	0.29	41.2
Approach			63	3.3	63	3.3	0.039	5.5	LOS A	0.0	0.3	0.28	0.55	0.28	41.3
West: Dairy Creek Road															
10	L2	All MCs	84	2.5	84	2.5	0.048	4.7	LOS A	0.0	0.0	0.00	0.60	0.00	55.7
11	T1	All MCs	242	4.8	242	4.8	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach			326	4.2	326	4.2	0.121	1.2	NA	0.0	0.0	0.00	0.15	0.00	62.7
All Vehicles			637	7.4	472	10.0	0.121	1.7	NA	0.0	0.3	0.04	0.19	0.04	61.1

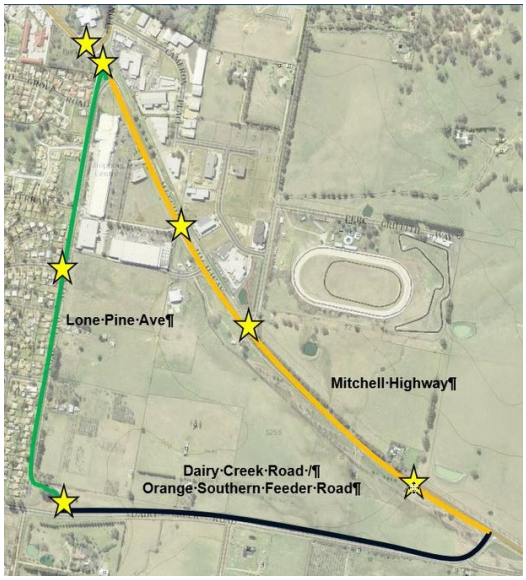
Appendix C

Meeting Minutes

Meeting Title:	**Redmond Place, Orange**	**Date:**	12-Feb-24
Purpose:	Traffic and Transport Meeting	**Start & finish time:**	11:00am
Meeting Chair:		**Venue:**	Parramatta Office / Teams

Name		Initials	
Paul Irwin	Development Director, Landcom	PI	Present
Stephanie Wang	Development Manager, Landcom	SW	Present
Vanessa Pretila	Senior Development Manager, Landcom	VP	Present
Rachel Keys	Senior Development Manager, Landcom	RK	Present
Kevin Jarvie	Regional Leader – Central West, Orange Office, GHD	KJ	Present
Mark Leigh Lucas	Technical Director Transport Planning, GHD	ML	Present
Christophe Steinbach	Technical Director, GHD	CS	Present
Ying Wang	Project Manager, GHD	YW	Present
Stephen Collins	Strategic Design & Planning Engineer, Orange City Council (OCC)	SC	Present
Courtney Smolenski	Strategic Design & Planning Engineer, Orange City Council (OCC)	CSm	Present
Apologies			

#	Item	Resp.	Status	Action
1	Introductions/Context	Landcom	• Minimum 330 dwellings (inclusive 66 apartments for affordable housing). Current mix 65% low density, 35% medium density	Note
2	Program	GHD	• Scope of work timeframe compressed – GHD confirmed can meet deliverables. • RK (Landcom) to provide concept options onced confirmed. Draft masterplan to be provided mid-April 2024 (if not sooner).	• GHD • RK (Landcom)
3	Traffic and Transport	OCC	• OCC to provide details of OCC-TfNSW Meeting held on 13.02.2024 re: locations for Traffic Count. GHD to complete Traffic Counts as per Figure 4.2 (amended) once TfNSW confirms positions are correct. Need to ascertain Traffic Count before development added.	• OCC/GHD

			 Figure 4.2 Proposed traffic survey locations (amended) as per meeting 12 February 2024. • SC (GHD) noted that exit points might also be considered at Perc Griffith Way and Mitchell Highway. • ML (GHD) noted opportunity to integrate out exit points at intersection Mitchell Highway and Lone Pine noting eastern Lone Pine is triggered. • SC (GHD) need confirmation on what TfNSW wants re: existing or additional access points and hierarchies • Key agenda items as per email 12.02.2024** to be raised at OCC and TfNSW meeting on 13.02.2024.	Note Note • OCC • OCC
4	Intersections (where have/not have)	GHD/ OCC	• PI – discussed Landcom constraints assessment mapping and noted we asked consultants to confirm what areas cannot be used for developable area (re: roads, parks, wetlands/basins etc)	Note
5	Access into Redmond Place site (ie Lone Pine, Dairy Creek Road or existing intersection at Hanger)	OCC	• ML (GHD) asked OCC to confirm : ➢ Mitchell Highway is 60km/hr given road works ➢ If Mitchell Highway speed limit can drop at Dairy Creek Road/Mitchell Highway junction ➢ If TfNSW want another access point on Mitchell Highway and if so, where? • SS (GHD) noted bypass and asked: ➢ TfNSW principles on approach to Orange ➢ OCC to confirm TfNSW position on additional access points or maintenance on same access. ➢ Signalisation may be required	Note • OCC • OCC • OCC • OCC • OCC/TfNSW

6	Any issues with above, site constraints	GHD	• GHD to confirm upon constraints mapping review	• GHD
7	Site access	Landcom /OCC	• GHD to get survey areas done next week	• GHD
8	Communications and meeting coordination	Landcom	• Next meeting 11.00am 26 February 2024	Confirm
9	Next steps	OCC	• GHD requested Dairy Creek Road to Mitchell Highway documentation (including CAD), traffic counts etc if available 1. SC (OCC) noted Impact of Housing Strategy on water catchment. ML (GHD) – noted constraints in vicinity of Redmond Place needs to be accounted for and development needs to be integrated. 2. CSm (OCC) noted Active Transport being updated. Last outputs for Strategic Transport Model (2018) Wider counts provide comparison. OCC to request any documentation on Mitchel Highway from TfNSW 3. Any upgrades in vicinity	• OCC • OCC • OCC/TfNSW

**Key agenda items (GHD email) for OCC to raise in TfNSW meeting on 13 February 2024:

- Brief TfNSW on the Redmond Master Plan (i.e. 330 dwellings)
- Indicative accesses required off Mitchell Highway, Dairy Creek Road and Lone Pine Avenue to support Master Plan.
- Points of discussion with TfNSW:
    - TfNSW position on new access points off Mitchell Hwy
    - TfNSW position re shifting speed limit south:
        - Noting bypass to the south
        - Development will likely shift Orange urban boundary to the south.
    - Any projects currently in planning by TfNSW along portion of Mitchell Highway
    - Any recent traffic counts along Mitchell Highway
    - LandCom will be undertaking traffic surveys to inform the traffic assessment.
- Request follow up detailed meeting with TfNSW Land Use and Planning team to discuss points above.

Meeting close 11.45am

Next meeting: 11.00am 26 February 2024 (to be confirmed)

From: Rachel Keys
To: Damien Pfeiffer; Richard Drooger; Jason Theakstone (InTouch); Vanessa Pretila; Stephanie Wang; Mark Leigh-Lucas; Taaj Davis
Cc: Kylie-anne Pont; Kevin Jarvie; Christophe Steinbach; Ying Wang
Subject: Redmond Place, Orange (Traffic and Transport) TfNSW, OCC, GHD, Landcom - Meeting Minutes
Attachments: 20240403 Agenda - Redmond Place, Orange (Traffic and Transport).pdf

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Hi all

Following Wednesday's meeting on 3 April, please find below the Minutes and Actions:

ITEM	MINUTE	ACTION	DUE DATE
1	i. AM and PM peak hour taken re: trip generation and distribution volumes. ii. Data from traffic count surveys included 7 camera locations but did minor intersections in between as it does not impact the overall data, can extrapolate on traffic volumes	Note Note	- -
2	i. **As per TfNSW instruction, the Traffic Assessment will account for only known and certain developments**	Note	-
3	i. **GHD will provide TfNSW with all SIDRA models upon completion of the study.**	GHD	05/04
4	i. **The growth rates for the adjoining road network will be sourced from the existing VISSUM model (to be provided to GHD)**	OCC	05/04
5	i. **Identifying suitable growth rates is one of the key concerns of TfNSW**	GHD	Ongoing
6	i. Interpret VISSUM – robust future growth and year analysis ii. Post development active transport – masterplan support sustainable transport option	Note Note	- -
7	i. TfNSW want active transport and bus routes built into development and linkages (ie to Canobolas High School) • masterplanner to address street concepts and cross sections • street hierarchy • bus capable • connect with active transport	Note	-
8	i. TfNSW need to review access points and saturation at Mitchell Highway. GHD noted that it is within acceptable performance of signalised intersection • Priority controlled signalised Lone Pine and Mitchell Highway • Short distance approach at 60m	Note	-
9	i. Trip generation methodology • Calculated out based on masterplan and x3 zones - Total area x dwelling type x average lot size • Number of trips generated based on method inbound and outbound trips established dwelling by dwelling type • AM and PM rates reflected in the data • Trip Generation Rates 2002 – best available data available • Utilise different x3 access points, model intersections and capacity issues given rates including: i) Mitchell Highway and Redmond Place, ii) Lone Pine Ave, iii)	Note	-

	Dairy Creek Road • Growth rates in VISSUM model Perc Griffith Way and Redmond Place		
10	i. **Analysis should account for the extension of the southern feeder road (Stage 4)**	Note	-
11	i. Planning and Programs model to be included	TfNSW	TBC
12	i. Likely 6 week assessment period for TfNSW	Note	-

Regards
Rachel

ghd.com

The Power of Commitment