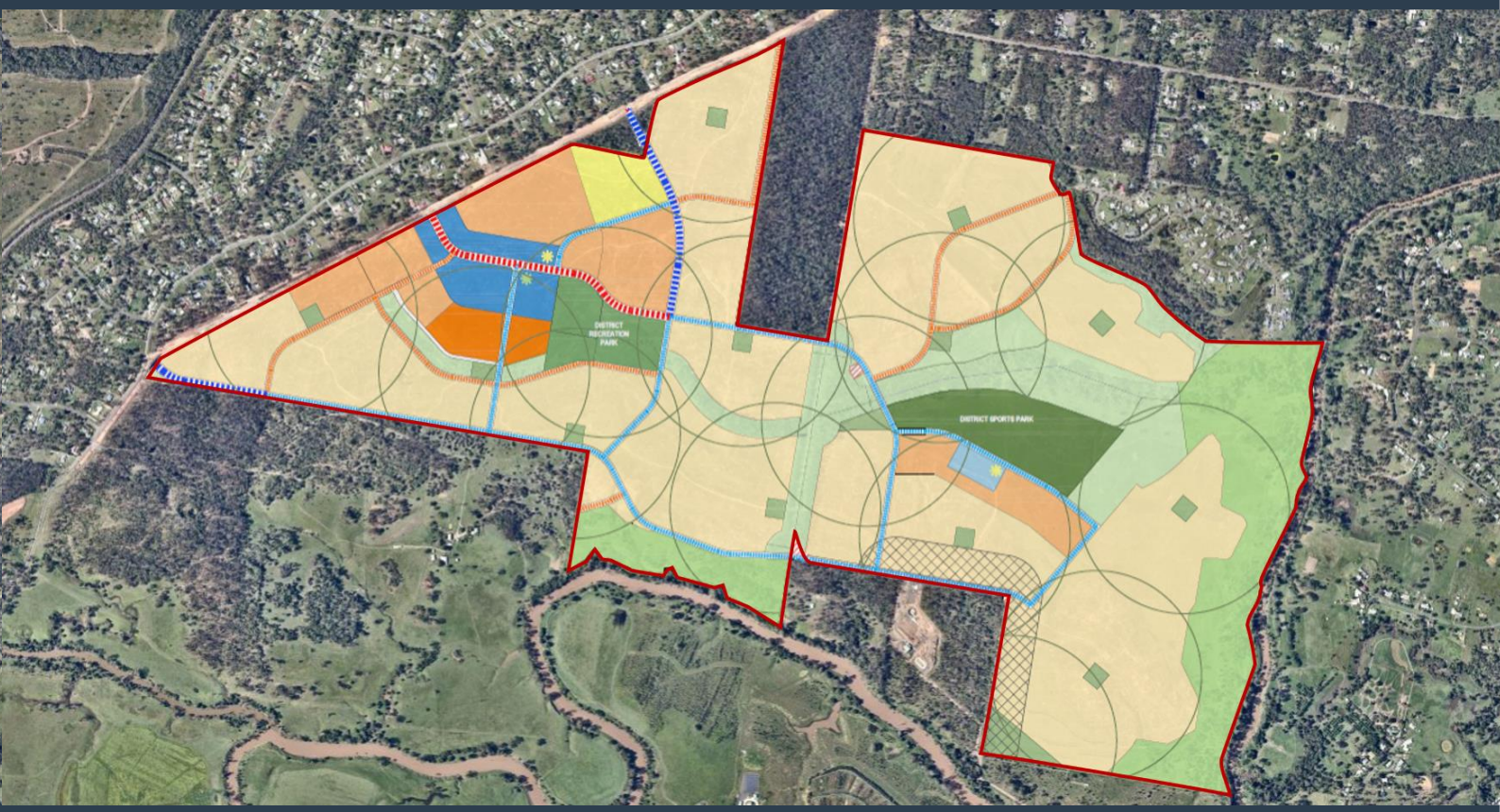
Movement Network Infrastructure Master Plan

Riverbend



02 September 2024

LAND USE PLANNING | DEVELOPMENT APPROVALS | TRANSPORT PLANNING | TRAFFIC ENGINEERING | PROGAM MANAGEMENT | INFRASTRUCTURE

DOCUMENT CONTROL

Document: Project Name: Riverbend
PSA Job Number: 1698
Report Name: Movement Network Infrastructure Master Plan

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REVISION HISTORY

VERSION	DATE	DETAILS	AUTHOR	AUTHORISATION
V4	2 September 2024	DRAFT	Daina Ruth Aliboso	Hannah Richardson RPEQ: 17016

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LIST OF ACRONYMS

DOS	Degree of Saturation
EDQ	Economic Development Queensland
IMP	Infrastructure Master Plan
LCC	Logan City Council
LGA	Local Government Area
LOS	Level of Service
PDA	Priority Development Area
PSA	PSA Consulting
ROL	Reconfiguring of Lot
RTA	New South Wales Roads and Traffic Authority
SDA	State Development Area
VLC	Veitch Lister Consulting

1. INTRODUCTION

PSA Consulting (Australia) Pty Ltd (PSA) has been engaged by Celestino Pty Limited (Celestino) to prepare this Movement Network Infrastructure Master Plan (IMP) for the Riverbend Master Planned Community within the Greater Flagstone Priority Development Area (PDA), as designated by Economic Development Queensland (EDQ). The development site is located at 155-243 Bushland Road, 1394-1432 Teviot Road, 1294-1352 Teviot Road, Jimboomba (Lots 102, 105, and 106 SP254145). The development is located east of Teviot Road and south of Glynton Road, with main access via Teviot Road and connection with Riverbend Boulevard to the north and Bushman Drive to the west. Figure 1 shows the development site in relation to the surrounding area and road network.

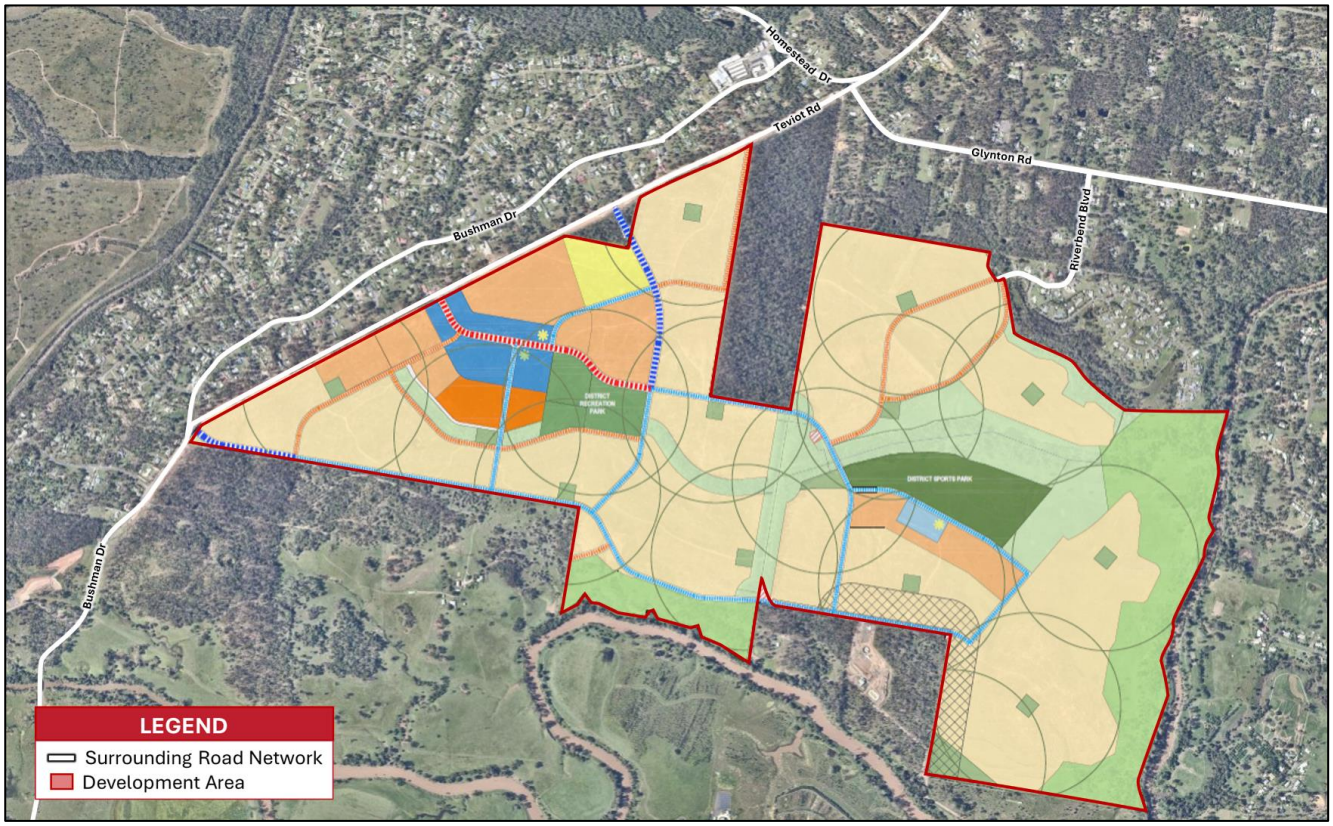


Figure 1: Site Locality (Source: Nearmap, Place Design Group)

1.1 GREATER FLAGSTONE PRIORITY DEVELOPMENT AREA

The Riverbend Master Planned Community is located within the Greater Flagstone PDA, previously referred to as the Greater Flagstone Urban Development Area. The Greater Flagstone PDA is located west of Jimboomba and the Mt Lindesay Highway, along the existing Brisbane-Sydney rail line, approximately 40km southwest from the Brisbane CBD. The PDA is located within the Logan City Council (LCC) Local Government Area (LGA). It is also located immediately north of the Bromelton State Development Area (SDA), which is a future major employment generator.

When fully developed, it is anticipated that Greater Flagstone will provide approximately 50,000 dwellings to house a population of up to 120,000 people. It will provide a major regional activity centre with several employment clusters; however, specific employment targets have not yet been nominated.

Existing employment hubs at Park Ridge and Logan Central, along with the proposed economic development at North Maclean and Bromelton SDA will provide a range of job opportunities for residents in the PDA. As such, large volumes of traffic are expected to be generated from the PDA and specifically from the subject site. Figure 2 shows the proposed Centres and Transport Network with land uses for the Greater Flagstone PDA from the Greater Flagstone Urban Development Area Development Scheme (Development Scheme).

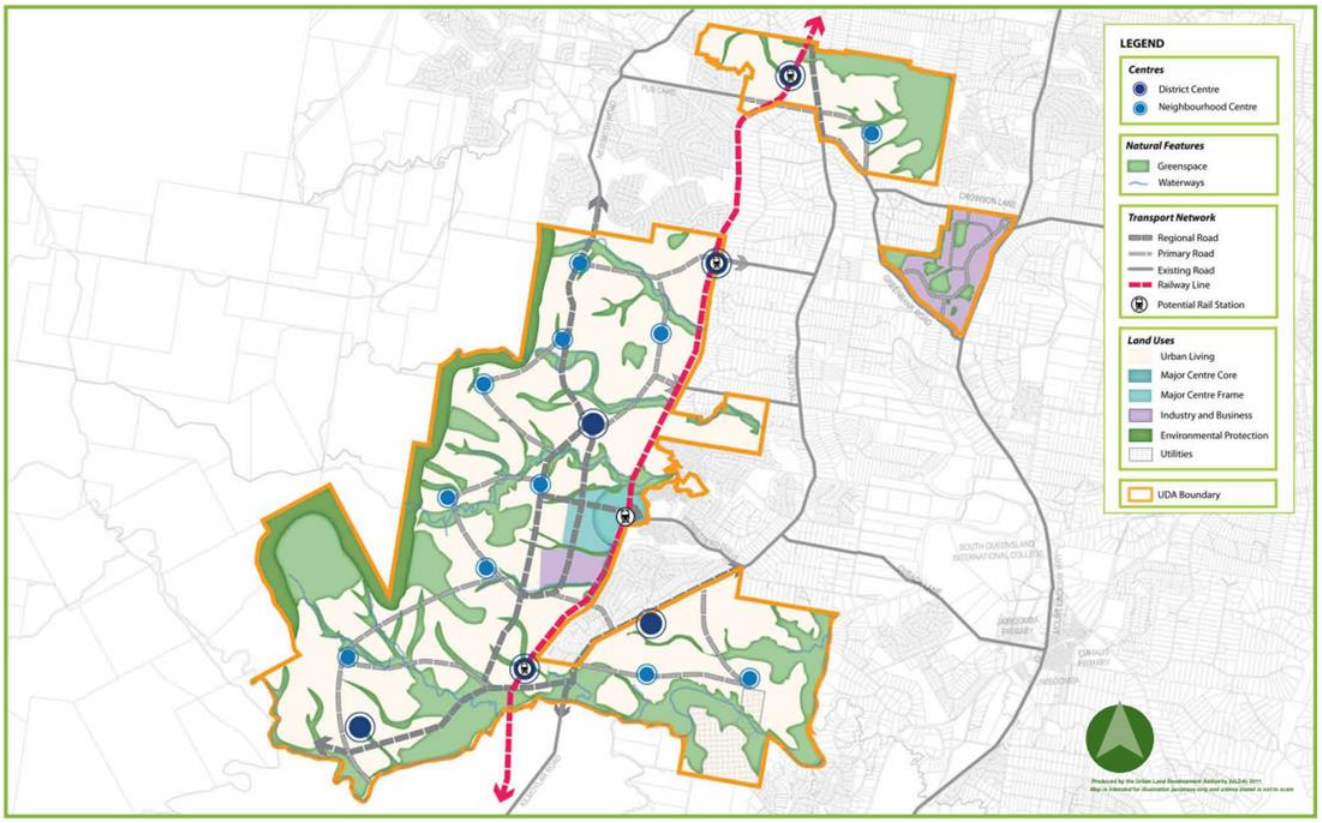


Figure 2: Greater Flagstone PDA Centres and Transport Network (Source: EDQ)

1.2 EXISTING APPROVAL

The initial Movement Network IMP, endorsed by EDQ, includes a context plan for the subject site, as shown in Figure 3 and detailed in Appendix 1. The endorsed context plan, approved by EDQ dated 21 September 2017, includes strategic zoning for the development site as well as a conceptual road hierarchy, cycle network and activity notes with associated catchment areas.

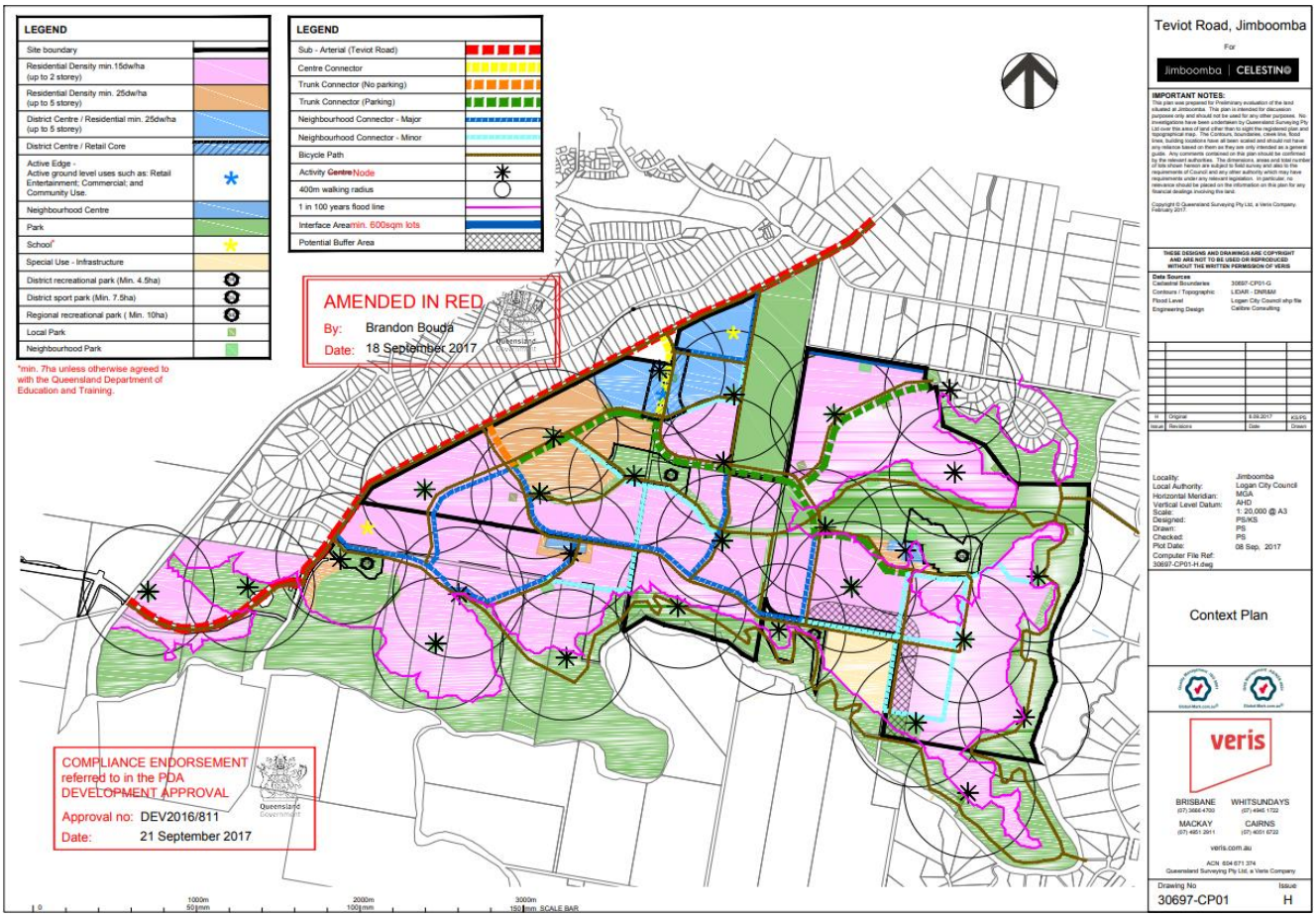


Figure 3: Endorsed Context Plan (Source: Veris, 2017)

1.3 RIVERBEND MASTER PLAN

The Riverbend Master Plan aligns with the endorsed context plan, with minor adjustments including the relocation of the district centre to the south and realignment of the road network. The approved Riverbend Master plan is shown in Figure 4 and detailed in Appendix 2.

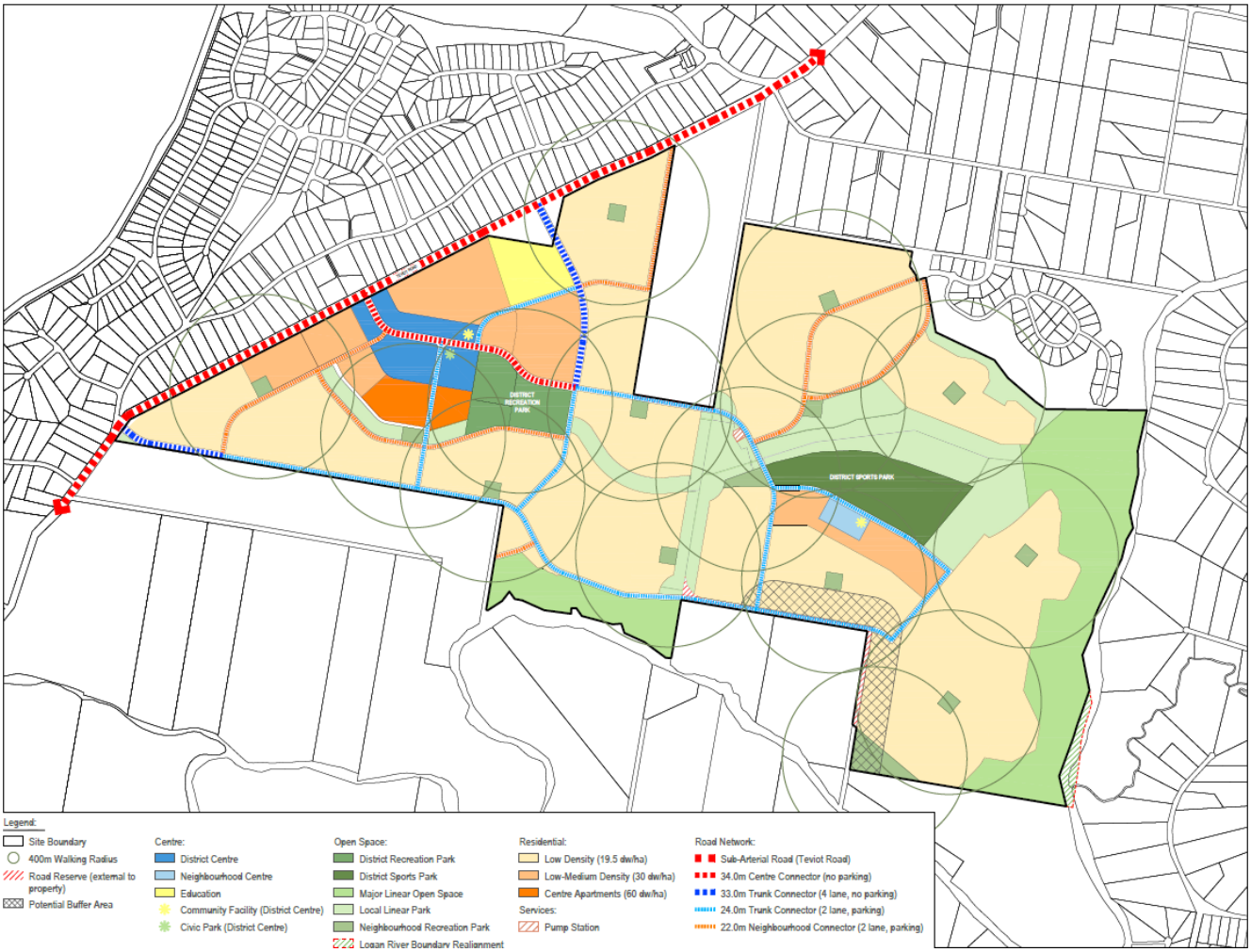


Figure 4: Riverbend Master Plan (Source: Place Design Group, 2024)

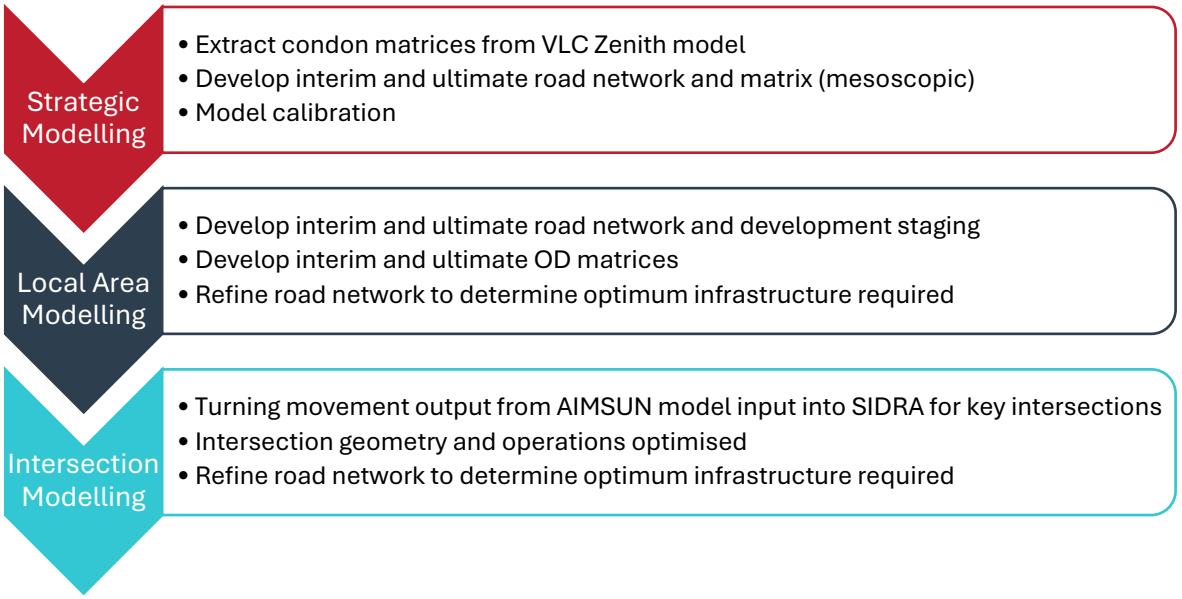
2. TRANSPORT MODELLING

The modelling of the Riverbend development was conducted using a comprehensive three-tiered modelling approach:

1. **Strategic Modelling (Zenith)**: This modelling focuses on the broader transportation network, assessing regional travel patterns and long-term strategic planning implications.
2. **Local Area Modelling (AIMSUN)**: This modelling involves detailed examination of the local traffic conditions, simulating traffic flows and interactions within the specific development are to identify potential issues and optimize traffic management.
3. **Intersection Modelling (SIDRA)**: This modelling involves the performance of the key intersections, evaluating their capacity and efficiency to manage traffic volumes and ensuring smooth vehicular movement.

The detailed modelling approach employed for Riverbend development is demonstrated in Figure 5.

Figure 5: Riverbend Modelling Methodology (Source: PSA)



Riverbend Master Planned Community is anticipated to be developed across multiple stages. For the purposes of the transport modelling, two full stages have been assessed aligning with the strategic transport modelling years. During Stage 1, Precinct 1 and 2 of Riverbend will be fully developed by 2031, with the remaining development planned for Stage 2, expected to be completed by 2066. The high level development staging, along with its road network is illustrated in Figure 6.

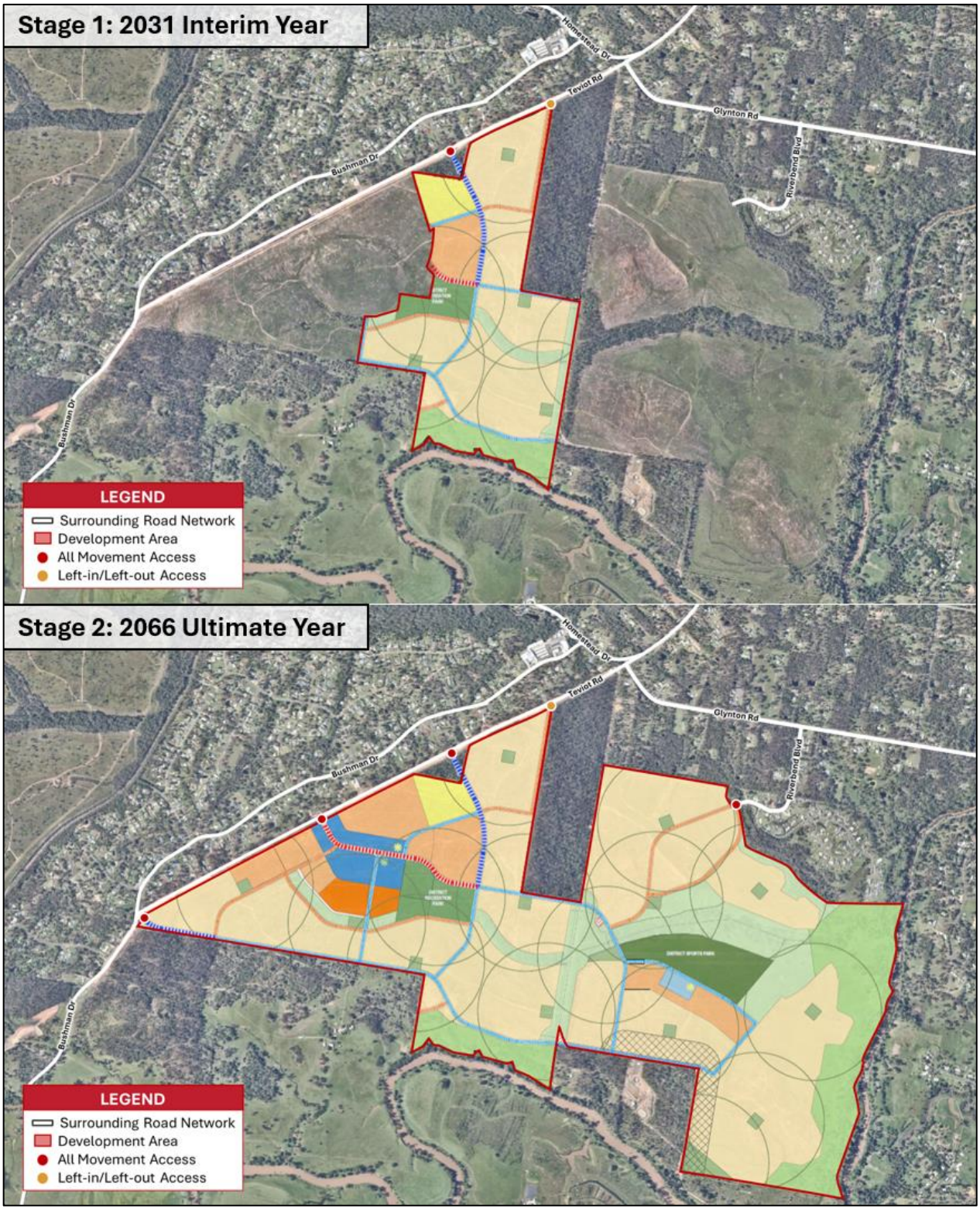


Figure 6: Development Staging (Source: PSA)

2.1 AIMSUN

A mesoscopic model was developed using AIMSUN software, incorporating outputs from the Veitch Lister Consulting (VLC) Zenith model. These outputs were utilised to calibrate traffic demands and estimate traffic volumes and delays on the road network for the 2031 and 2066 future design years. Figure 7 illustrates the AIMSUN model's demand development and assumptions.

Further details of the AIMSUN modelling are shown within the separate AIMSUN Modelling Report by Dykman Consulting included in Appendix 3. It should be noted that the demand estimation is likely conservatively high given that 'discounting' of trips on the internal network that may produce higher active travel mode choice has not been applied. This provides a conservative assessment to ensure that the intersections planned at this level have sufficient space to accommodate their required footprints, while further detailed analysis can be undertaken at the detailed ROL stage.

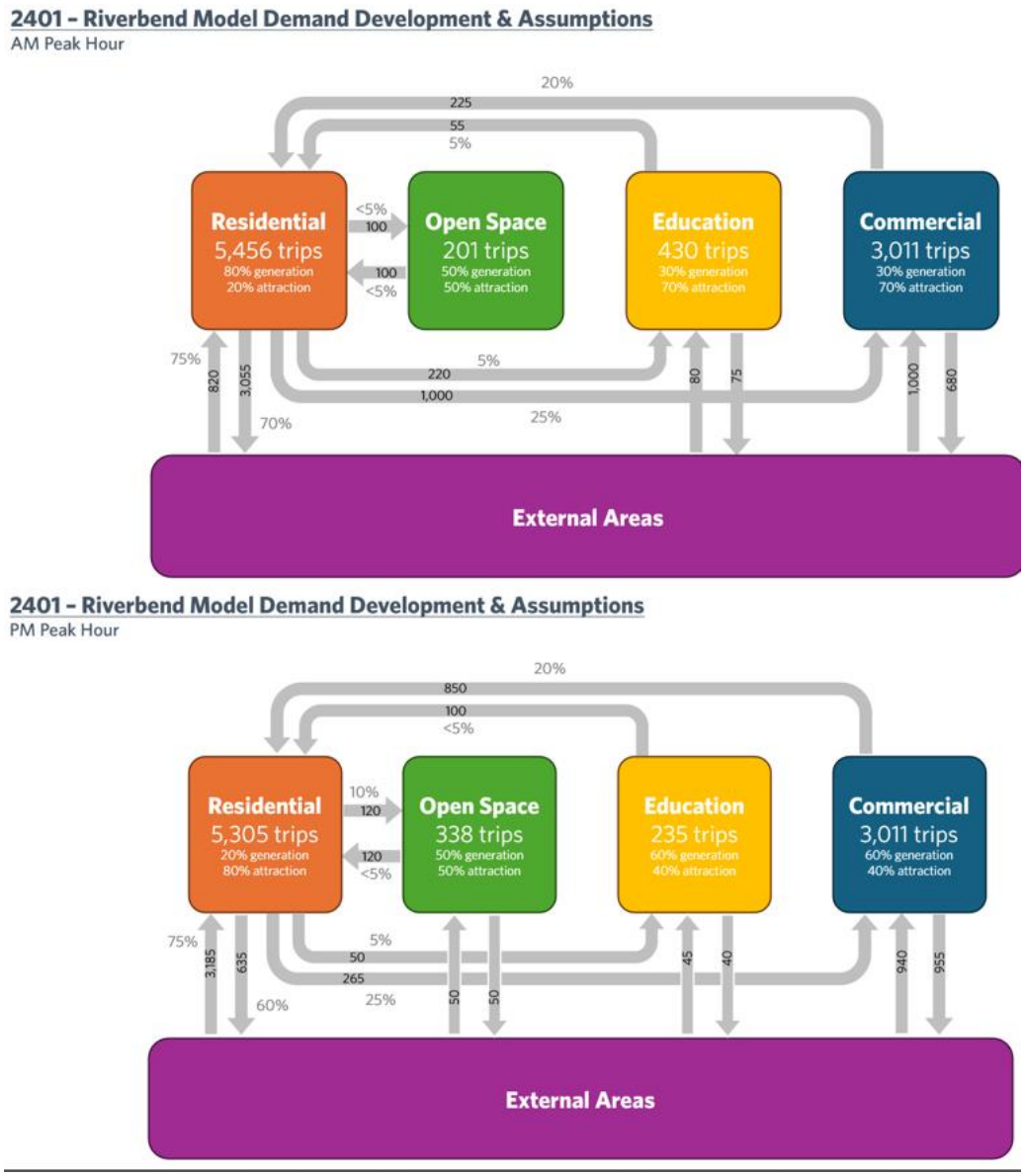


Figure 7: AIMSUN Model Demand Development & Assumptions (Source: Dykman Consulting)

2.1.1 2031 Interim Year

During the Stage 1 of the development, only Precincts 1 and 2 are operational, with two (2) constructed access points along Teviot Road: one accommodating all movements and another serving left-in left-out access. Figure 8 illustrates the AIMSUN model, while Figure 9 demonstrates the resulting daily traffic volume (vehicles per day) of the road network for the 2031 interim year scenario.



Figure 8: 2031 Road Network AIMSUN Model (Source: Dykman Consulting)



Figure 9: 2031 Daily Traffic Volume (Source: Dykman Consulting)

2.1.2 2066 Ultimate Year

In Stage 2, full development is operational, with two (2) additional access points along Teviot Road: one at the district centre and a four-legged intersection at Teviot Road/Bushman Drive. Moreover, the development will be connected to Riverbend Boulevard. Figure 10 illustrates the AIMSUN model, while Figure 11 demonstrates the resulting daily traffic volume (vehicles per day) of the road network for the 2066 ultimate year scenario.



Figure 10:2066 Road Network AIMSUN Model (Source: Dykman Consulting)

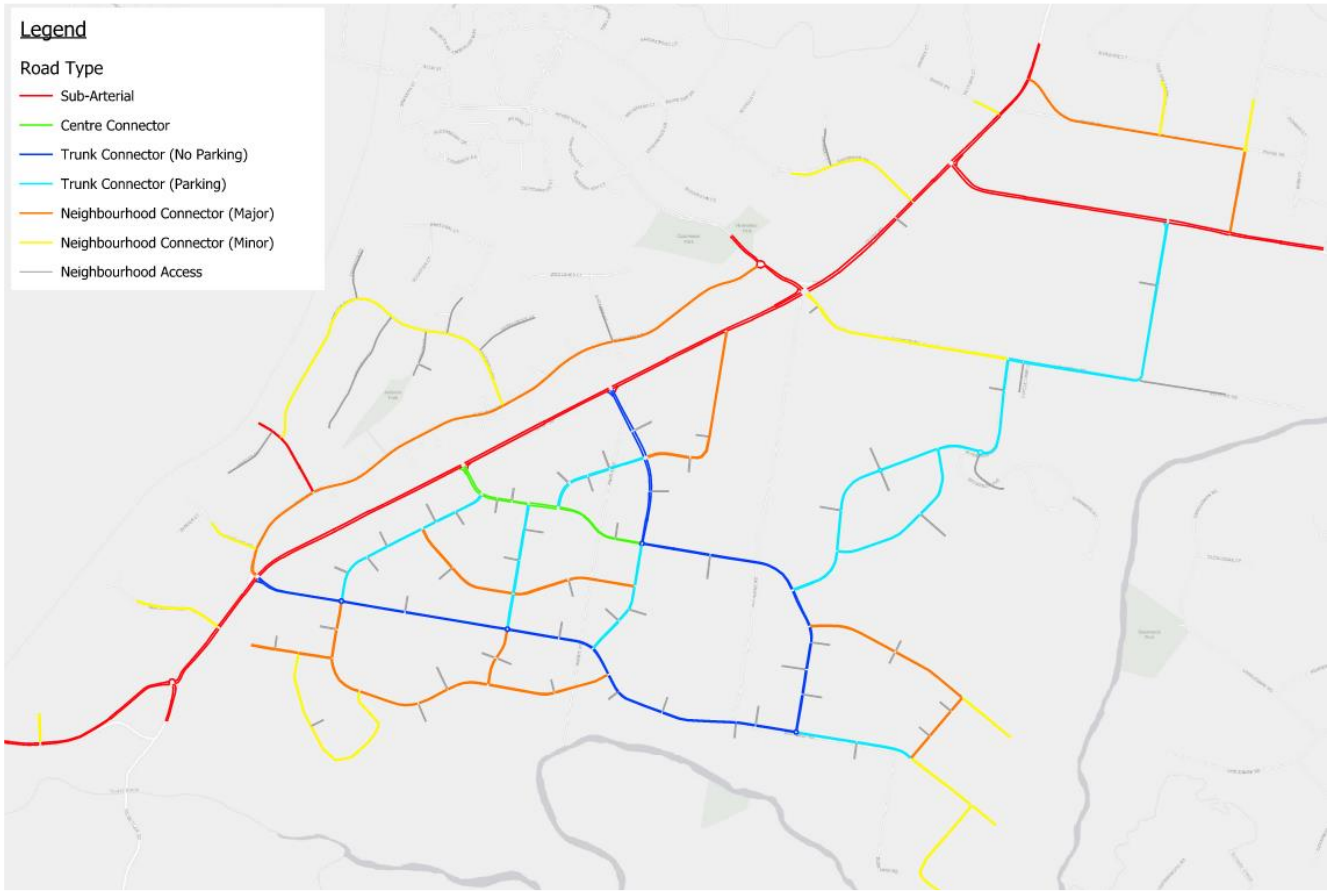


Figure 11:2066 Daily Traffic Volume (Source: Dykman Consulting)

As per the VLC Zenith model, a future connection at Drover Crescent is slated for construction across the future rail line by 2066, despite no existing road reserve at present. This location of the southern intersection with Bushman Drive is considered too close in proximity to another intersection on Teviot Road. For the purpose of our analysis, we have assumed only one intersection with Bushman Drive and Teviot Road, which is considered a conservative assessment. Should the intersection with Bushman Drive be removed and replaced with the Drover Crescent intersection, it is proposed that the connection into the Celestino development would relocate to meet at this new signalised intersection to create a four-way intersection so that there are not unnecessary additional intersections along Teviot Road. This issue could be addressed through reconfiguration of the internal network within southwestern portion of the development, aligning it with the Drover Crescent intersection instead and removing the southern intersection from Bushman Drive.

2.2 SIDRA

A SIDRA model was developed using layouts and outputs derived from the AIMSUN model, which were then calibrated. The future year models were developed based on the volumes produced in the AIMSUN model. Detailed modelling layout and movement summaries are included in Appendix 4.

2.2.1 Key Performance Parameters

Three key measures of performance are generally used when assessing the operations of intersections. These include:

- Level of Service (LoS) and delay;
- Degree of Saturation (DoS) and practical capacity; and
- Queue Length for critical movements.

Allowable thresholds used for this study are defined in the following sections. These thresholds are based on standard practice adopted within New South Wales and form the basis of the determination of any deficiencies within the existing or future road network.

2.2.1.1 Level of Service

Levels of Service and delay definitions are shown in Table 1. These values are industry accepted thresholds published by the New South Wales Roads and Traffic Authority (RTA) in Guide to Traffic Generating Developments.

Table 1: Level of Service – All Intersection Types (Source: Roads and Traffic Authority, 2002)

Level of Service	Average Delay per Vehicle (sec/veh)	Comments Traffic Signal & Roundabout	Comments Give Way & Stop Sign
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & space capacity	Good with acceptable delays & space capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity At signals, incidents will cause excessive delays Roundabout require other control mode	At capacity Requires other control mode

2.2.1.2 Degree of Saturation

The effect of differing levels of traffic flow on the operating performance of intersections has traditionally been assessed by dividing the intersection volume with its capacity – referred to as the Degree of Saturation (DOS). As traffic volumes approach the capacity of the intersection, the DOS approaches the theoretical capacity of 1. The practical DOS thresholds used for assessment are presented in Table 2.

Table 2: Practical Degree of Saturation at Intersections (Source: Roads and Maritime Services, 2013)

Intersection Type	Practical DOS
Sign Controlled	0.80
Roundabout	0.85
Signalised Intersection	0.90

2.2.1.3 Queue Lengths

The SIDRA queue lengths reported herein are 95th percentile queues. This means that 95% of the time, queue lengths will not exceed the specified queue length. Queue lengths are deemed acceptable if queuing is contained within given storage areas. Where queuing exceeds the short lane capacity, queue lengths can also be deemed acceptable provided that queues do not impact upon major adjacent conflict points (e.g. an adjacent through lane).

2.2.2 2031 Interim Year

During the Stage 1 of the Development, key intersections surrounding the development are Teviot Road/Bushman Drive/Glypton Street intersection and Teviot Road/Riverbend Access North intersection. During this period, it is assumed that sections of Teviot Road north of Riverbend Access North have already been upgraded to a four-lane dual carriageway. Figure 12 illustrates intersection layout of key intersections during 2031 interim year.

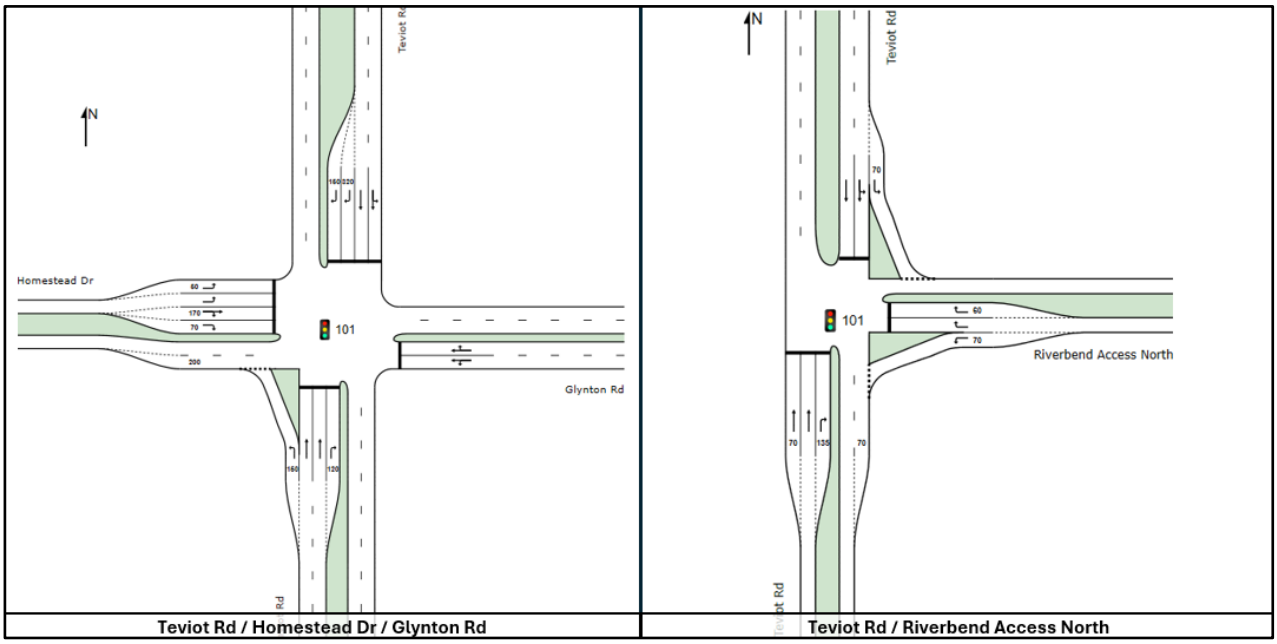


Figure 12:2031 Key Intersection Layouts (Source: PSA)

The AM and PM peak hour intersection results from the 2031 model are shown below in Table 3.

Table 3: 2031 SIDRA Model Output

Intersection	AM Peak Hour			PM Peak Hour		
	DOS	Ave Delay	Queue Length	DOS	Ave Delay	Queue Length
Teviot Rd/Homestead Dr/Glynton Rd	1.06	49.1	179.5	1.18	74.1	323.0
Teviot Rd/Riverbend Access North	0.77	22.4	17.3	0.54	16.0	47.6

Intersection analysis demonstrates that Teviot Road / Homestead Drive / Glynton Road intersection will exceed the acceptable intersection performance threshold. The intersection performance is worsened by vehicles right turning to Homestead Drive from the north approach of Teviot Road.

Meanwhile, Teviot Road / Riverbend Access North intersection is operating with acceptable DOS and low delays. Despite Teviot Road / Homestead Drive / Glynton Road intersection exceeding acceptable DOS, all intersections are operating with average delays less than the maximum control delays as specified in the Logan Planning Scheme.

2.2.3 2066 Ultimate Year

In Stage 2, Riverbend Access Centre and Riverbend Access South will be constructed with Riverbend Access South forming a four-legged intersection at Teviot Road and Bushman Drive. During this period, it is assumed that section of Teviot Road fronting the development have already been upgraded to a four-lane dual carriageway. Figure 13 illustrates intersection layout of key intersections during 2066 ultimate year.

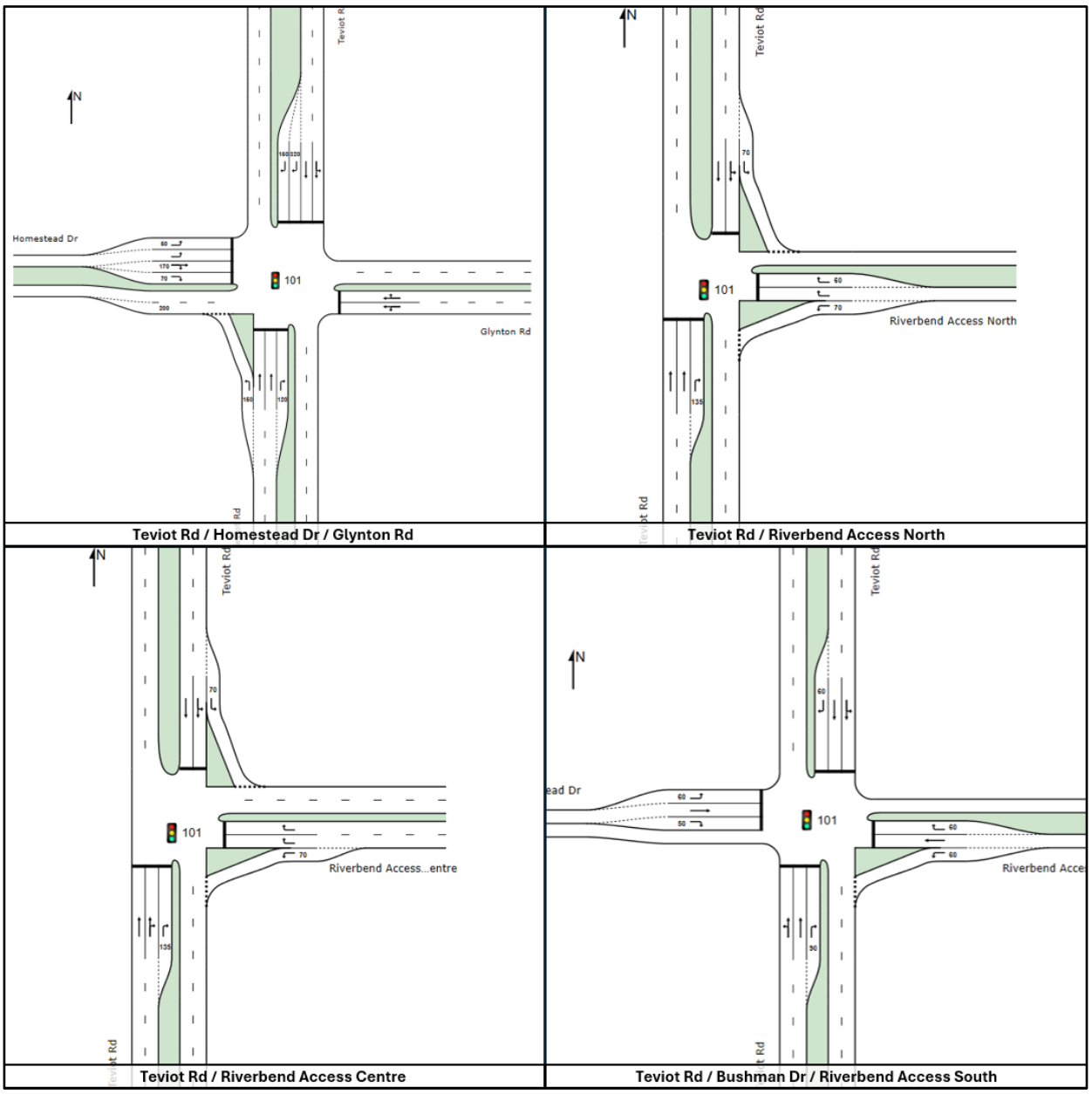


Figure 13:2066 Key Intersection Layouts (Source: PSA)

The AM and PM peak hour intersection results from the 2066 model are shown below in Table 4.

Table 4: 2066 SIDRA Model Output

Intersection	AM Peak Hour			PM Peak Hour		
	DOS	Ave Delay	Queue Length	DOS	Ave Delay	Queue Length
Teviot Rd/Homestead Dr/Glynton Rd	1.17	118.9	862.0	1.91	167.5	622.7
Teviot Rd/Riverbend Access North	1.13	65.6	380.1	1.42	182.7	658.8
Teviot Rd/Riverbend Access Centre	0.58	18.8	96.4	1.49	130.2	460.5
Teviot Rd/Bushman Dr/Riverbend Access South	1.10	74.5	363.6	1.52	166.2	576.2

Intersection analysis demonstrates that all intersections are expected to exceed the acceptable intersection performance threshold and the maximum control delays as specified in the Logan Planning Scheme. Particularly, critical movement among these intersections are through movement along Teviot Road. Additionally, critical movements at Teviot Road /Homestead Drive / Riverbend Access North intersection are right turning movement from Teviot Road north approach to Homestead Drive with delays exceeding 140 seconds. Meanwhile, critical movements at Teviot Road /Bushman Drive / Riverbend Access South intersection are along Bushman Drive with all entering movements' delay exceeding 80 seconds.

It should be noted that the traffic demand estimates surrounding the development is conservative, without considering any discounts. Additionally, it should be noted that with the construction of the Salisbury to Beaudesert Rail Line is expected to alleviate a significant amount of through traffic volumes along Teviot Road, along with reduction of turning movements to the west area of Teviot Road, which are the critical movements of the current surrounding intersections.

2.2.4 Internal Intersection Operations

All signalised intersections internal to the development have been coded with fixed traffic signal timings, with signal cycles, phase plans and associated green times determined through SIDRA analysis. Further traffic operational enhancements could be achieved with the adoption of actuated control; however given the development road network operates within acceptable performance parameters through to 2066, it is expected this will provide minimal benefit at this phase of the development application process and that this level of analysis demonstrates that sufficient land is provided to allow for intersections to operate satisfactorily to be assessed in more detail as part of future applications for each precinct.

Three (3) signalised intersections have been provided internally within the Riverbend development, near the District Centre and Primary School, as shown in Figure 14.

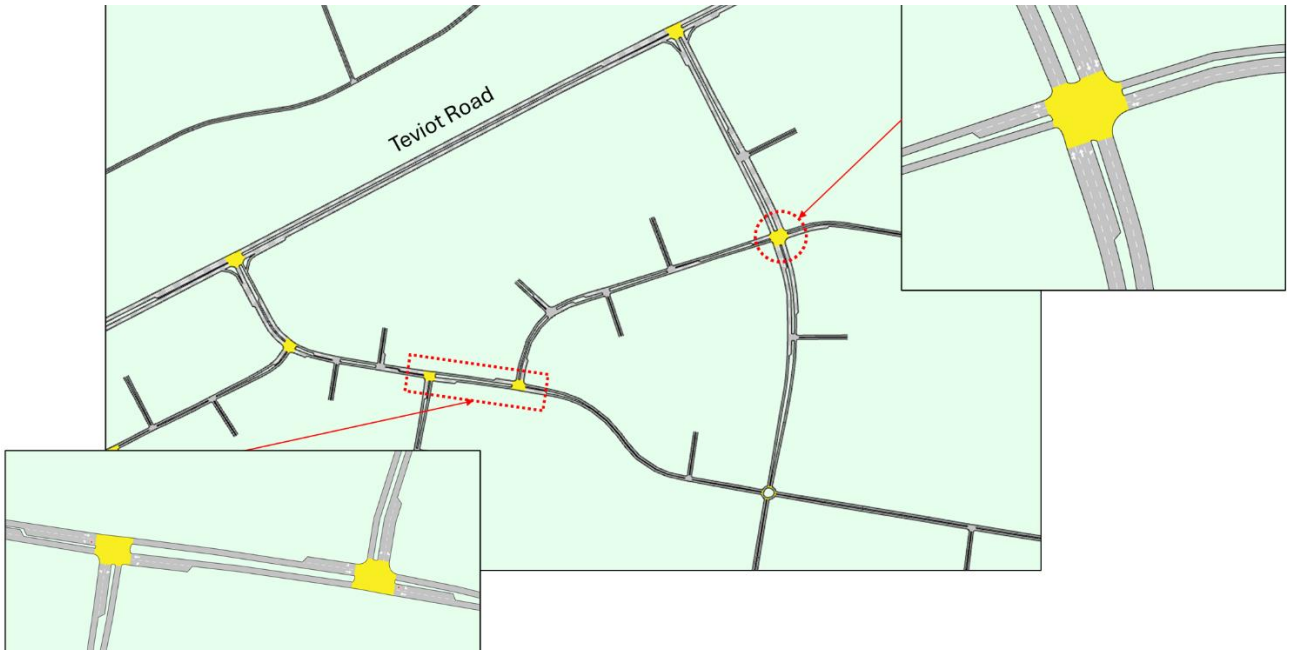


Figure 14:2066 Internal Signalised Intersections (Source: Dykman Consulting)

Figure 15 illustrates intersection layout of internal signalised intersections during 2066 ultimate year.

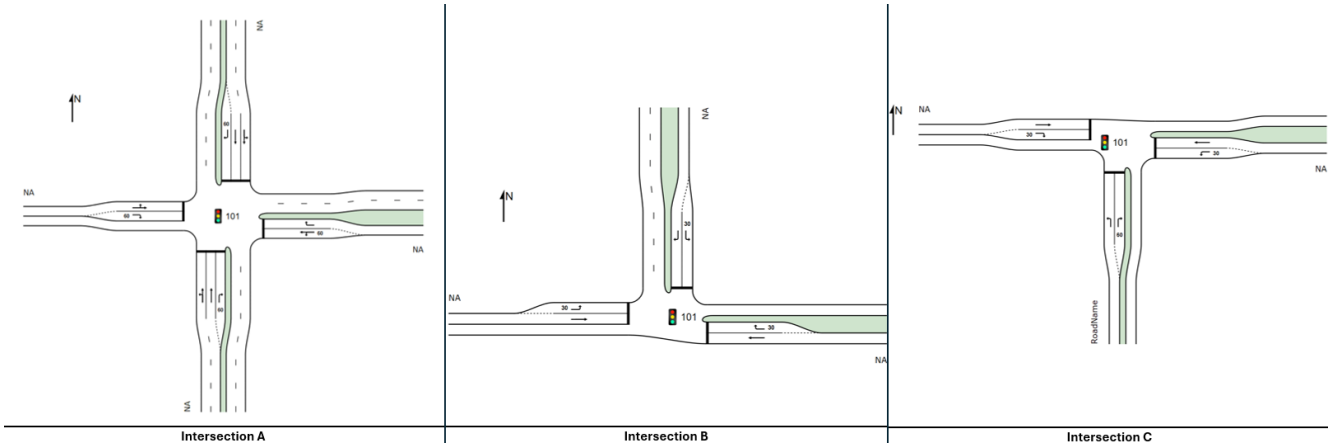


Figure 15:2066 Internal Intersection Layouts (Source: PSA)

The AM and PM peak hour internal signalised intersection results from the 2066 model are shown below in Table 5.

Table 5: 2066 SIDRA Model Output – Internal Intersections

Intersection	AM Peak Hour			PM Peak Hour		
	DOS	Ave Delay	Queue Length	DOS	Ave Delay	Queue Length
Intersection A	0.83	21.1	73.4	0.71	20.6	53.6
Intersection B	0.47	11.6	40.9	0.38	13.6	38.8
Intersection C	1.00	20.2	78.7	0.79	17.2	59.9

Intersection analysis demonstrates that Intersection C is expected to exceed the acceptable intersection performance threshold but within the maximum control delays as specified in the Logan Planning Scheme. It should be noted that the traffic demand estimates surrounding the development is conservative for 2066, without considering any discounts for alternative transport modes or linked trips.

3. MOVEMENT NETWORK INFRASTRUCTURE MASTER PLAN

This Movement Network Infrastructure Master Plan addresses the specific traffic and transport networks for the subject site to demonstrate consistency with the development intent stated within the Development Scheme, interconnectivity with adjacent Context Plans proposed by third parties, it also reflects recent discussions with Economic Development Queensland (EDQ) transport and engineering representatives.

Where already agreed with EDQ, the IMP also includes reference to specific details such as modelling for the subject site and associated road network and intersection requirements and those layouts already approved by EDQ which are to be utilised for future Reconfiguring a Lot (ROL) applications.

The Master Plan includes the road, public and active transport networks all in one; however, for simplicity, a breakdown of each of the networks: road, public and active transport, has also been included.

3.1 ROAD NETWORK

3.1.1 Road Hierarchy

The road hierarchy within the site is made up of the road links described in Table 6, which align to the EDQ Guideline No. 06 Street and movement network. Shown in Figure 16 is the road hierarchy plan based on the traffic volumes generated from AIMSUN, which includes Sub-Arterial to connector roads. Based on these traffic volumes, some trunk connectors may be reclassified as neighborhood connectors. The location of lower order road types such as neighbourhood access roads will be determined through future ROL applications and therefore these have been excluded from the Master Plan.

The designation of the internal and external road types outlined in within the road network has been based on the AIMSUN modelling for a site yield of:

- Approximately 7,000 residential lots;
- A Primary School;
- A District and Neighbourhood Centre; and
- Recreational facilities, being a District Sports Park, Regional Recreation Park, Neighbourhood and Local Parks and Community Facilities.

Upon completion, the site will have a total residential population of approximately 20,000 people.

As a result of the designating a range of the road types throughout the development, the proposed road network is expected to be adequate to accommodate the traffic generation of the precinct.

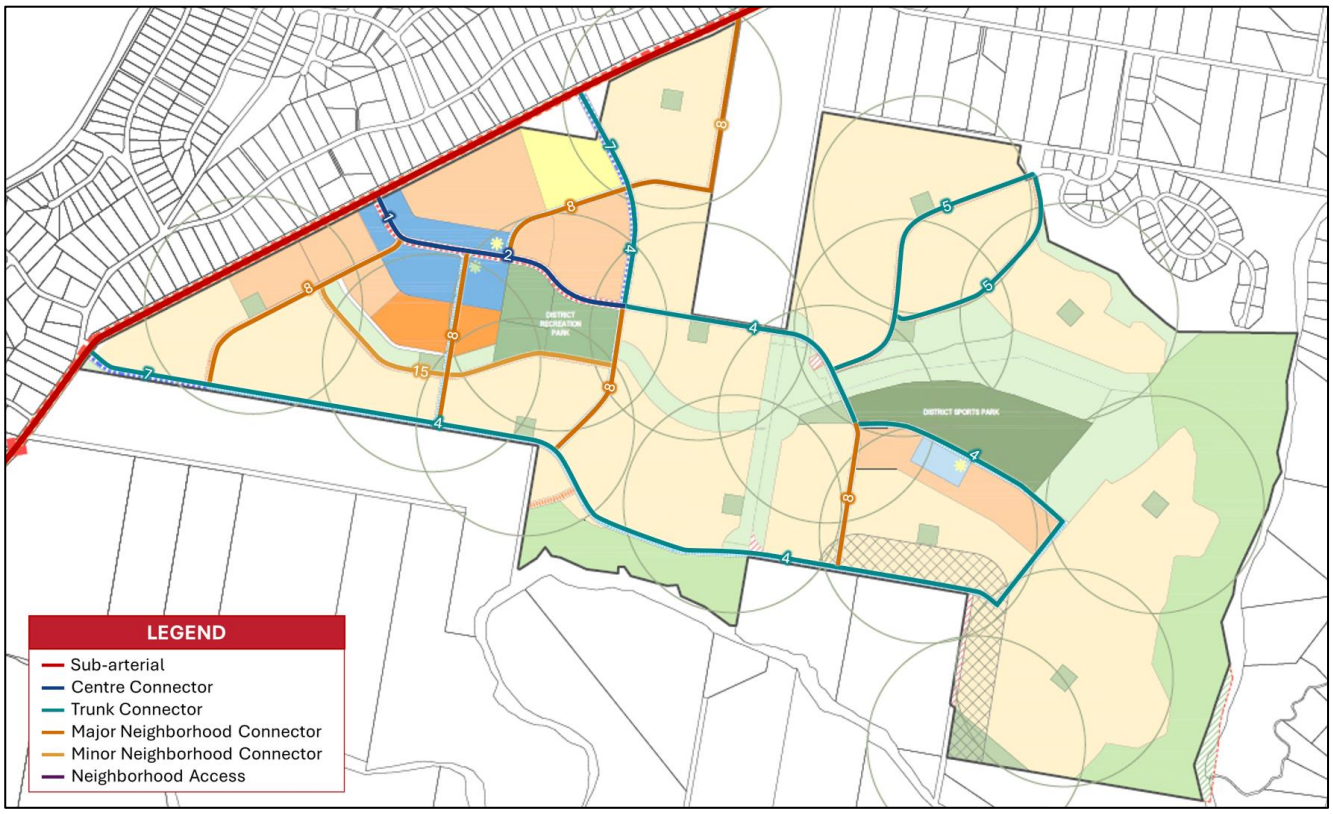


Figure 16:Road Hierarchy Plan (Source: PSA)

Table 6: Road Hierarchy within the site

Road Type	Traffic Volume	Direct Access	Reserve Width	Posted Speed Limit
Centre Connector	7,500 – 15,000 vpd	Limited	34-38m	50 – 60km/h
Trunk Connector	7,500 - 18,000 vpd (2 lane) 18,001 - 30,000 vpd (4 lane)	Nil over 10,000vpd	22-24m (2 lane) 33m (4 lane no parking)	50 - 70km/h
Neighbourhood Connector	3,000 – 7,499 vpd	Yes	22m	50km/h (default)
Neighbourhood Access	<3,000 vpd	Yes	15.5 – 16m	50km/h (default)
Neighbourhood Lane	<500 vpd	Yes	6.5m	50km/h (default)

It is noted that due to the constraints that may be applicable on the site, the above cross sections are subject to detailed design for each future ROL application.

3.1.2 Intersection Spacing

The spacing of development access points along Teviot Road should be in adherence to the guidelines outlined in Logan Planning Scheme. Meanwhile, internal road network intersection spacing should be designed in accordance with EDQ Guideline No. 06 Street and movement network. When minimum intersection spacing is not provided for a specific road hierarchy, intersection spacing should be provided to allow sufficient sight distance at every

intersection and not impact queuing, efficiency or safety on other intersections. Table 7 details required intersection spacing on each road hierarchy. The currently proposed transport network layout provides compliance with the intersection spacing requirements of both LCC and EDQ in Table 7.

Table 7: Road Hierarchy Intersection Spacing (LCC, EDQ)

Road Type	Intersection Spacing	Reference
Arterial Road	800 m	LCC
Centre Connector	100 m	EDQ
Trunk Connector	300 m	EDQ
Neighbourhood Connector	120 m	EDQ
Neighbourhood Access	N/A	EDQ
Neighbourhood Lane	N/A	EDQ

3.1.3 External Road Network

3.1.3.1 Teviot Road

Teviot Road is currently a two-lane, two-way, undivided arterial road, spanning from Middle Road, Greenbank to Glynton Road, Jimboomba. South of Glynton Road, Teviot Road transitions into a gravel surface, terminating at Bushman Drive, approximately 3km southwest of the Glynton Road / Teviot Road / Homestead Drive intersection.

Teviot Road serves as a vital north-south connection within the LCC LGA, facilitating connectivity to the Mt Lindesay Highway via Stoney Camp Road, Greenbank Road/Crowson Lane and Cusack Lane; to Springfield via Springfield Greenbank Arterial Road; and to Browns Plains via Middle Road. Notably, there is limited existing pedestrian and cyclist infrastructure designated along Teviot Road.

Teviot Road is proposed to be ultimately widened to a four-lane dual carriageway for the full length from Middle Road, Greenbank to Bushman Drive in the south.

3.1.3.2 Homestead Drive

Homestead Drive is currently a two-lane, two-way, divided arterial road, spanning from Teviot Road to Flagstone Drive, Flagstone. Certain sections of Homestead Drive have pedestrian and cyclist paths and infrastructure. Homestead Drive is a key link into Flagstone centre and will provide future connection to proposed strategic arterial routes through Flagstone and New Beith.

Homestead Drive is proposed to be widened to a four-lane dual carriageway for the full length from Teviot Road to the west of Flagstone.

3.1.3.3 Glynton Road

Glynton Road is currently a two-lane, two-way, undivided arterial road, spanning from Teviot Road in the west to Margaret Road in the east. East of Margaret Road, Glynton Road transitions into a gravel road which services a small number of residential properties. There is no existing pedestrian or cyclist infrastructure along Glynton Road.

3.1.3.4 Riverbend Boulevarde

Riverbend Boulevarde is currently a two-lane, two-way, divided arterial road, spanning from Glynton Road in the north to just west of the MacKenzie Avenue roundabout in the south. There is a footpath which runs along Riverbend Boulevarde and connects with a shared path which continues to the south. Riverbend Boulevarde currently provides access to a number of residential lots. The roundabout has provision to provide a secondary connection to the Riverbend Development.

3.1.4 Development Parking

3.1.4.1 Parking Provisions

The provision of parking within the site is applicable to the relevant land uses proposed within the development. Parking for the development should be provided in accordance with:

- EDQ PDA Guideline No. 01: Residential 30;
- Greater Flagstone Urban Development Area Development Scheme; and
- Logan City Council Planning Scheme

3.1.4.2 On-Street Parking

On-street parking plans should be provided for in accordance with EDQ Practice Note No. 11 Parking Analysis Plans and designed in detail as part of each future ROL application. Figure 17 illustrates the on-street parking based on the road hierarchy of the road network.

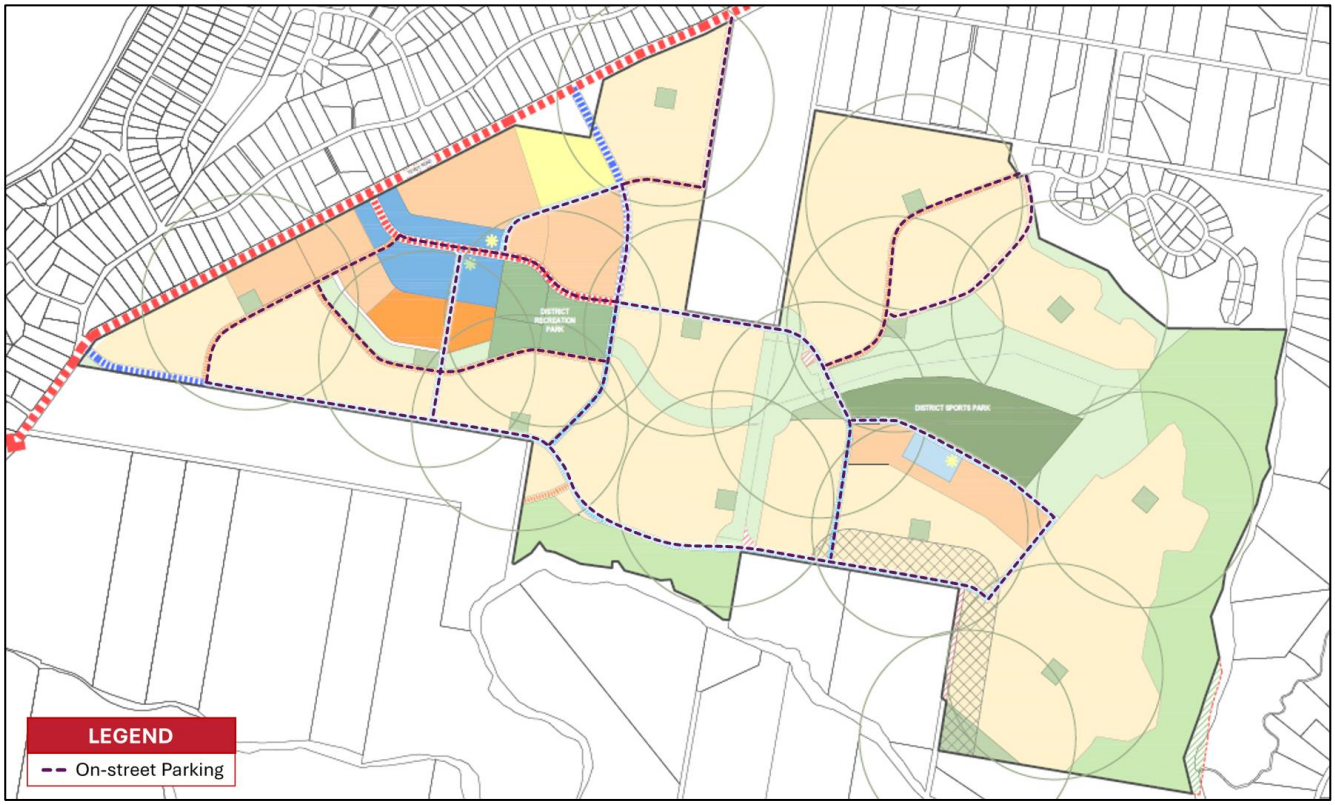


Figure 17:On-street Parking Network (Source: PSA)

3.2 PUBLIC TRANSPORT NETWORK

The potential future public transport corridors and indicative bus stop locations within and adjacent to the subject sites is illustrated in Figure 18. The provision of public transport corridors along Teviot Road will improve public transport within the entire PDA precinct. The proposed network is generally in accordance with the Development Scheme Centres and Transport Network attached in Figure 2. As development proceeds, interim bus stops / turn around areas are to be provided as part of staged ROL applications.

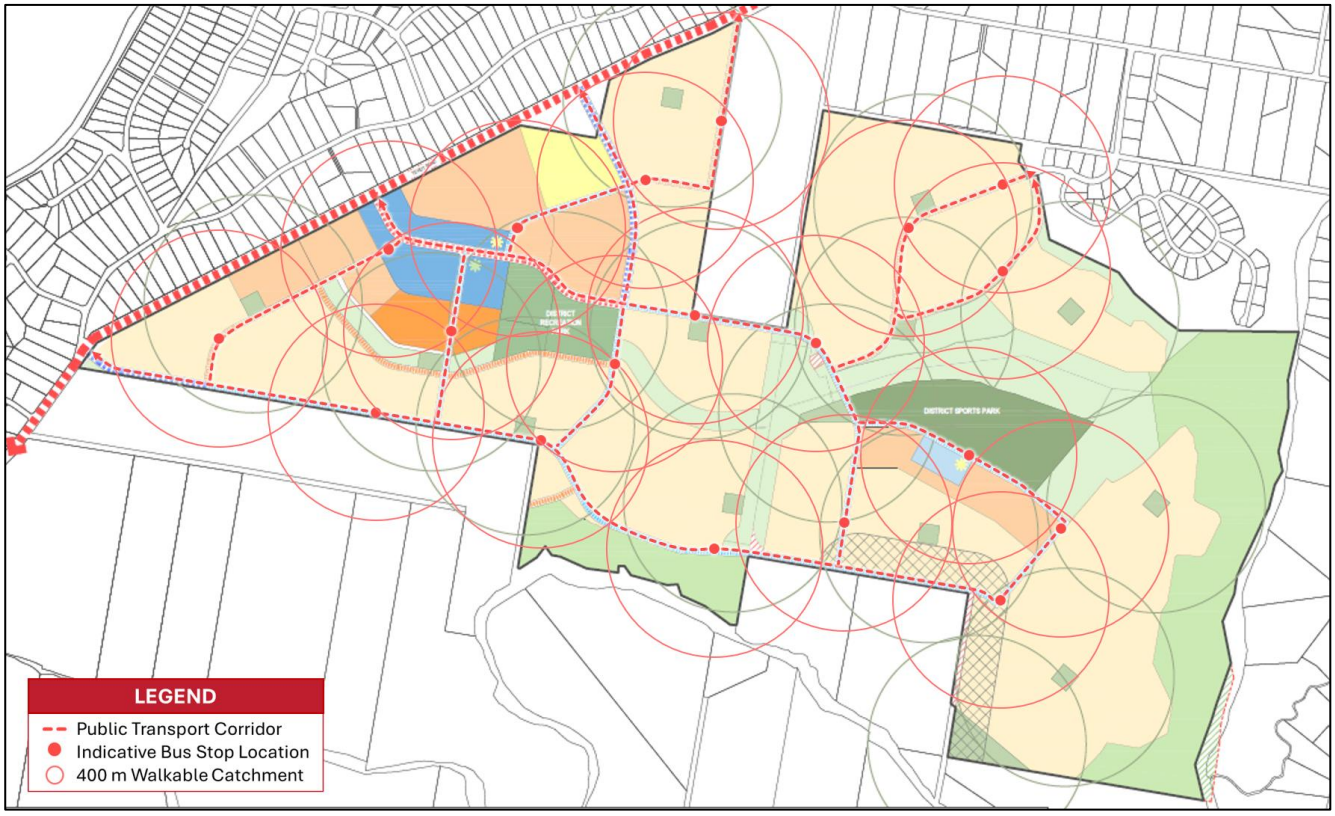


Figure 18:Public Transport Network (Source: PSA)

It is expected that with such provisions, the public transport network within the site will be readily accessible to the community, with over 90% of all dwellings within 400m of a potential public transport service, as required in the Development Scheme. As such, the public transport network is considered to be consistent with the Development Scheme.

The integration of the subject site as part of the public transport network will develop over the design life of the development and the surrounding Greater Flagstone PDA. It is understood and supported that EDQ and TransLink are working towards the delivery of an early public transport service and associated funding scheme for the entire PDA. Prior to implementation of the early service, access to the public transport network will be reliant upon services at the Park Ridge Park 'n' Ride, requiring residents to drive to this location.

It is expected that future review of the bus service network by EDQ and TransLink will be required with the implementation of the Salisbury to Beaudesert Rail Line and future demand in the Greater Flagstone PDA.

3.3 ACTIVE TRANSPORT NETWORK

Included in the Movement Network IMP are a number of varying types of cycle and pedestrian paths. The specific inclusion of the type of path on each road type is included in in Section 3.1.1 of this document. These cross sections are in accordance with the EDQ Guideline No. 06 Street and movement network. Active transport links are proposed throughout the site as demonstrated in Figure 19. The active transport network is provided through separated cycle paths, shared cycle and pedestrian paths, and recreational tracks. The separated cycle lanes are

located on the centre connector and trunk connector coming into the development. The shared cycle and pedestrian paths are located on trunk connector and neighbourhood connector roads. The recreational tracks are provided along the open space and local/neighbourhood parks surrounding and within the site.

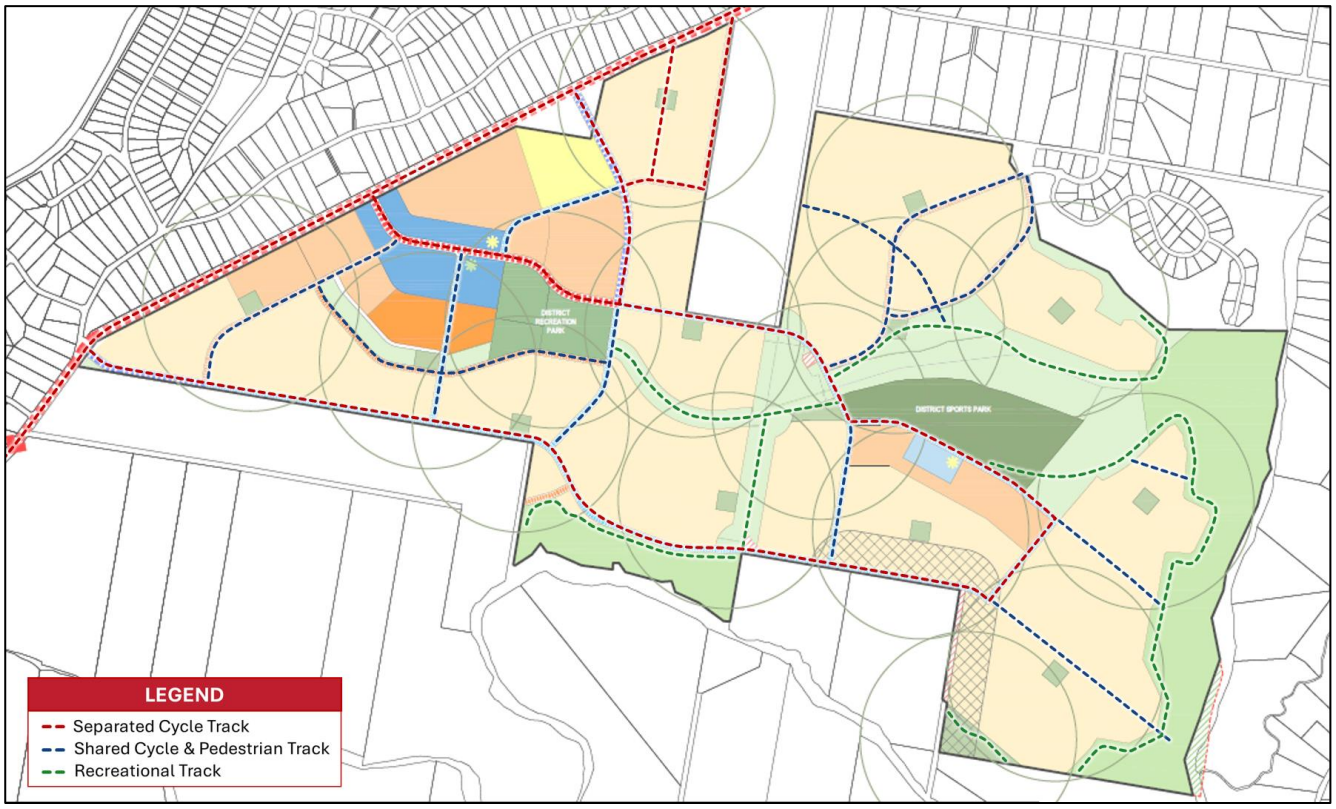


Figure 19:Active Transport Network (Source: PSA)

The proposed network is generally in accordance with the Development Scheme Centres and Transport Network attached in Figure 2 as it provides connections to and along Teviot Road with potential to connect further to the Greater Flagstone PDA, including the paths required as part of the Salisbury to Beaudesert Rail Line project.

The street network is permeable, with pedestrian and cycle connections provided throughout the development, with links to Teviot Road where necessary and available. There are connections proposed to Riverbend Boulevarde and the Gittins Development. This well-connected network is expected to encourage active transport access to the proposed public transport opportunities within the precinct and overall PDA. Cycle lanes and paths will be designed generally in accordance with TMR's TN128 Selection and Design of Cycle Tracks as part of future ROL applications for the site.

3.4 TRAVEL DEMAND MANAGEMENT

Travel demand for the proposed development will be managed in conjunction with LCC's development of travel demand measures as proposed in their Integrated Local Transport Plan, Way2Go: Connecting Logan. The inclusion of a varied active transport network and passenger transport network as proposed will also assist LCC in reaching their goal to achieve a more sustainable balance of transport modes to improve the performance of Logan's transport system overall.

In this regard, Celestino is supportive of the negotiations that are understood to be underway between EDQ and TransLink to encourage the early delivery of a public transport service before the occupation of the 200th residential lot.

APPENDIX 1 ENDORSED CONTEXT PLAN AP01

LEGEND

Site boundary	
Residential Density min.15dw/ha (up to 2 storey)	
Residential Density min. 25dw/ha (up to 5 storey)	
District Centre / Residential min. 25dw/ha (up to 5 storey)	
District Centre / Retail Core	
Active Edge - Active ground level uses such as: Retail Entertainment; Commercial; and Community Use.	*
Neighbourhood Centre	
Park	
School*	*
Special Use - Infrastructure	
District recreational park (Min. 4.5ha)	DR
District sport park (Min. 7.5ha)	DS
Regional recreational park (Min. 10ha)	RR
Local Park	
Neighbourhood Park	

*min. 7ha unless otherwise agreed to with the Queensland Department of Education and Training.

LEGEND

Sub - Arterial (Teviot Road)	
Centre Connector	
Trunk Connector (No parking)	
Trunk Connector (Parking)	
Neighbourhood Connector - Major	
Neighbourhood Connector - Minor	
Bicycle Path	
Activity ~~Centre~~ Node	✳
400m walking radius	○
1 in 100 years flood line	
Interface Area min. 600sqm lots	
Potential Buffer Area	

AMENDED IN RED

By: Brandon Bouda

Date: 18 September 2017

Queensland Government

COMPLIANCE ENDORSEMENT
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2016/811

Date: 21 September 2017

Queensland Government

0 1000m 50 mm 2000m 100 mm 3000m 150 mm SCALE BAR

Teviot Road, Jimboomba

For

Jimboomba | CELESTINO

IMPORTANT NOTES:

This plan was prepared for Preliminary evaluation of the land situated at Jimboomba. This plan is intended for discussion purposes only and should not be used for any other purposes. No investigations have been undertaken by Queensland Surveying Pty Ltd over this area of land other than to sight the registered plan and topographical map. The Contours, boundaries, creek line, flood lines, building locations have all been scaled and should not have any reliance based on them as they are only intended as a general guide. Any comments contained on this plan should be confirmed by the relevant authorities. The dimensions, areas and total number of lots shown hereon are subject to field survey and also to the requirements of Council and any other authority which may have requirements under any relevant legislation. In particular, no relevance should be placed on the information on this plan for any financial dealings involving the land.

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Data Sources

Cadastral Boundaries	30697-CP01-G
Contours / Topographic	LIDAR - DNR&M
Flood Level	Logan City Council shp file
Engineering Design	Calibre Consulting

Issue	Revisions	Date	Drawn
H	Original	8.09.2017	KS/PS

Locality:	Jimboomba
Local Authority:	Logan City Council
Horizontal Meridian:	MGA
Vertical Level Datum:	AHD
Scale:	1: 20,000 @ A3
Designed:	PS/KS
Drawn:	PS
Checked:	PS
Plot Date:	08 Sep, 2017
Computer File Ref: 30697-CP01-H.dwg	

Context Plan

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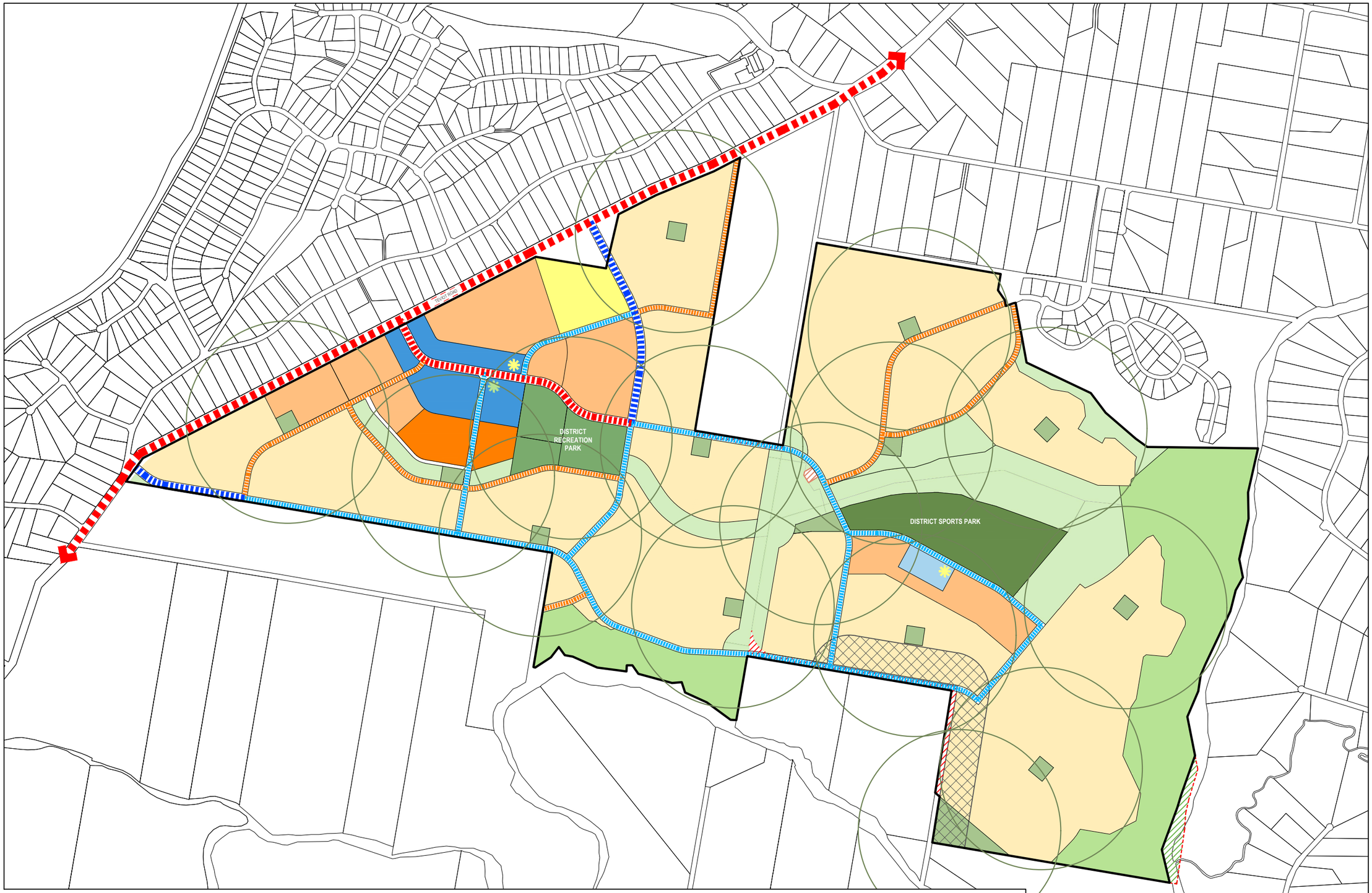
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Queensland Surveying Pty Ltd, a Veris Company

Drawing No 30697-CP01

Issue H

APPENDIX 2 CONTEXT PLAN

AP02



Legend:

- Site Boundary
- 400m Walking Radius
- Road Reserve (external to property)
- Potential Buffer Area

Centre:
- District Centre
- Neighbourhood Centre
- Education
- Community Facility (District Centre)
- Civic Park (District Centre)

Open Space:
- District Recreation Park
- District Sports Park
- Major Linear Open Space
- Local Linear Park
- Neighbourhood Recreation Park
- Logan River Boundary Realignment

Residential:
- Low Density (19.5 dw/ha)
- Low-Medium Density (30 dw/ha)
- Centre Apartments (60 dw/ha)

Services:
- Pump Station

Road Network:
- Sub-Arterial Road (Teviot Road)
- 34.0m Centre Connector (no parking)
- 33.0m Trunk Connector (4 lane, no parking)
- 24.0m Trunk Connector (2 lane, parking)
- 22.0m Neighbourhood Connector (2 lane, parking)

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PROJECT

RIVERBEND

CLIENT

CELESTINO

NOTES

ALL LOT NUMBER AND DIMENSIONS (INCLUDING AREAS) ARE APPROXIMATE ONLY AND SUBJECT TO FURTHER DESIGN DEVELOPMENT.

ALL DIMENSIONS HAVE BEEN ROUNDED TO THE NEAREST 0.1 METRES AND ALL AREAS HAVE BEEN ROUND TO THE NEAREST SQUARE METRE.

THE BOUNDARIES ON THIS PLAN SHOULD NOT BE USED FOR THE FINAL DESIGN AND ARE SUBJECT TO FINAL DETAILED DESIGN BY ENGINEERS.

INFORMATION ON THIS PLAN ARE FROM THE FOLLOWING SOURCES:

SITE BOUNDARIES: COLLIERS (JUNE 2024)
ADJOINING CADASTRE: QSPATIAL
DESIGN CONTOURS: COLLIERS (JUNE 2024)
AERIAL PHOTOGRAPHY: NEARMAP
TEVIOT ROAD DETAIL: COLLIERS (OCTOBER 2023)

DRAFT

ISSUE	CODE	ISSUE DESCRIPTION	BY	CHK	DATE
-	PRE	FOR REVIEW	NV	TD	29/08/2024

PRE - Preliminary | CA - Council Approval | T - Tender | CON - Construction

DRAWING TITLE

MASTER PLAN

DESIGN : TD
DOCUMENT : TD / NV
PROJECT : 4123001
1:20,000 @ A3

NORTH

0 50 100 150 200 250

DRAWING NUMBER 4123001-13

REVISION -

APPENDIX 3 AIMSUN MODELLING REPORT AP03

DYKMAN CONSULTING

TRAFFIC MODELLING REPORT

RIVERBEND DEVELOPMENT

JOB NO. 2401 | 13TH August 2024



Document Control

Project Name	Riverbend Development	**Date of Issue**	13/08/2024
Document No.	2401-REP-Traffic Modelling-Riverbend-DRAFT	**Discipline**	Traffic Modelling
Subject	Traffic Modelling Report	**Project No.**	2401
Author/s	Harry Wilson	**Reviewed by**	David Hayward
Prepared for	PSA Consulting	**Attention to**	Hannah Richardson

Revision	Revision Date	Details	Authorised by
A	11 June 2024	Draft Report	David Hayward
B	13 August 2024	Final Report	David Hayward

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1 Introduction

Dykman Consulting has been engaged by PSA Consulting on behalf of Celestino to provide traffic modelling services for the proposed mixed land use subdivision development application on the south-eastern side of Teviot Road, Riverbend.

1.1 Project Summary

1.1.1 Background

The proposed development at Riverbend is located within the Greater Flagstone Urban Development Area boundary, with the development and road network plans provided at Appendix A. The development application (DA) process has a Development Scheme administered by the Urban Land Development Authority. Previous work was undertaken in 2017 for the original Reconfiguring a Lot (ROL) application. The updated development plan has been assessed within a traffic impact assessment (TIA), with the support of an operational transport model to assess the impact of the development on the surrounding road network.

1.1.2 Subject Site

The location of the development along with the Aimsun transport model area is presented in Figure 1. The transport model boundaries encompass the road network surrounding Teviot Road to the east (Logan River) and west (Sydney-Brisbane railway line) for the 6km long corridor extending from Payne Road (north) to Wyatt Road (south). The proposed development area is located to the east of the new Teviot Road corridor between Glynton Road (north) and Gittins Road (south).

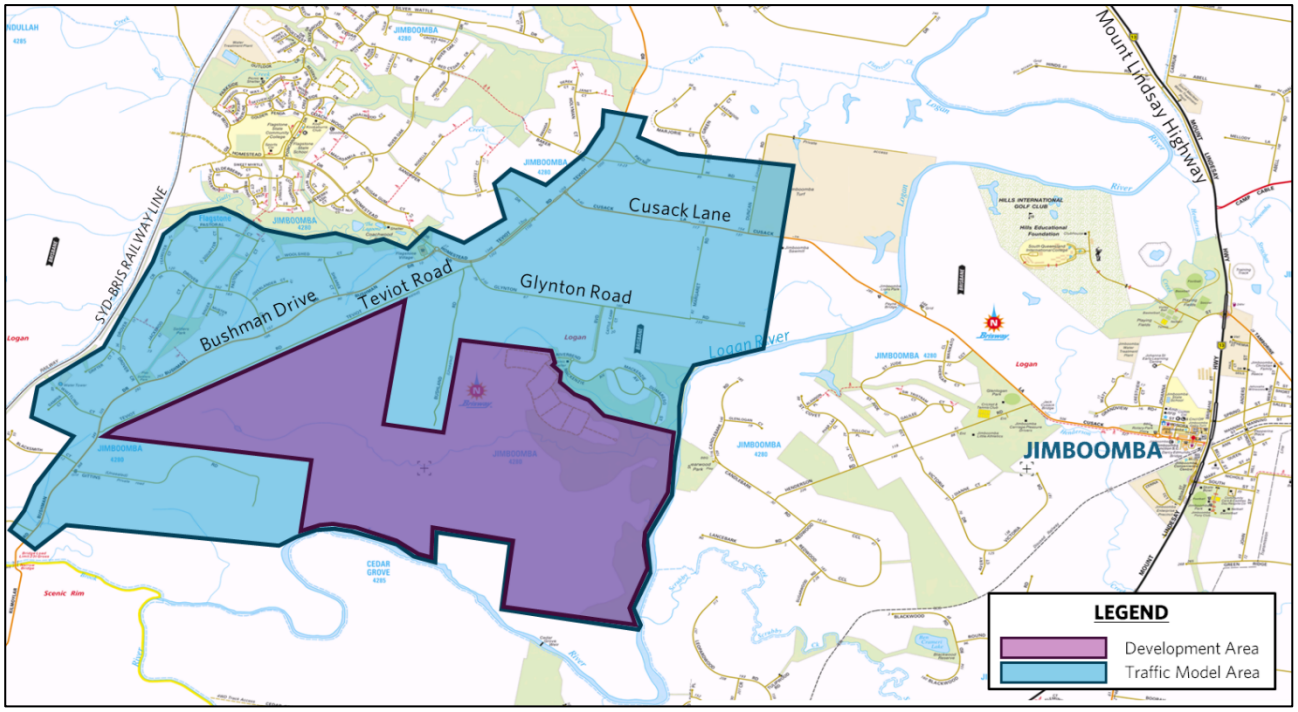


Figure 1: Riverbend Traffic Model and Development Areas (Source: Street-Directory)

1.1.3 Project Objectives

The purpose of the transport modelling for the development application is to determine the road network and intersection requirements of the entire proposed development area for the design years of 2031 and 2066.

1.1.4 Scope of Work

The following report outlines the scope of work undertaken with regards to the transport model development and application. This included the following:

- Development of the Riverbend Transport Model (RTM) – operational Aimsun model.
- Demand development (in association with VLC strategic modelling and outputs).
- Model outputs and road network recommendations.

1.2 Limitations and Assumptions

The modelling included for this project is subject to the following limitations and assumptions:

- Operational model demands are based on inputs and assumptions of the relevant strategic model outputs and assumptions on generation and attraction for the development zones.
- Assessment is limited to impacts within the study area for the time periods and assessment years 2031 and 2066 only.
- Due to the greenfield nature of the proposed development, no formal base model calibration or validation of existing road network traffic conditions has been undertaken, with updated model outcomes assessed against local knowledge and previous model outputs.

2 Model Development Approach

2.1 Model Framework Overview

The framework of transport modelling for the Riverbend DA includes three levels of detail and scale, with the network traffic operational model providing a central role for planning a safe and efficient road network of urban development projects of this scale. The inclusion of the network traffic operational model within the wider project framework is outlined below in Figure 2.

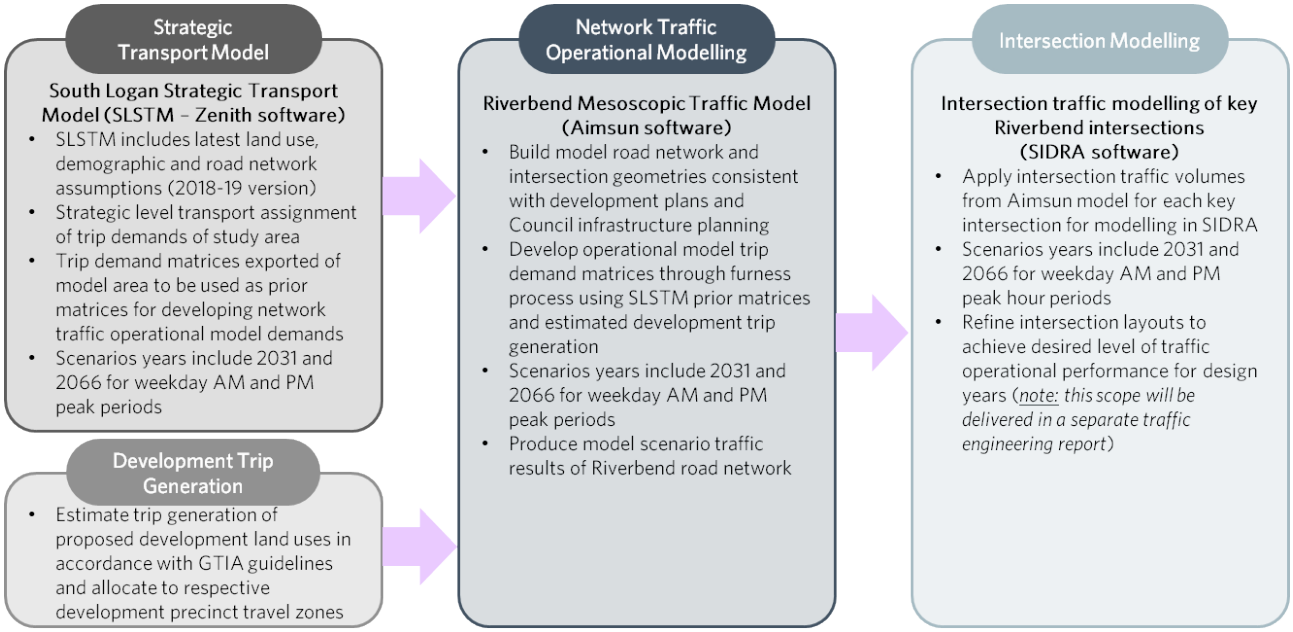


Figure 2: Model Framework Overview

2.2 Inputs Summary

2.2.1 Overview

The following section outlines the key inputs in the development of the RTM, including relevant transport modelling inputs and development assumptions.

2.2.2 Model(s)

2.2.2.1 Operational Model

The 2017 Arup Riverside Celestino models were used a base for developing the updated RTM. The previous models were developed in Aimsun version 8.2.2. to support the previous TIA submission. These models were reviewed and deemed suitable for use as a base for the updated transport modelling scope of work.

2.2.2.2 Strategic Model

The South Logan Strategic Transport Model (SLSTM) was developed by VLC in 2019. It was updated in April 2024 to reflect the latest changes in future infrastructure commitments and projected regional growth. The updated cordon demands were developed and provided for the years 2031 and 2066. These were used as a base for developing operational demands for the RTM. The technical note provided as part of this set of work (from VLC) has been provided in Appendix C.

2.2.3 Development Inputs

The following inputs were used in the development of the Riverbend development and associated demands:

- Riverbend layout designs and configurations (provided by PSA/Celestino).
- SLSTM cordon demands used for demand distribution assumptions (provided by VLC).
- Riverbend yield assumptions (provided by Goodrock).
- Relevant guidelines for determining appropriate generation and attraction for Riverbend precincts:
    - TMR Road Planning and Design Manual (RPDM) Chapter 3A.
    - Roads and Maritime Services (RMS) Guide to Traffic Generating Developments Updated Traffic Surveys (2013).

2.3 Operational Model Development

2.3.1 Overview

The Riverside Celestino Aimsun models (Arup, 2017) were used as a base for development of the updated RTM (Dykman Consulting, 2024). The following section outlines the work undertaken in developing the updated operational models, with reference to previous model development work and inputs and assumptions outlined from external sources (guidelines, PSA Consulting, VLC etc.).

2.3.2 Network Development

2.3.2.1 Software

The RTM has been developed in the latest version of Aimsun Next 23.0.1.

2.3.2.2 Model Extents

The Aimsun model extents for the 2066 scenario is depicted below in **Error! Reference source not found.**.



Figure 3: RTM Network 2066

2.3.2.3 Time Periods

The model time periods from the 2017 Arup model were maintained, with 1-hour AM and PM peak periods developed with an additional 30-minute warm-up included to ensure appropriate starting conditions.

Table 1: RTM Scenario Time Periods

Peak Period	Warm-up	Peak Hour
AM Peak	6:30am – 7:00am	7:00am – 8:00am
PM Peak	3:30pm – 4:00pm	4:00pm – 5:00pm

2.3.2.4 Road Hierarchy

The full network road hierarchy is shown below in Figure 4.

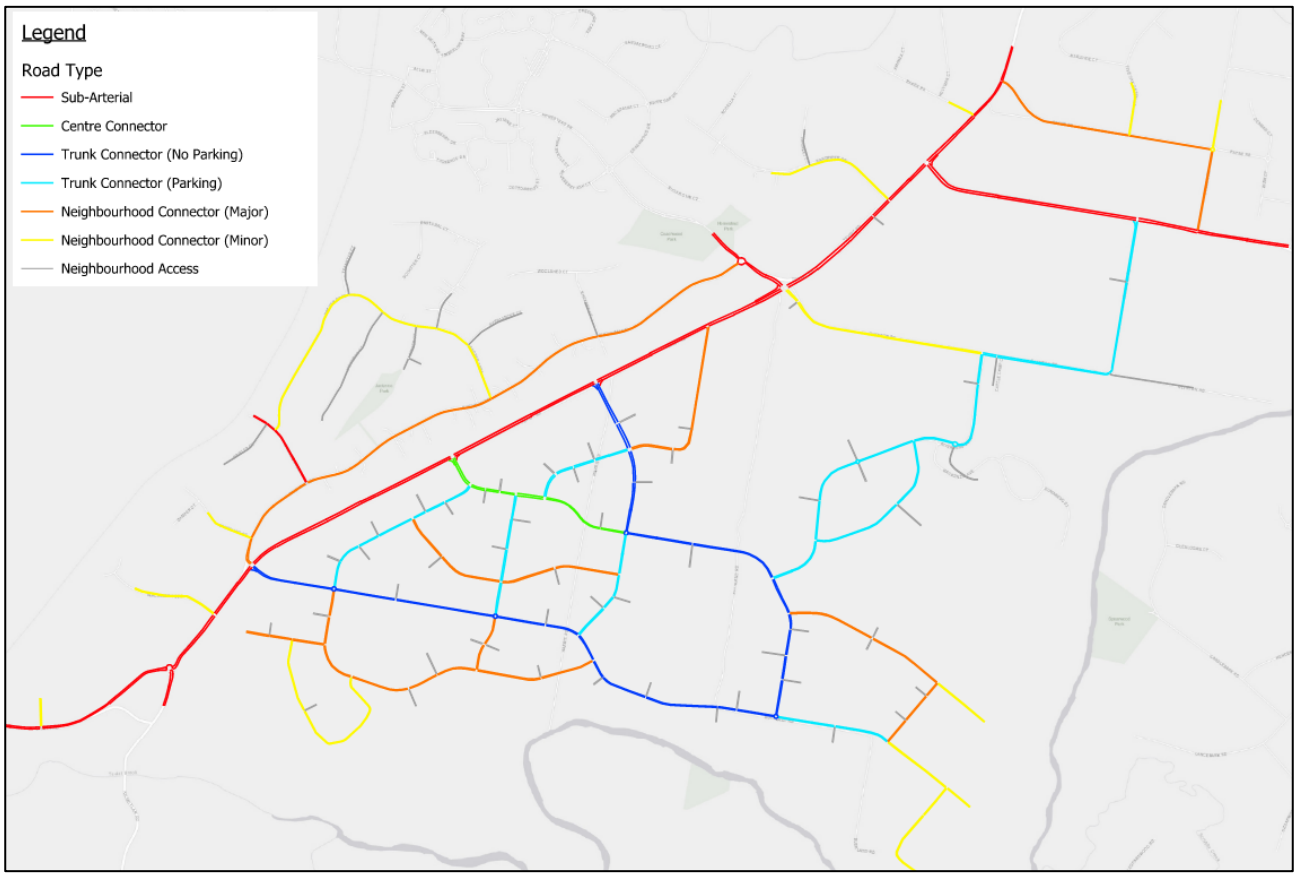


Figure 4: Road Network Hierarchy (2066)

2.3.2.5 Speed Limits

Expected network speeds for 2031 and 2066 in the network external to the Riverbend development were reviewed and maintained as per the previous modelling assessment. The internal road network for Riverbend was limited to 50km/h with the exception of the streets adjacent to the District Centre and Primary School. which were limited to 40km/h. This was to account for school speed zone restrictions and likely speed restrictions at the activity centre to ensure appropriate placemaking expectations were met.

2.3.2.6 Public Transport Network

Given there are no commitments to the form of the future public transport network in this region and the limited impact that buses would have on the operational performance of the model, public transport lines were not explicitly modelled.

2.3.2.7 Network Assumptions

Network inclusions and assumptions, particularly with respect to the road widening and upgrades along Teviot Road, have been developed in accordance with information provided by all stakeholders. The expected Teviot Road upgrades for the ultimate year (2066) have been modelled as per the provided AutoCAD drawings, with interim year changes mostly affecting the northern section of Teviot Road alongside the Riverbend signalised intersection. Full RTM network plans modelled in Aimsun have been included in Appendix B.

2.3.2.8 Signalised Intersections

The signalised intersection arrangements for the previous modelling have been reviewed and updated as required to reflect the proposed developments travel demands and trip patterns. The ultimate layouts for Teviot Road have been modelled with network geometry consistent with the provided AutoCAD intersection layout plans. Three (3) signalised intersections have been provided internally within the Riverbend development, proximate to the District Centre and Primary School, as depicted in Figure 5.

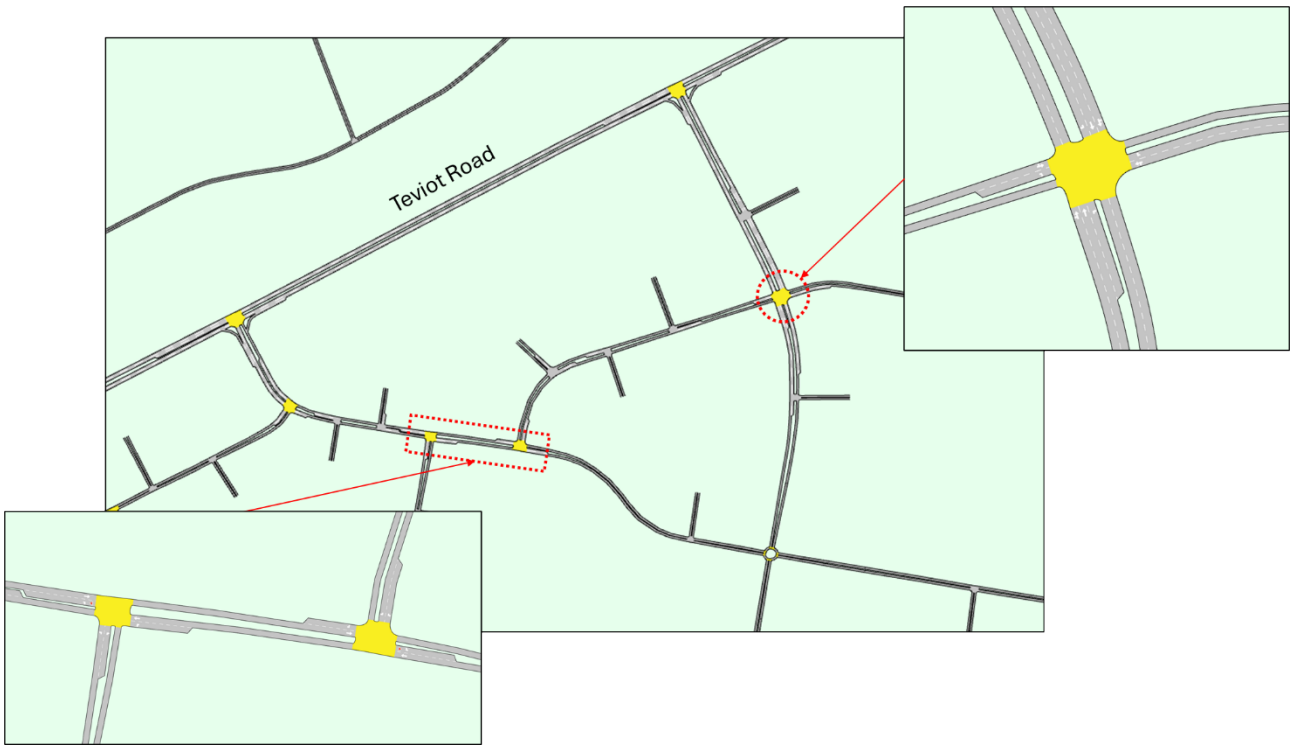


Figure 5: RTM Signalised Intersections (2066)

All signalised intersections have been coded with fixed traffic signal timings, with signal cycles, phase plans and associated green times determined through SIDRA analysis. Further traffic operational enhancements could be achieved with the adoption of actuated control; however, given the development road network operates within acceptable performance parameters through to 2066, it is expected this will provide minimal benefit at this phase of the development application process.

2.3.2.9 Assignment Type

All scenarios have been modelled through the following assignment framework:

1. **Static Assignment** – to create initial static paths for the network.
2. **Mesoscopic Dynamic User Equilibrium (DUE)** – using the static assignment path outputs from step 1, dynamic paths were determined across equilibrium to use as an input into the output scenarios.
3. **Mesoscopic Stochastic Route Choice (SRC)** – paths created in the DUE were used as an input to the SRC scenarios, with five (5) random seeds run for each and results reported on from the average.

These steps and scenarios were developed for the AM and PM peaks for 2031 and 2066 model year scenarios.

2.3.3 Demand Development

2.3.3.1 Overview

This section highlights the process for developing traffic operational model demands for the RTM. The key steps involved were as follows:

1. Processing VLC cordon demands
2. Aggregation/disaggregation of Riverbend precincts
3. Finessing based on target generation/attraction
4. Import demands to Aimsun

2.3.3.2 Operational Demand Process

2.3.3.2.1 VLC Cordon Demands

The SLSTM was updated by VLC to reflect the latest changes in future infrastructure commitments and projected regional growth. Cordon demands were provided for the RTM for the years 2031 and 2066 by vehicle types 'Car', 'LCV' and 'HCV'. The SLSTM cordon zones for this project is highlighted below in Figure 6.

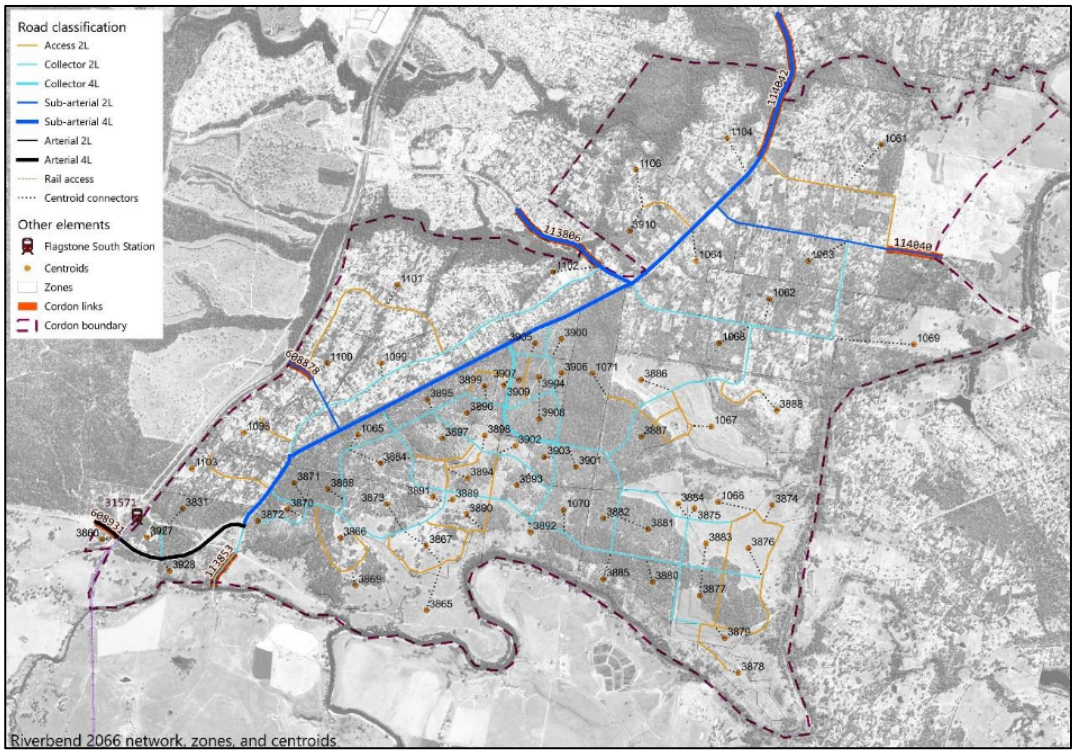


Figure 6: SLSTM Cordon Map – 2066

These demands were reviewed and deemed fit for purpose in developing a refined demand set for the RTM scenarios.

2.3.3.2.2 Aggregation and Disaggregation of Riverbend Precincts

After the initial VLC modelling within SLSTM, the internal precincts for the Riverbend Development were reconfigured. As such, the development model area internal origin and destination volumes for the Riverbend precinct were redeveloped. This redevelopment process involved aggregating the Riverbend precinct volumes prior to disaggregation into the new precinct layout, while maintaining the integrity and structure of the original SLSTM distributions.

Assumptions were made initially on appropriate splits of demands to the new matrix form to match the requirements of the Aimsun model zones. An overview of the assumptions on breakdown of precincts, which matches the internal zoning system within Aimsun, is outlined below in Figure 7.

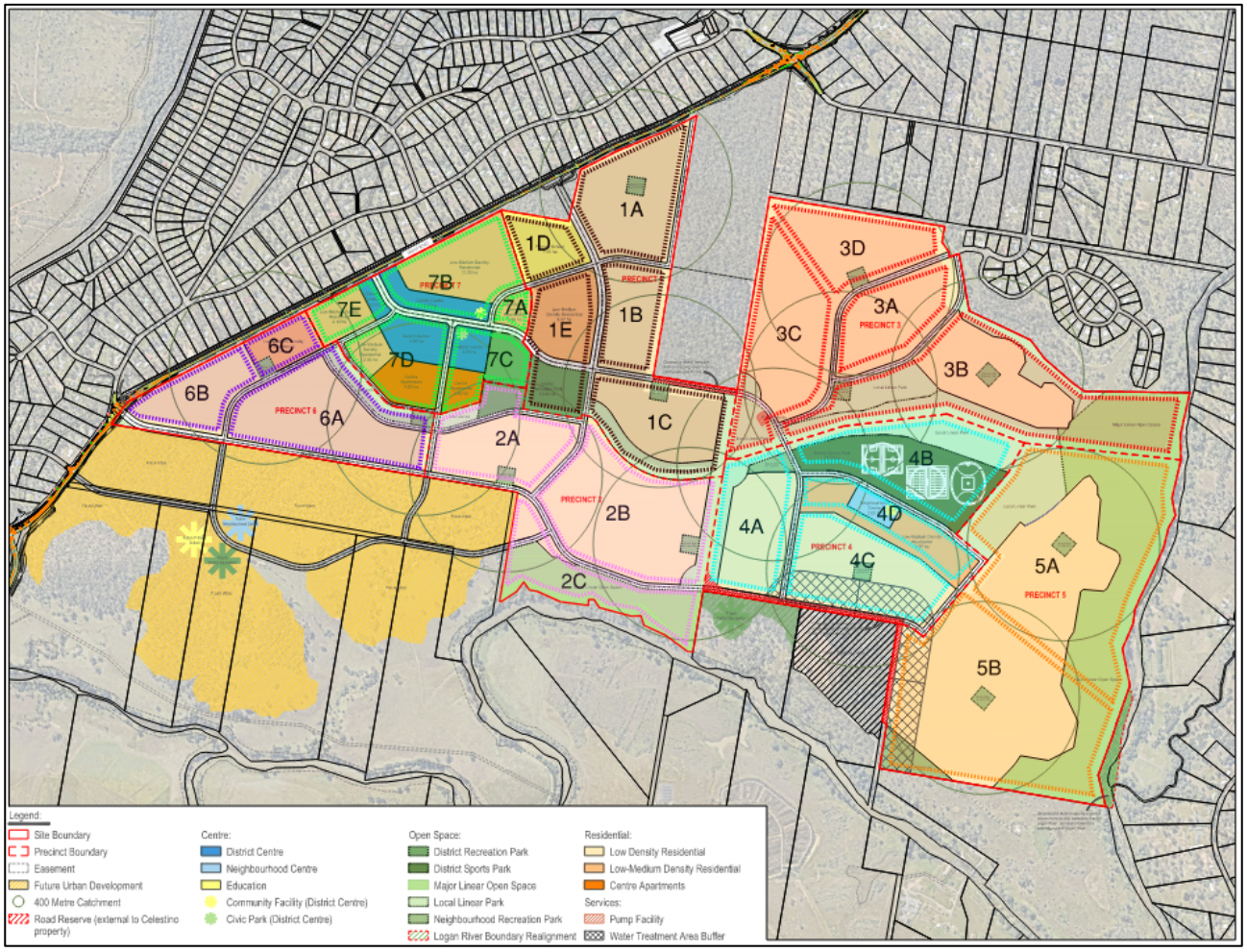


Figure 7: Option 1 Layout Sub-precinct Breakdown

2.3.3.2.3 Matrix Finessing

Following the initial development of matrix structures, further trip demand matrix refinements were made through a finessing process to appropriately match and balance total origin and destination demands of each zone (internal or external). The demand sets were finessed separately by peak period (AM and PM), year (2031 and 2066) and vehicle type (car, LCV and HCV).

Finessing targets were set for external zones as the initial origin or destination demands from the SLSTM cordon demands. Internal Riverbend sub-precinct demands were set based on generation and attraction totals calculated with the following assumptions:

- Generation of total AM and PM peak trips were developed by number of dwellings (by type) for residential zones, and by total land size for education, commercial centres and open space precincts.
- Generation rates were applied based on assumptions from the previous assessment and the guidelines outlined in Section 2.2.3.
    - Residential generated trips per dwelling (AM peak / PM peak):
        - Low density: 0.85 / 0.85
        - Low-medium density: 0.6 / 0.6
        - Apartments: 0.53 / 0.32
- Percentage split of generated trips between origin trips and destination trips were defined as follows:
    - Residential generation/attraction rates:

        - AM Peak: 80% / 20%
        - PM Peak: 20% / 80%
    - Education generation/attraction rates:
        - AM Peak / PM Peak: 50% / 50%
    - Open space and commercial centres:
        - AM Peak: 30% / 70%
        - PM Peak: 70% / 30%

The final finessed matrices were reviewed for appropriateness and terms of the following metrics:

- Total origin and destination trips.
- Distribution across the network.
- Internal (Riverbend development) and external trips.

Further review was undertaken after the initial static assignment of the demands.

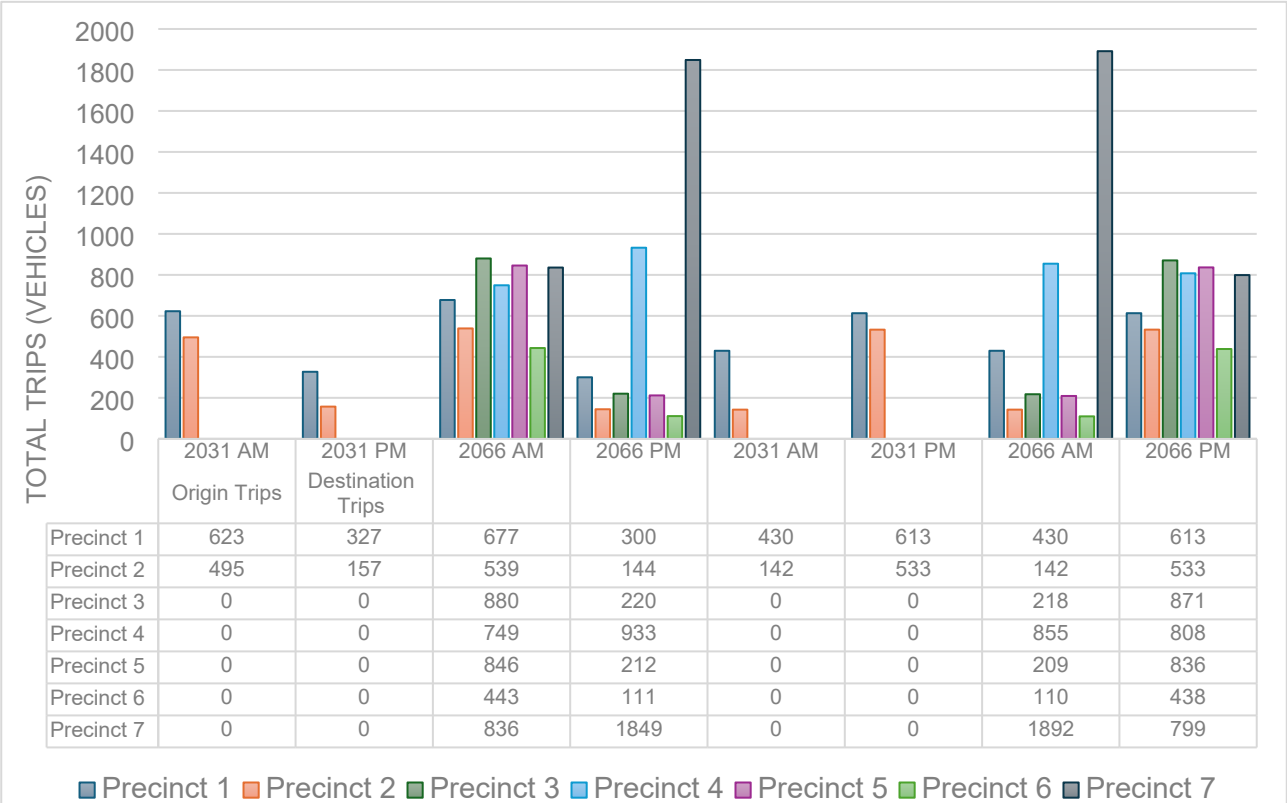
2.3.3.2.4 Final Aimsun Demands

Final finessed demands were imported to Aimsun for assignment in the RTM. These demands were developed as simple 1-hour peak demands for the AM and PM peak periods across the three (3) vehicle types: Car, LCV and HCV. The total 1-hour demands by scenario and vehicle type are outlined in Table 2 below.

Table 2: Aimsun 1-hour Demands

Vehicle Type	2031		2066	
	AM	PM	AM	PM
Car	3,669	4,002	10,977	10,956
LCV	55	40	165	115
HCV	16	12	43	30
Total	**3,740**	**4,054**	**11,185**	**11,101**

A summary of specific precinct trips generated (origins) and attracted (destinations) for each scenario is summarised below in Figure 8.



	2031 AM Origin Trips	2031 PM Destination Trips	2066 AM	2066 PM	2031 AM	2031 PM	2066 AM	2066 PM
Precinct 1	623	327	677	300	430	613	430	613
Precinct 2	495	157	539	144	142	533	142	533
Precinct 3	0	0	880	220	0	0	218	871
Precinct 4	0	0	749	933	0	0	855	808
Precinct 5	0	0	846	212	0	0	209	836
Precinct 6	0	0	443	111	0	0	110	438
Precinct 7	0	0	836	1849	0	0	1892	799

Figure 8: Riverbend Precinct Demand Totals (Origin and Destination) by Scenario

From trip generation perspective by development land use type, the 2066 AM and PM peak hour trip generation and distribution traffic flow schematic is provided in Figure 9 and Figure 10. This highlights the level of trip generation contribution by the four primary trip generating land uses of residential (low, medium and high density); education; commercial centres, and recreational park areas and how they are indicatively distributed to other land use types or areas external to the development. Further the diagrams present indicative proportional bi-directional distribution of residential development generated trips to other land use types or areas external to the development for the AM and PM peak periods.

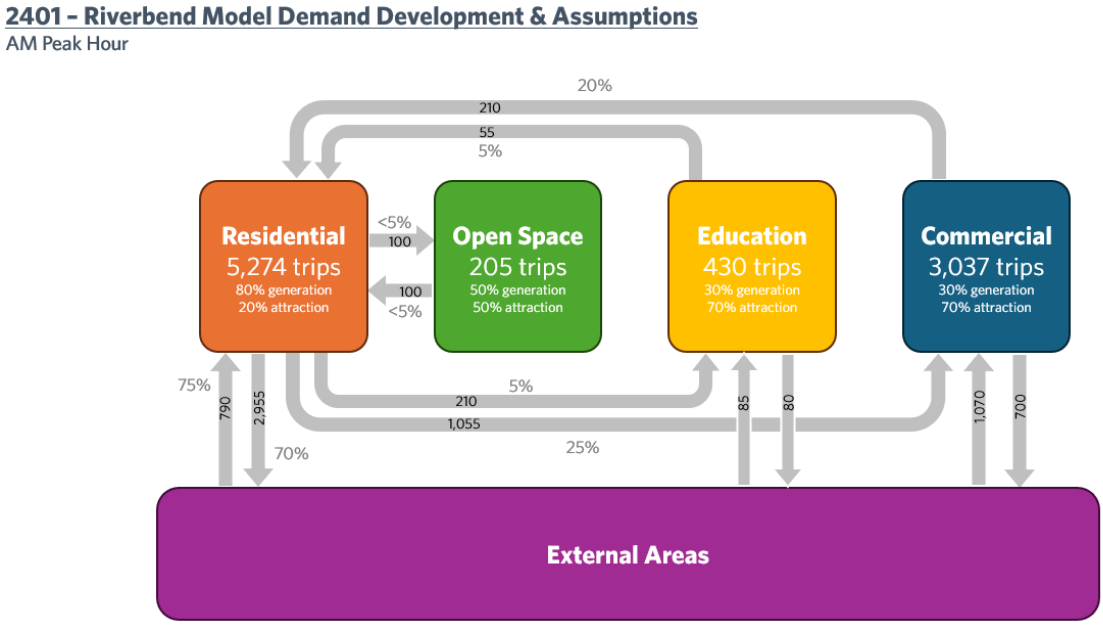


Figure 9: Riverbend Precinct 2066 AM Peak Hour Demand Totals (Generation and Distribution) by Development Land Use Type

2401 – Riverbend Model Demand Development & Assumptions
PM Peak Hour

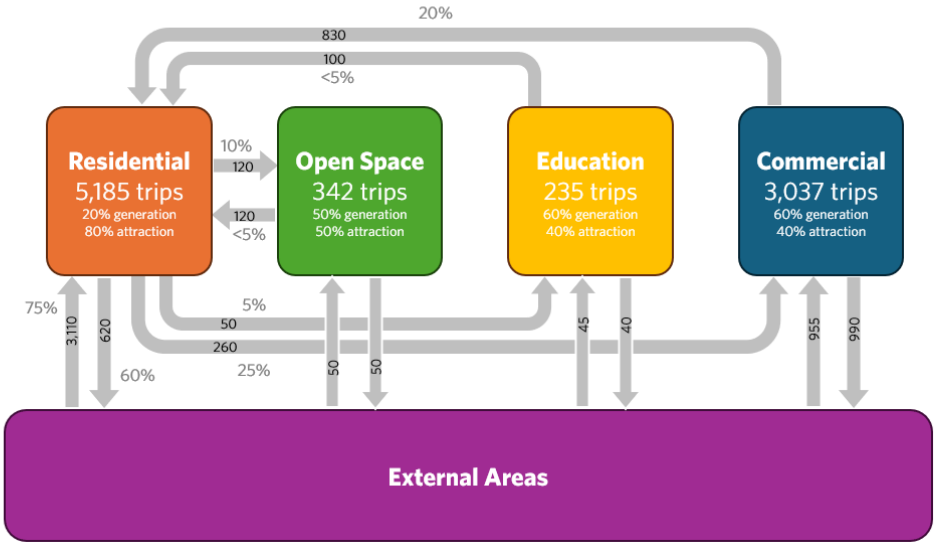


Figure 10: Riverbend Precinct 2066 PM Peak Hour Demand Totals (Generation and Distribution) by Development Land Use Type

3 Model Outputs

3.1 Overview

The outputs of the RTM are included in the TIA submission, providing details on the outcomes of various internal development arrangements and the development impacts on the wider transport network. The following key outputs are provided for the 2031 and 2066 model scenarios:

- Daily traffic volume snapshots
- Network density plots

Snapshots of outputs have been included within this section, with full model outputs included in Appendix B.

3.2 Model Outputs

3.2.1 Daily Traffic Volumes

The RTM estimated daily traffic volumes plots for the 2031 and 2066 AM and PM peak hour scenarios are presented in Figure 11 to Figure 12. The daily traffic volumes were calculated through the adoption of a peak hour to daily traffic volume factor of 10 based on the average AM and PM peak hour traffic volumes by direction on a given link.

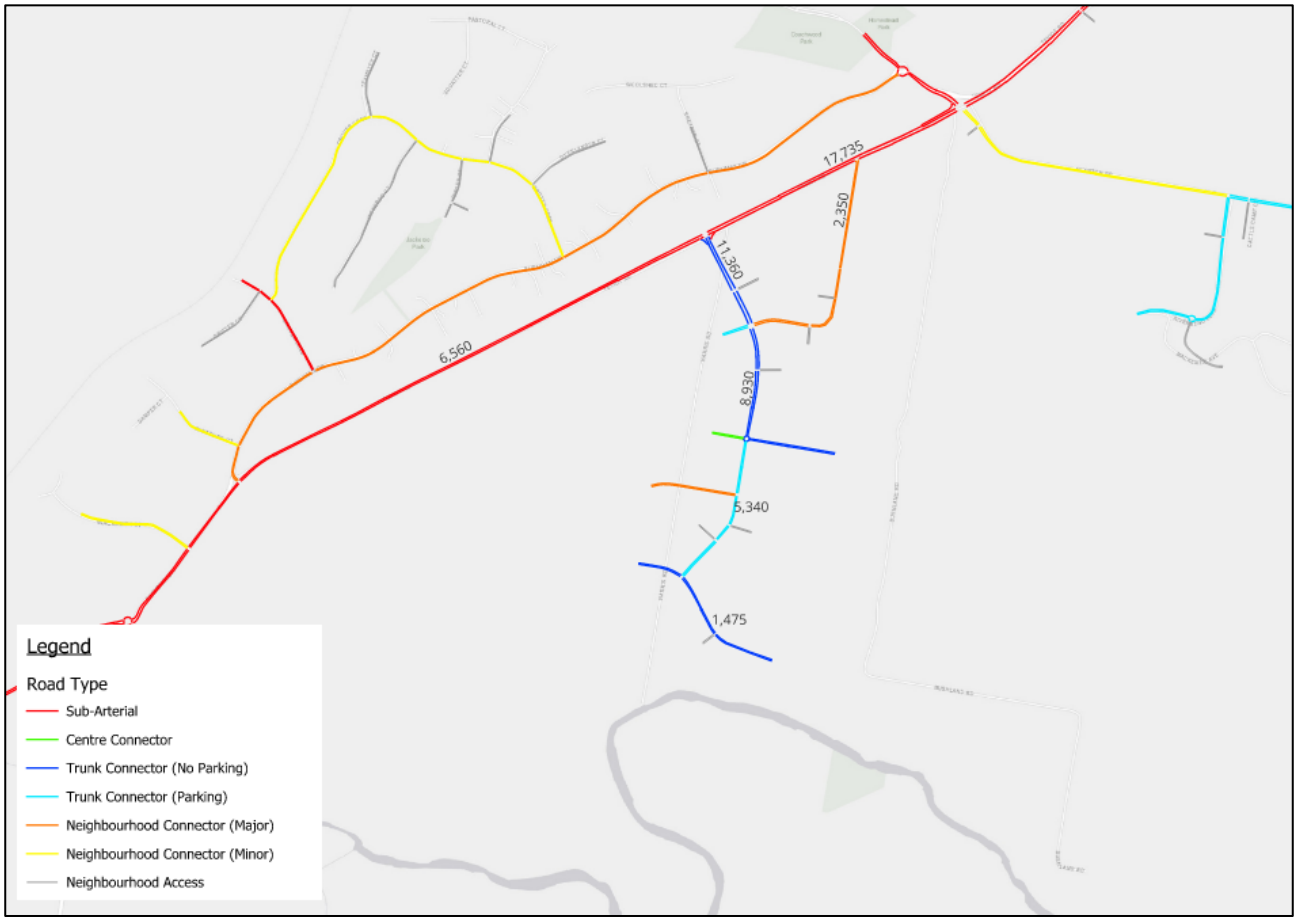


Figure 11: 2031 Daily Traffic Volumes (RTM Output)

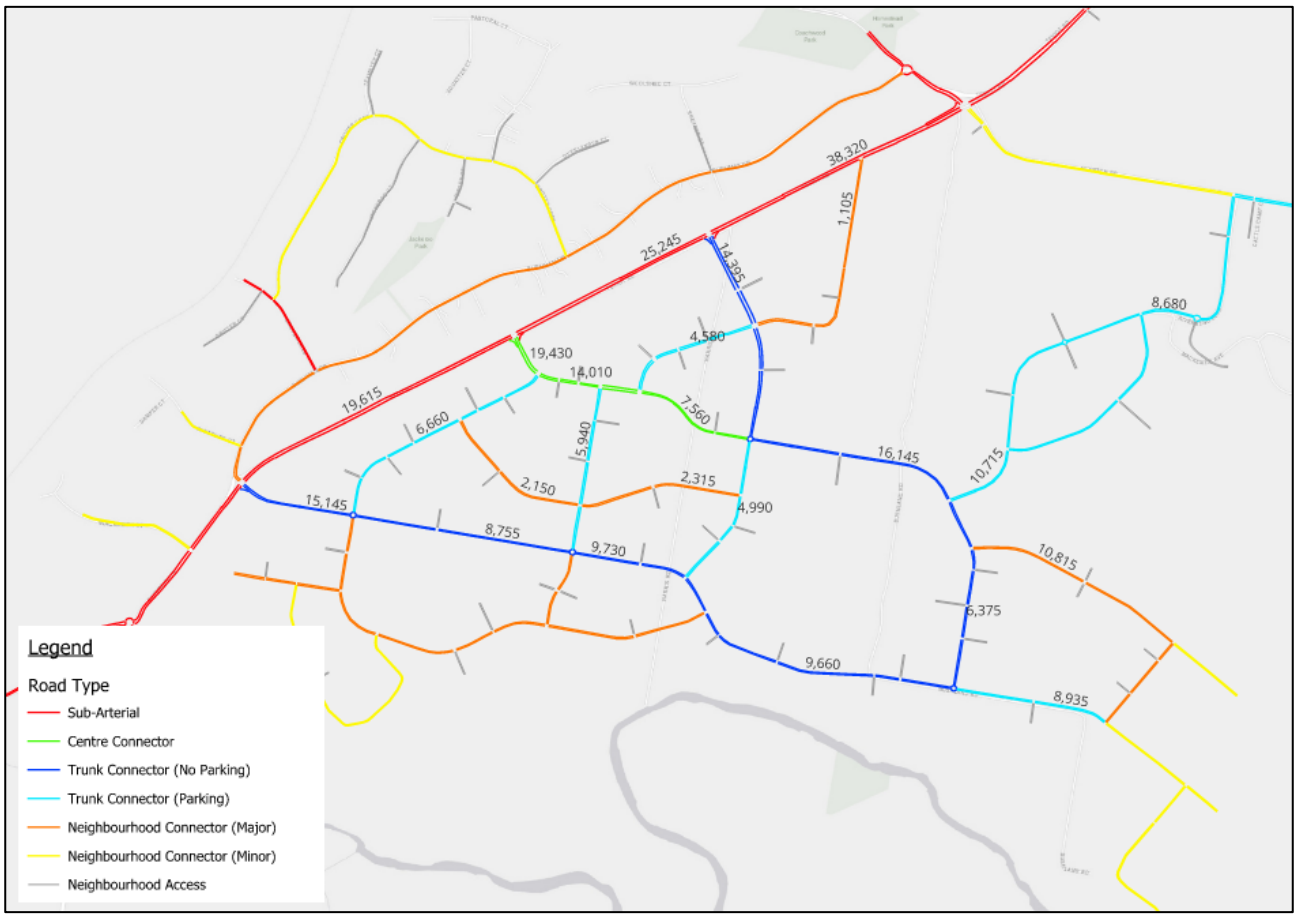


Figure 12: 2066 Daily Traffic Volumes (RTM Output)

Economic Development Queensland's PDA guideline no. 06 (February 2019) provides recommendations on daily traffic volume range thresholds by road type for development areas. The estimated daily traffic volumes for the 2031 and 2066 scenarios and their level of compliance with these guidelines are as follows:

- 2031 daily traffic volumes by road type
    - Trunk connector (4 lane) 18,001-30,000vpd – *modelled range of up to 11,360vpd*
    - Trunk connector (2 lane) 7,500 -18,000vpd – *modelled range of up to 8,930vpd*
    - Neighbourhood connector (2 lane) 3,000-7,499vpd – *modelled range of up to 2,350vpd*
- 2066 daily traffic volumes by road type
    - Trunk connector (4 lane) 18,001-30,000vpd – *modelled range of up to 14,395vpd*
    - Trunk connector (2 lane) 7,500 -18,000vpd – *modelled range of up to 16,156vpd*
    - Neighbourhood connector (2 lane) 3,000-7,499vpd – *modelled range of up to 10,820vpd*
    - Centre connector street 7,500-15,000vpd – *modelled range of up to 19,350vpd*

3.2.2 Network Density Plots

The RTM road network density plots for the 2031 and 2066 AM and PM peak hour scenario are presented in Figure 13 to Figure 16. Simulated density outputs of a mesoscopic traffic model is a representation of traffic congestion within the network on a given road link, measured by the number of vehicles per kilometre. For context, a vehicle queue is typically formed where the simulated density of a road link is greater than 60veh/km.

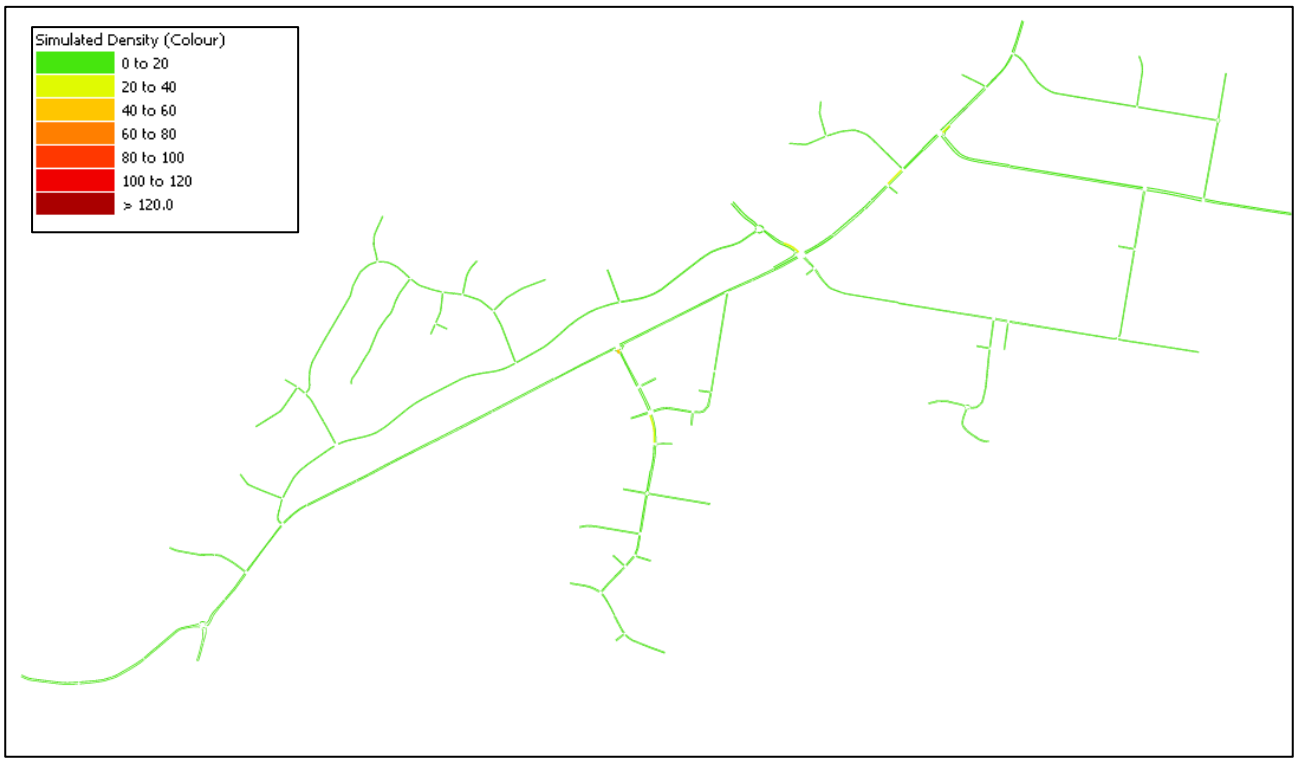


Figure 13: Simulated Density – 2031 AM Peak (7:30am)

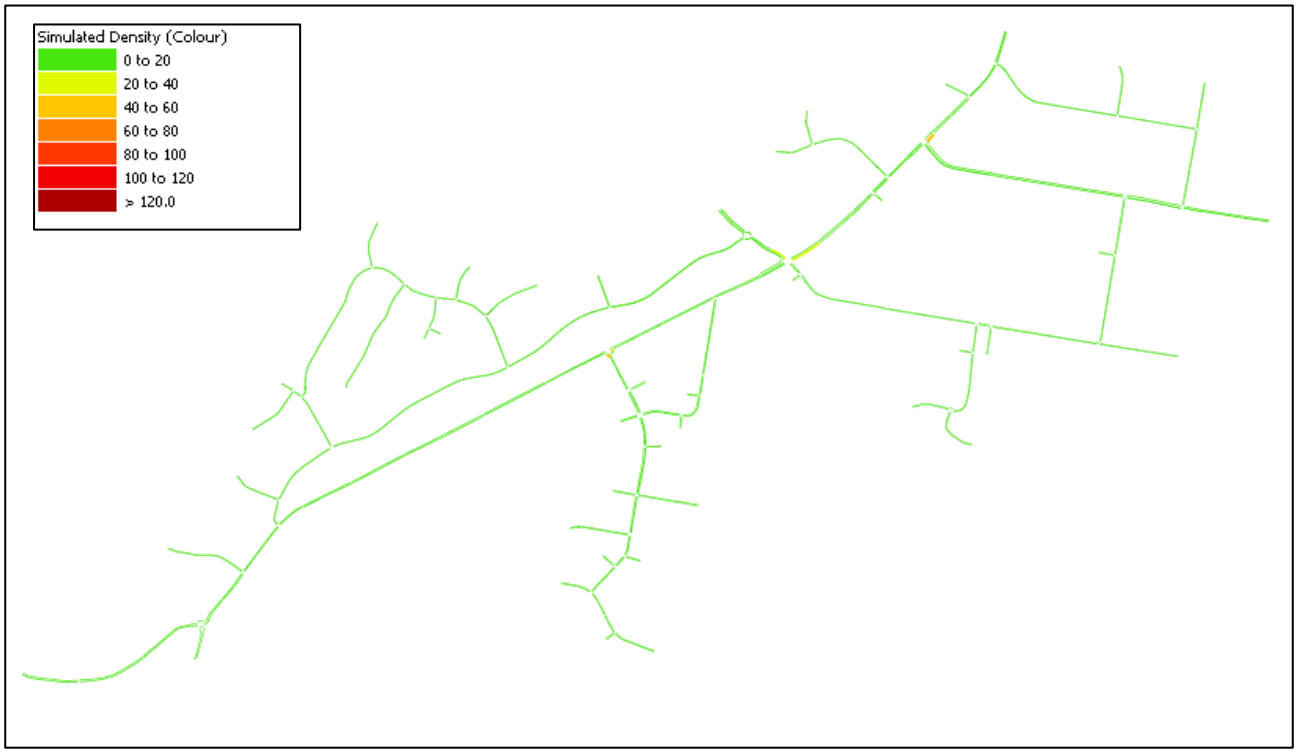


Figure 14: Simulated Density – 2031 PM Peak (4:30pm)



Figure 15: Simulated Density – 2066 AM Peak (7:30am)



Figure 16: Simulated Density – 2066 PM Peak (4:30pm)

The network density plots of the RTM road networks indicate the 2031 and 2066 AM and PM peak hour scenarios are expected to operate within acceptable traffic operational performance parameters.

The 2031 AM and PM peak hours are expected to operate with limited vehicle queuing, indicating the proposed road network and intersection geometries are sufficient to accommodate the estimated traffic demands.

With regard to the 2066 AM and PM peak hour scenarios, minor vehicle queuing is expected locations internal and external to the Riverbend development. For the AM peak hour, the northern approach of the Teviot Road / Cusack Lane intersection is expected to experience vehicle queuing no greater than 50m. While during the PM peak hour, vehicle queuing of approximately 100m in length is expected at the following locations:

- Northern Teviot Road approach to the intersection with Bushman Drive and the southern development access road.
- Northern approach to the main roundabout intersection within the development adjacent to Precinct 1.

The RTM simulated density outputs of the 2066 scenario indicate the road network and associated intersection geometries provide sufficient capacity to accommodate the estimated development trip generation and distribution during the AM and PM peak hours.

4 Conclusion

The RTM inputs and outputs presented within this report provide a traffic operational assessment of Celestino's proposed Riverbend development application for the internal and surrounding external road network, while maintaining consistency with Logan City Council demand forecasts (provided by VLC), through to 2066.

The model outputs indicate the proposed road network and intersection geometries provide sufficient capacity for the estimated trip generation of the proposed development to operate within acceptable performance parameters.

From a daily traffic volume perspective for the 2031 and 2066 scenarios, the level of compliance with PDA guidelines for each road type are as follows:

- 2031 daily traffic volumes by road type
    - Trunk connector (4 lane) 18,001-30,000vpd – *modelled range of up to 11,360vpd*
    - Trunk connector (2 lane) 7,500 -18,000vpd – *modelled range of up to 8,930vpd*
    - Neighbourhood connector (2 lane) 3,000-7,499vpd – *modelled range of up to 2,350vpd*
- 2066 daily traffic volumes by road type
    - Trunk connector (4 lane) 18,001-30,000vpd – *modelled range of up to 14,395vpd*
    - Trunk connector (2 lane) 7,500 -18,000vpd – *modelled range of up to 16,156vpd*
    - Neighbourhood connector (2 lane) 3,000-7,499vpd – *modelled range of up to 10,820vpd*
    - Centre connector street 7,500-15,000vpd – *modelled range of up to 19,350vpd*

From a traffic operational congestion perspective, the network density plots of the RTM road networks indicate the 2031 and 2066 AM and PM peak hour scenarios are expected to operate within acceptable traffic operational performance parameters.

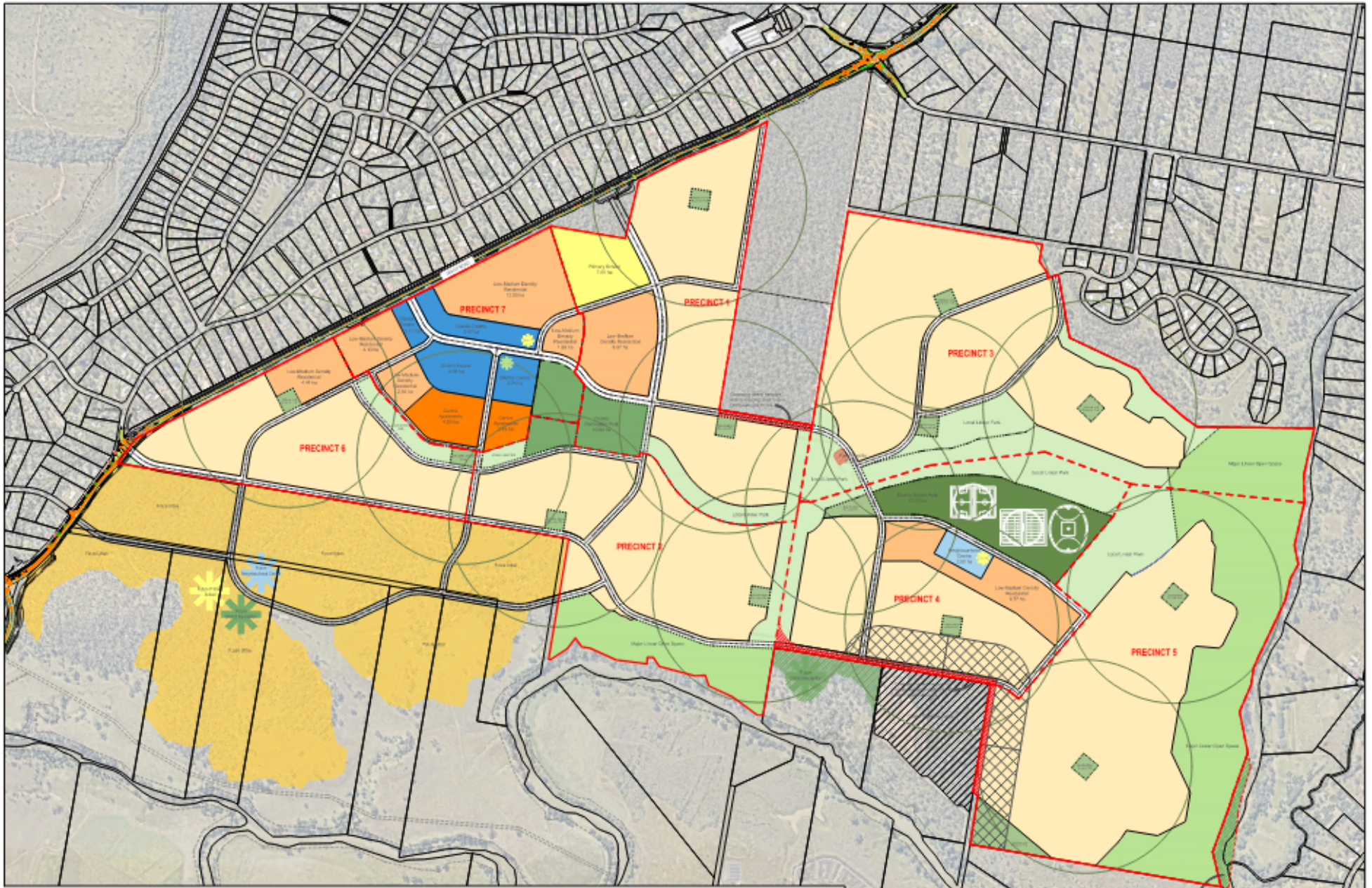
The 2031 AM and PM peak hours are expected to operate with limited vehicle queuing, indicating the proposed road network and intersection geometries are sufficient to accommodate the estimated traffic demands.

Regarding the 2066 AM and PM peak hour scenarios, minor vehicle queuing is expected locations internal and external to the Riverbend development. For the AM peak hour, the northern approach of the Teviot Road / Cusack Lane intersection is expected to experience vehicle queuing no greater than 50m. While during the PM peak hour, vehicle queuing of approximately 100m in length is expected at the following locations:

- Northern Teviot Road approach to the intersection with Bushman Drive and the southern development access road.
- Northern approach to the main roundabout intersection within the development adjacent to Precinct 1.

The RTM simulated density outputs of the 2066 scenario indicate the road network and associated intersection geometries provide sufficient capacity to accommodate the estimated development trip generation and distribution during the AM and PM peak hours.

APPENDIX A – Riverbend Development Plan



Legend:

- Site Boundary
- Precinct Boundary
- Easement
- Future Urban Development
- 400 Metre Catchment
- Road Reserve (external to Celestino property)

Centre:

- District Centre
- Neighbourhood Centre
- Education
- Community Facility (District Centre)
- Civic Park (District Centre)

Open Space:

- District Recreation Park
- District Sports Park
- Major Linear Open Space
- Local Linear Park
- Neighbourhood Recreation Park
- Logan River Boundary Realignment

Residential:

- Low Density Residential
- Low-Medium Density Residential
- Centre Apartments

Services:

- Pump Facility
- Water Treatment Area Buffer

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PROJECT

RIVERBEND

CLIENT

CELESTINO

NOTES

ALL LOT NUMBER AND DIMENSIONS (INCLUDING AREAS) ARE APPROXIMATE ONLY AND SUBJECT TO FURTHER DESIGN DEVELOPMENT

ALL DIMENSIONS HAVE BEEN ROUNDED TO THE NEAREST 0.1 METRES AND ALL AREAS HAVE BEEN ROUND TO THE NEAREST SQUARE METRE

THE BOUNDARIES ON THIS PLAN SHOULD NOT BE USED FOR THE FINAL DESIGN AND ARE SUBJECT TO FINAL DETAILED DESIGN BY SURVEYORS.

INFORMATION ON THIS PLAN HAS FROM THE FOLLOWING SOURCES:

SITE BOUNDARIES: COLLIERS (JUNE 2024)
ADJOINING CADASTRE: DCDB/SA
DESIGN CONTOURS: COLLIERS (JUNE 2024)
AERIAL PHOTOGRAPHY: NEARMAP
BUNOT ROAD DETAIL: COLLIERS (OCTOBER 2022)

DRAFT

ISSUE	DES	ISSUE DESCRIPTION	BY	CHK	DATE
	PRE	PRELIMINARY	TD	TD	21/06/2023
A	PRE	PRELIMINARY	TD	TD	21/06/2023
B	PRE	PRELIMINARY	TD	TD	21/06/2023
C	PRE	PRELIMINARY	TD	TD	21/06/2023
D	PRE	PRELIMINARY	TD	TD	21/06/2023
E	PRE	PRELIMINARY	TD	TD	21/06/2023
F	PRE	PRELIMINARY	TD	TD	21/06/2023
G	PRE	PRELIMINARY	TD	TD	21/06/2023
H	PRE	PRELIMINARY	TD	TD	21/06/2023
I	PRE	PRELIMINARY	TD	TD	21/06/2023
J	PRE	PRELIMINARY	TD	TD	21/06/2023
K	PRE	PRELIMINARY	TD	TD	21/06/2023
L	PRE	PRELIMINARY	TD	TD	21/06/2023
M	PRE	FOR REVIEW	TD	TD	21/06/2023
N	PRE	FOR REVIEW	TD	TD	21/06/2023
O	PRE	FOR REVIEW	TD	TD	21/06/2023
P	PRE	UPDATED DISTRICT CENTRE	TD	TD	21/06/2023
Q	PRE	FINAL ISSUE	TD	TD	21/06/2023

PRE - Preliminary, DA - Development Application, CON - Construction

DRAWING TITLE

STRUCTURE PLAN - RIVERBEND

DESIGN : TD
DOCUMENT : TD / MV
PROJECT : 4123601
1:5,000 @ A0

NORTH

DRAWING NUMBER 4123605-01

REVISION Q

APPENDIX B – RTM
Aimsun Outputs

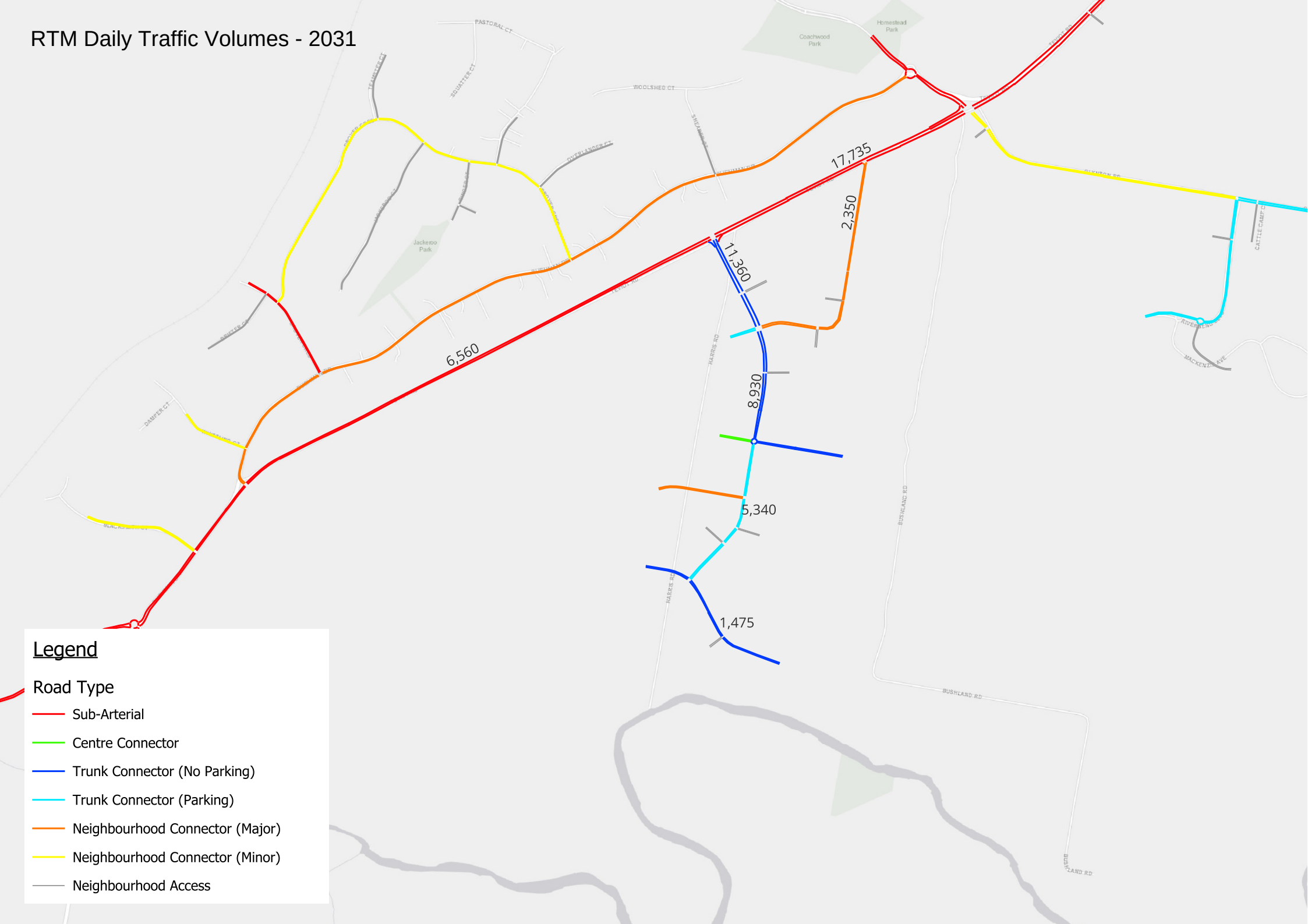
RTM Network Layout - 2031



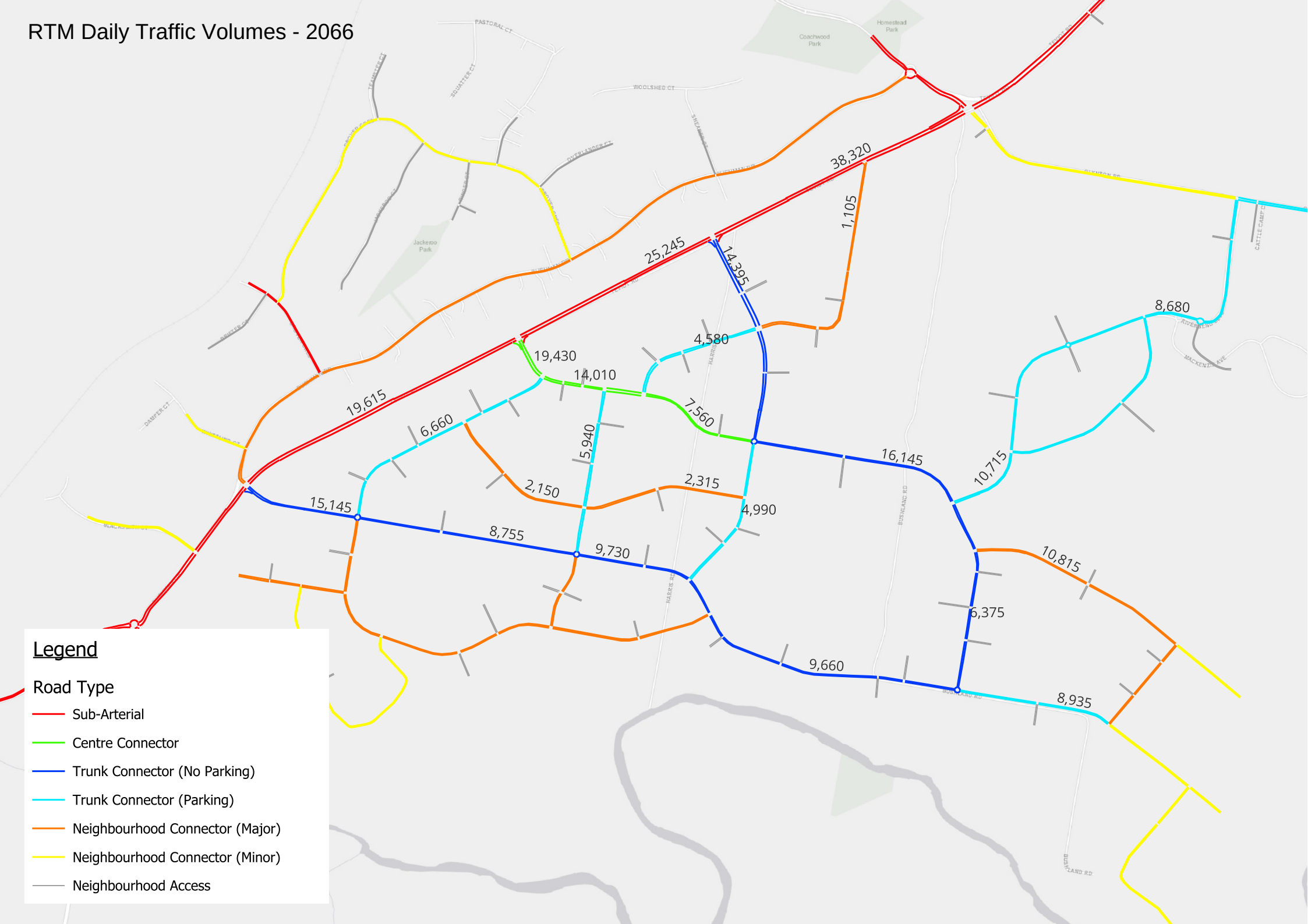
RTM Network Layout - 2066



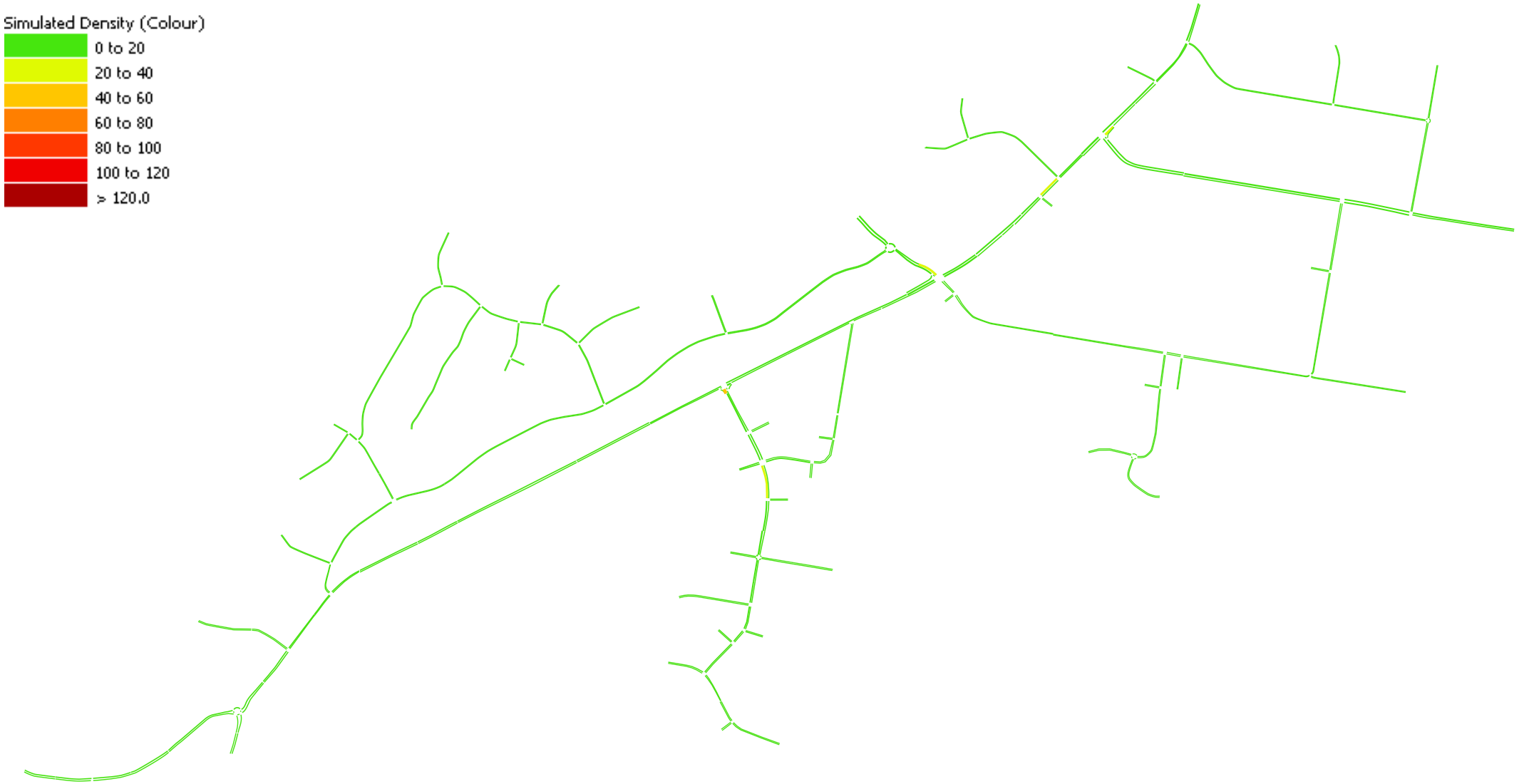
RTM Daily Traffic Volumes - 2031



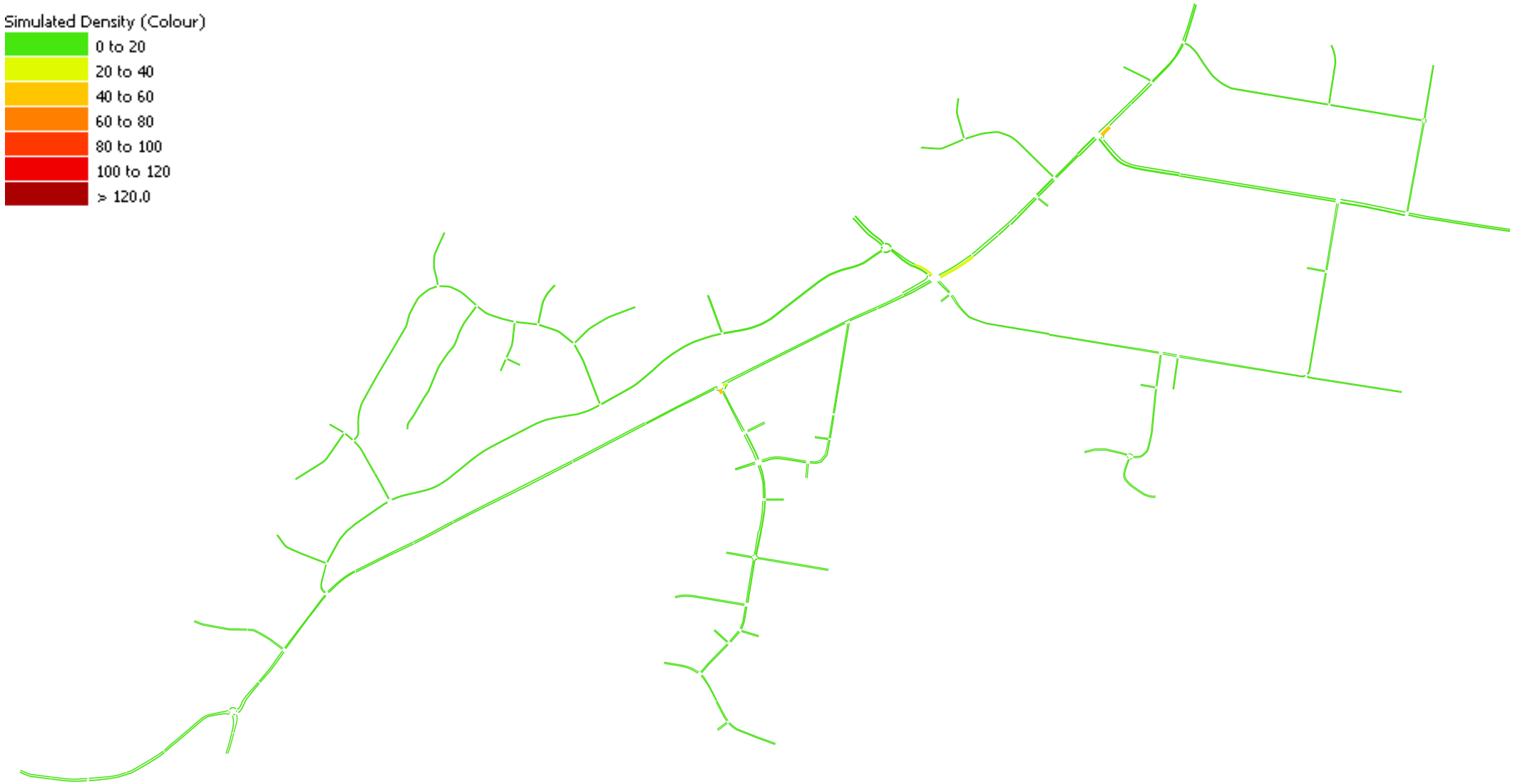
RTM Daily Traffic Volumes - 2066



Simulated Density - 2031 AM Peak



Simulated Density - 2031 PM Peak



Simulated Density - 2066 AM Peak



Simulated Density - 2066 PM Peak



APPENDIX C – SLSTM Technical Note (VLC)

Riverbend Cordon 2024

Cordon delivery note			
VLC Job No.	**24-0160**		
File Name	RiverbendCordon2024_delivery_note_v1	Primary Author	Andrew O'Brien
Version	1	Approved By	Mark Iliffe
Date Issued	19/04/2024	No. of Pages	12

Introduction

VLC was requested by PSA Consulting to deliver cordon matrices for the Riverbend development area, based on the 2018/2019 South Logan Strategic Transport Model (SLSTM), for the 2031 and 2066 model years.

The delivered cordon area, land use, and transport network are based on those agreed to and delivered to Arup in July/August 2017, with minor updates due to the 2018/2019 development of the SLSTM.

Model Selection

The South Logan Strategic Transport Model (SLSTM) was developed through 2018 and 2019, by VLC, in collaboration with Economics Development Queensland (EDQ, the primary client), Logan City Council (LCC), and the Department of Transport and Main Roads (TMR). This model represents the latest holistic model for the Greater Flagstone Priority Development Area (PDA), and is documented in the South Logan Strategic Transport Model, Model Development and Network Apportionments report, October 2019.

The 2066 'ultimate' model year represents a 'fully developed' Greater Flagstone PDA, including land use projections and infrastructure assumptions from LCC and TMR which were current at the time the model was development.

The 2031 model year was selected by PSA, out of the available SLSTM model years (2031 and 2041).

The specific model runs adopted from the SLSTM are:

- For 2066 – Model run 046
- For 2031 – Model run 043

Transport Networks

The model networks and infrastructure assumptions from LCC and TMR were accurate at the time of model development. Riverbend internal networks were based on those agreed to and delivered to Arup in July/August 2017, with minor updates only.

The 2031 network assumptions were consistent with LCC's Way2Go modelling conducted at the same time, and included some public transport projects which are yet to be committed, including heavy rail line from Salisbury to Flagstone South (partial completion of the Salisbury to Beaudesert rail project).

The 2066 network assumptions within the Greater Flagstone and Yarrabilba PDA's were developed to align with the infrastructure plans within the PDA's. External to the PDA's, the network was based on infrastructure identified in the Logan West Area Transport Strategy (LWATS) and the SEQ Regional Plan ShapingSEQ.

Major projects included in the 2066 network were:

- upgrades to Camp Cable Road to a four-lane arterial;
- extension of the Park Ridge Connector as a two-lane motorway standard from Park Ridge in the north to Camp Cable Road in the south;
- new four-lane arterial north of Yarrabilba connecting Waterford-Tamborine Road and Beaudesert-Beenleigh Road;
- heavy rail extension to Beaudesert (Salisbury to Beaudesert rail project).

A major deviation from the previous cordon model, relevant to the Riverbend development, is that the Southern Infrastructure Corridor is no longer assumed as a 4-lane expressway, and the scale of the Park Ridge Connector has also been reduced.

The assumed network is shown in Figure 1 and Figure 2, using a functional road hierarchy. The 2066 network aligns with the EDQ Guideline 6 road hierarchy as shown in Figure 3.

Figure 1: 2031 cordon area network, zones, and centroids

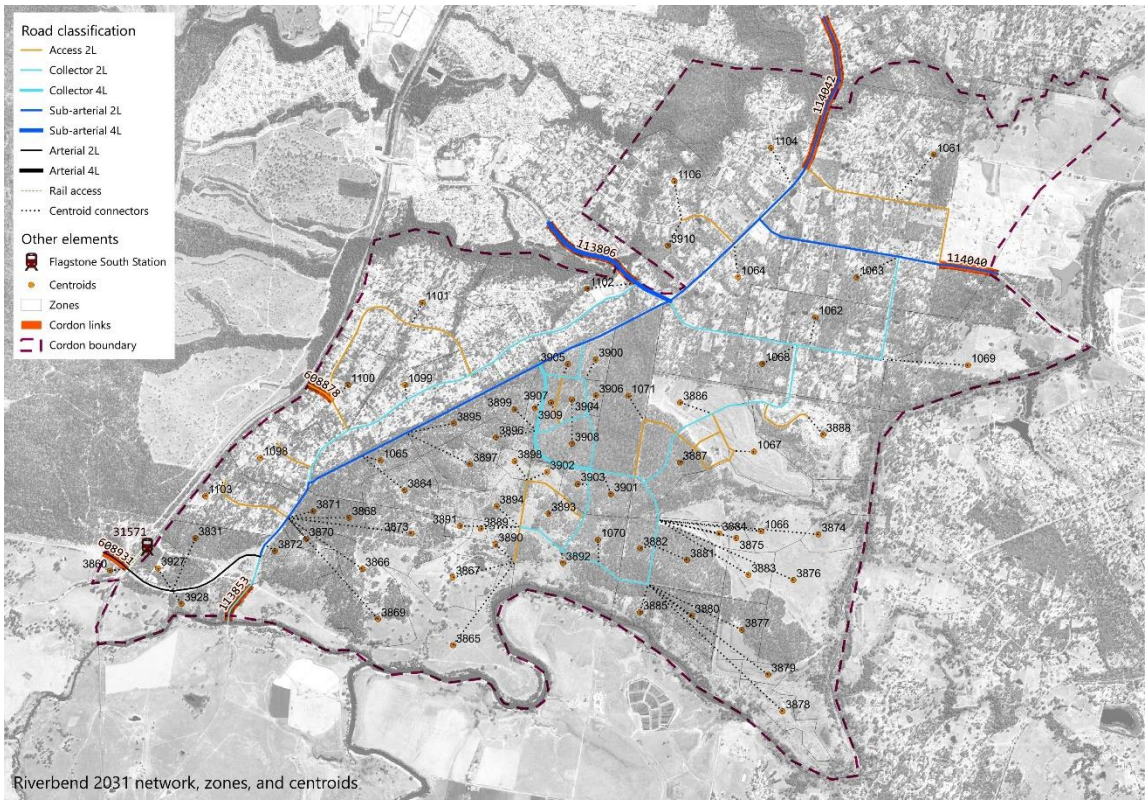


Figure 2: 2066 cordon area network, zones, and centroids

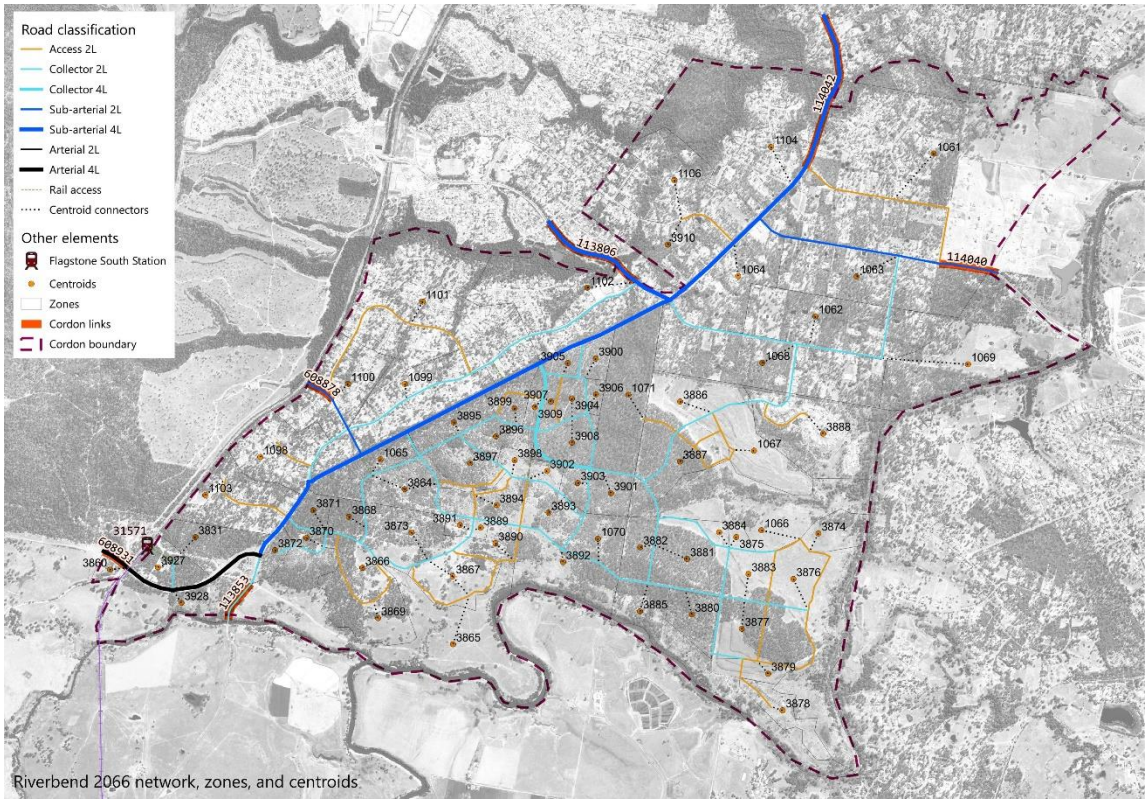
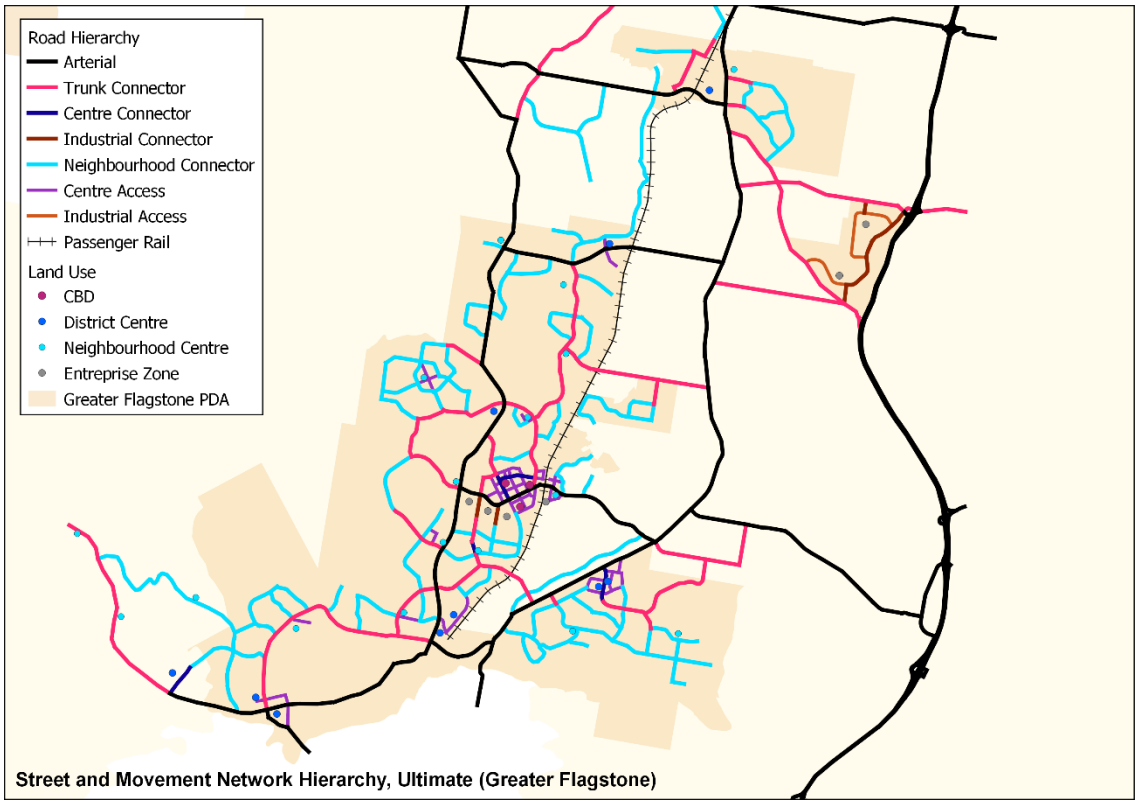


Figure 3: Greater Flagstone Street and Movement Network Hierarchy, as per EDQ Guideline 6



Land use

Population and employment forecasts used in the SLSTM have been developed from population forecasts provided by LCC. Demographic inputs up to 2041 are consistent with the Queensland Government Statistician's Office (QGSO) demographic projections (2015 medium series) at the SA2 Level. Demographic forecasts beyond 2041 have been prepared for the Logan LGA area only and in consultation with TMR, LCC, EDQ and the QGSO**.**

Land use assumptions within the Riverbend development area are based on information received from Arup in 2017, with adjustments during development of the SLSTM to account for updated information in some of the initial areas (now already developed), and a rationalisation of competing growth between developers was included through consultation with LCC, EDQ, and the developers.

In 2031 the cordon area has approximately 23% lower population and 31% lower employment than assumed in the previous cordon model.

In 2066 the population is slightly reduced in Riverbend, but slightly increased in Teviott Brook and some non-pda areas, and employment is 9% lower, compared to the previous cordon model.

Assumed primary school enrolments have been reduced substantially in both 2031 (by 50%) and 2066 (by 33%), compared to the previous cordon model.

Model zone system and land use are presented in CSV and GIS format in:

- riverbend_cordon_zones_v1.1.gpkg
- riverbend_landuse_LCC_LIP_demogs31_v2.2.csv
- riverbend_landuse_LCC_LIP_demogs66_v2.2.csv
- riverbend_landuse_variables.xlsx

Model limitations

As outputs from a strategic transport model, the cordon matrices can and should be adjusted to suit more detailed modelling steps, such as mesoscopic modelling. It may also need adjustment to account for differences between the modelled land use assumptions, and the latest planning from developers.

The 1-hour peak period demands and loads have been calculated using a peak hour factor of *0.53* from the 2-hour SLSTM periods. If a different peak hour factor can be justified, then these demands and loads could be factored accordingly.

Like many strategic transport models, the Zenith model under-estimates vehicle movements to/from shopping centres, due to 'catch-trade' and 'diverted' trips (i.e. dropping in on the way home from work/school, etc) being substantially under-reported in the household travel surveys from which we source our modelling parameters. We suggest that it might be appropriate to manipulate some of the trips passing near the District Centre to 'drop in' (and out) trips, whenever detailed assessment of access to the centre is conducted.

Further caveats are relevant for the 2066 model, due to the length of the projection. The 2066 model is based on demographic inputs developed specifically for this project in collaboration with TMR and LCC. Demographic inputs beyond 2041 for areas outside of LCC are unavailable. Therefore, the SLSTM model, in 2066, does not include growth in population or employment outside of the Logan LGA. This limitation has implications for the modelled distribution of trips and network demands.

The limitation in demographic inputs outside of the Logan LGA invariably mean that there is a high level of ambiguity in the 2066 forecasts. Further, with the emergence of new technologies including autonomous vehicles, the introduction of personalised mobility solutions, mobility as a service and any number of possible outcomes. it is reasonable to assume that there will be significant changes in travel behaviours not captured by this modelling.

The 2066 model has been developed primarily for the purposes of generating cordon matrices as inputs to mesoscopic models developed for applications within the PDA areas. For these purposes VLC believe the 2066 models are an appropriate source of information as they provide ultimate demands and distributions of trips to, from and within the PDA.

Results

Model results are presented in terms of AWDT, and 1 hour peak traffic volumes. The 1 hour peak results are derived from the SLSTM's 2-hour AM and PM time periods, with a peak hour factor of 0.53 applied.

Traffic classes are as follows:

- Car – Car traffic, excluding pt access trips. Austroads class 1 and 2.
- PtAcc – Car traffic, specifically accessing major public transport stations (park'n'ride and/or kiss'n'ride). This version of the model does not include return trips for kiss'n'ride.
- LGV – Light goods vehicles. Austroads class 3.
- HGV – Heavy goods vehicles. Austroads class 4 and above.

The model loaded network results for AWDT, and AM and PM 1 hour peak periods are presented in GIS format, as well as graphically in Figure 4 through Figure 9. The GIS files include:

- riverbend_loaded_networks_2031_071_v1.gpkg
- riverbend_loaded_networks_2066_072_v1.gpkg
- riverbend_loaded_network_field_definitions.xlsx

The cordon matrices for the AM and PM 1 hour peak periods are presented in Excel format spreadsheets, in the following files:

- 070_2066_riverbend_cordon_AM1hr_v1.1.xlsx
- 070_2066_riverbend_cordon_PM1hr_v1.1.xlsx
- 071_2031_riverbend_cordon_AM1hr_v1.1.xlsx
- 071_2031_riverbend_cordon_PM1hr_v1.1.xlsx

The cordon endpoints are identified in Figure 1 and Figure 2, and in GIS format by combining the loaded network files with the following centroid and stop files:

- riverbend_cordon_centroids_v1.1.gpkg
- riverbend_cordon_stops_v1.1.gpkg

Figure 4: 2031 modelled AWDT

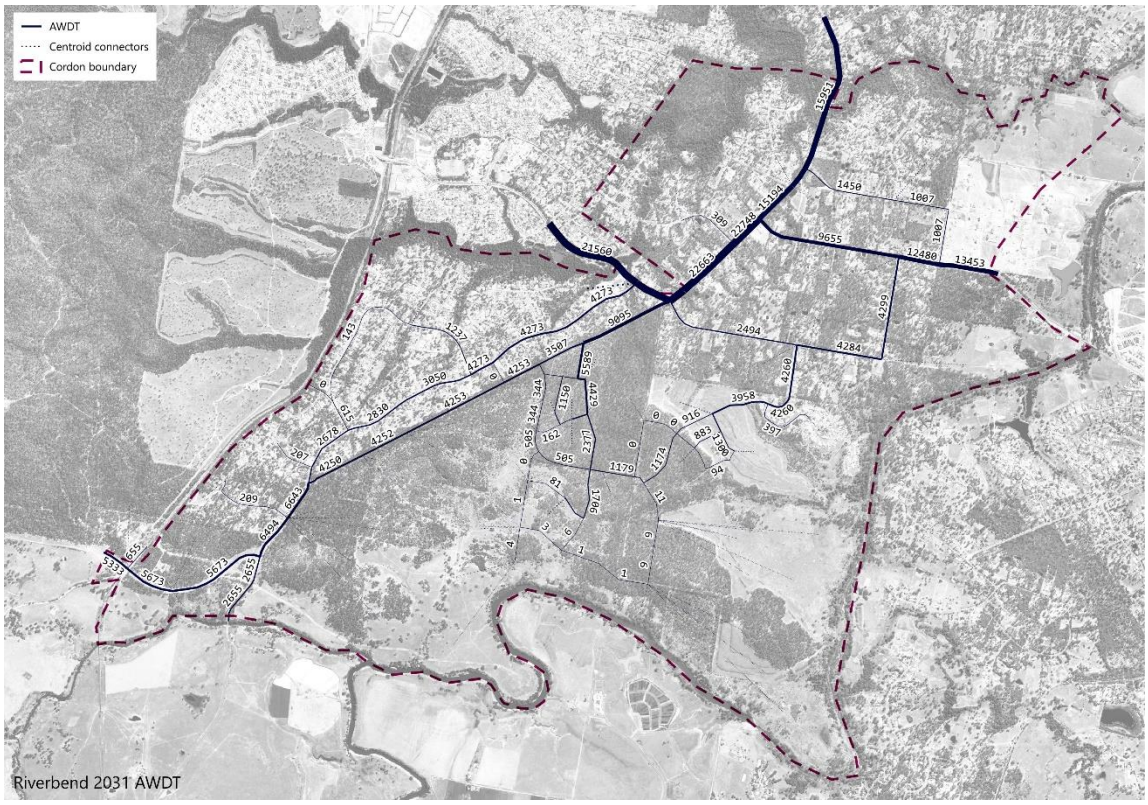


Figure 5: 2031 modelled AM peak 1 hour traffic

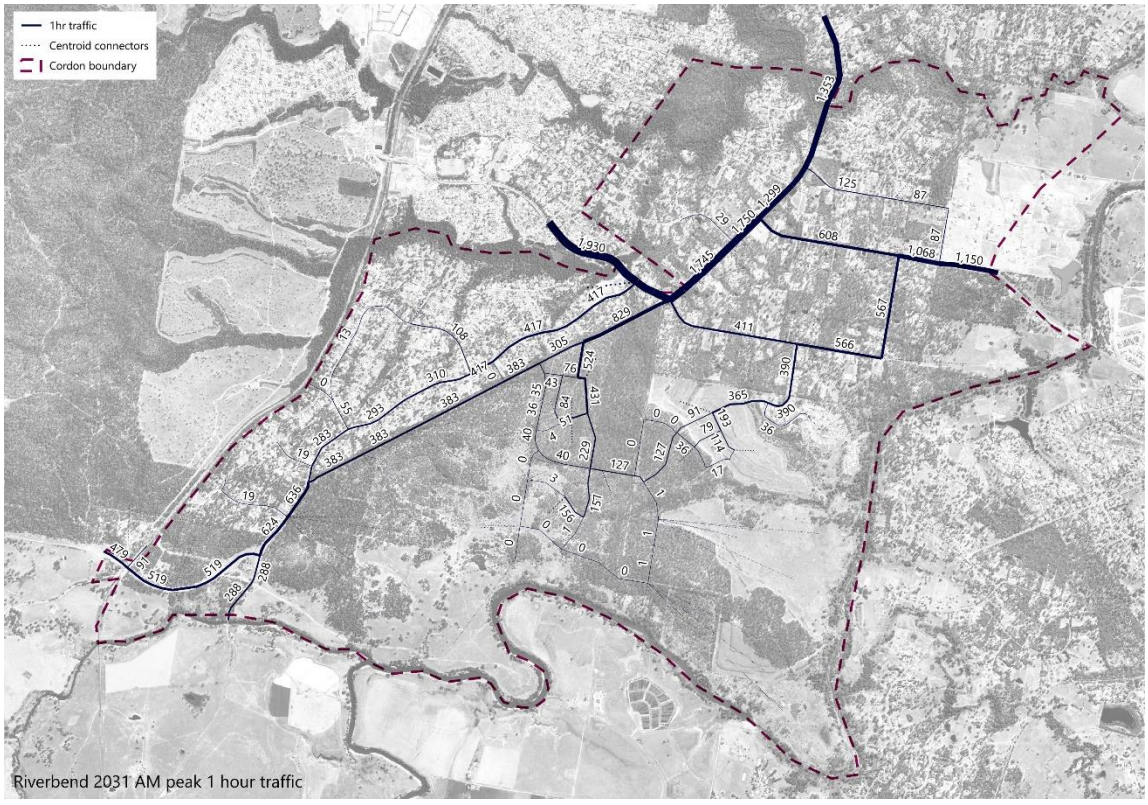


Figure 6: 2031 modelled PM peak 1 hour traffic

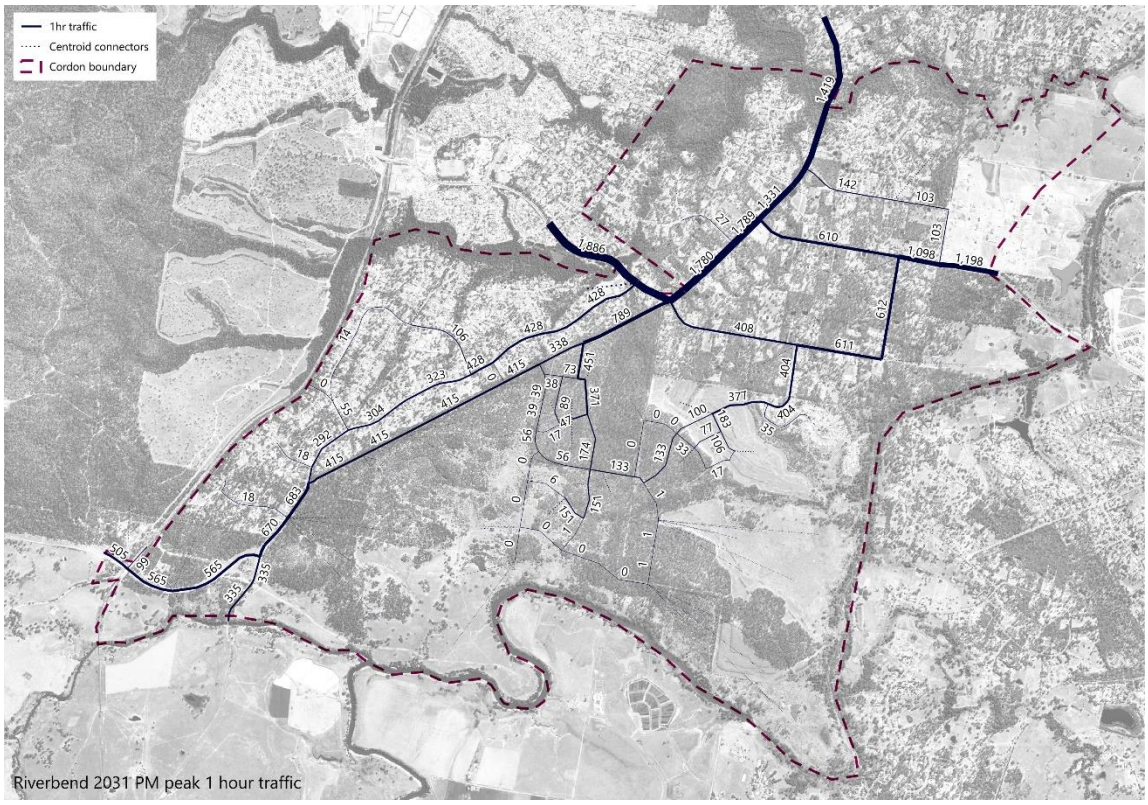


Figure 7: 2066 modelled AWDT

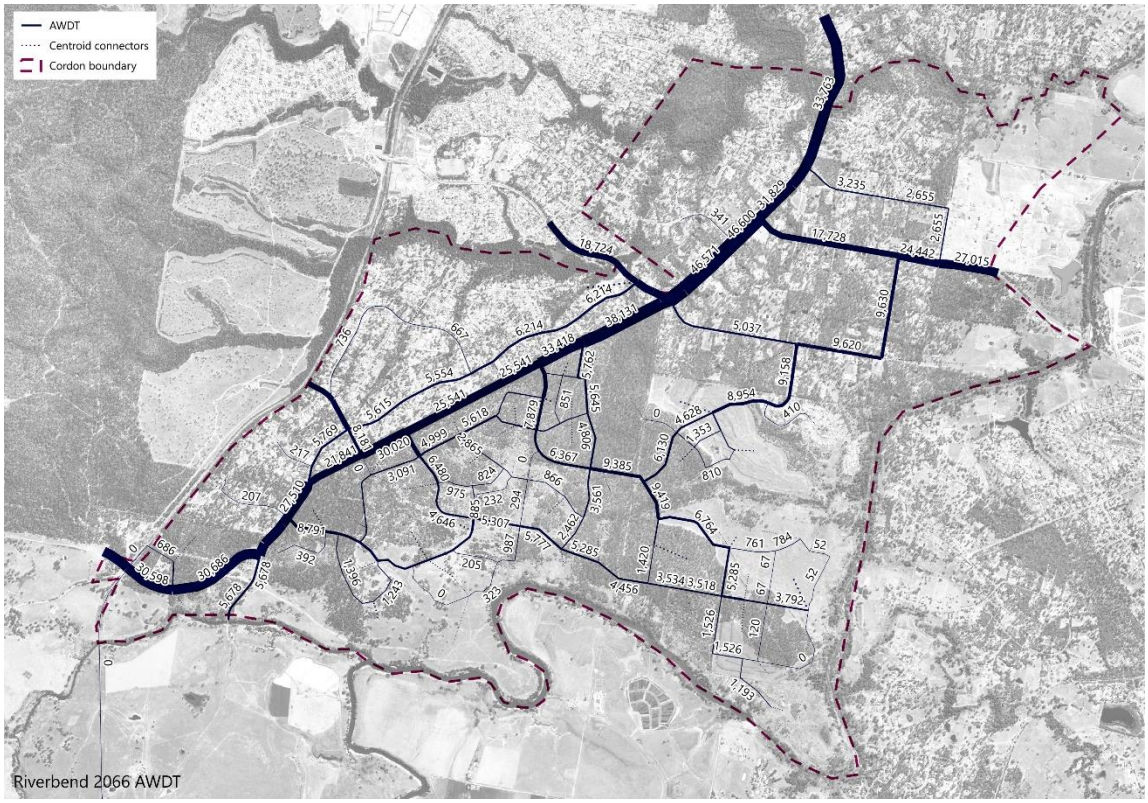


Figure 8: 2066 modelled AM peak 1 hour traffic

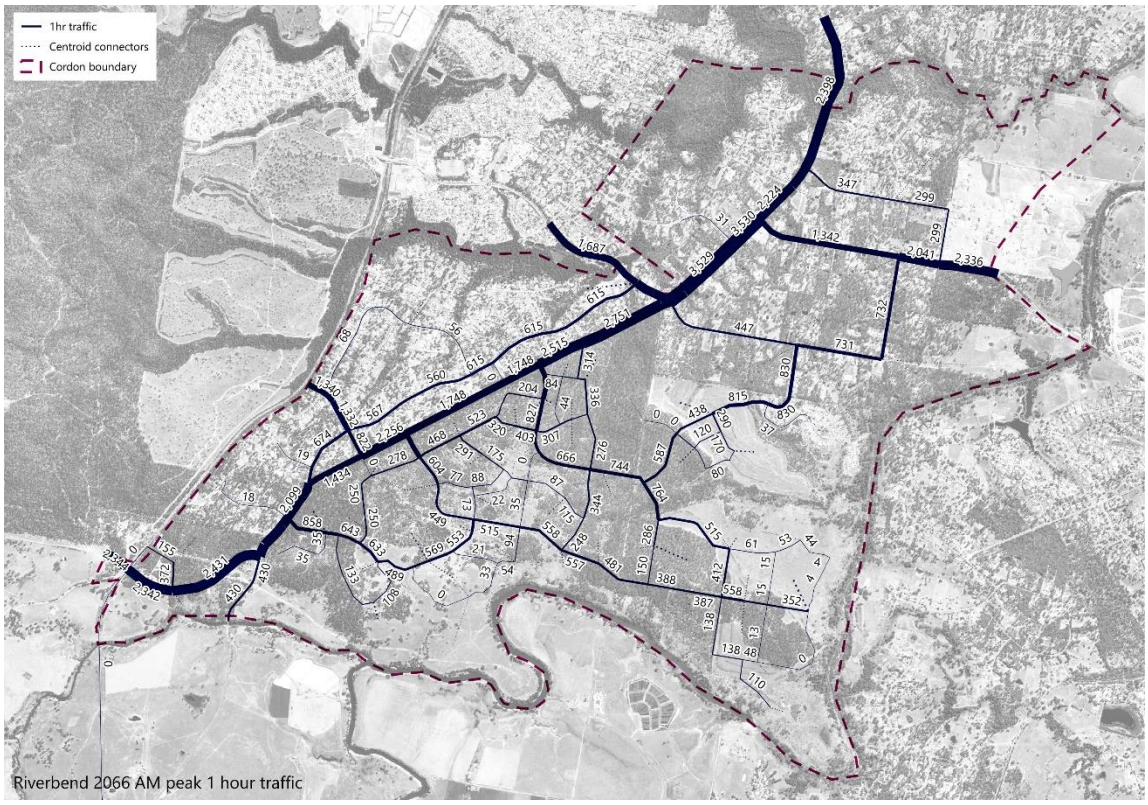
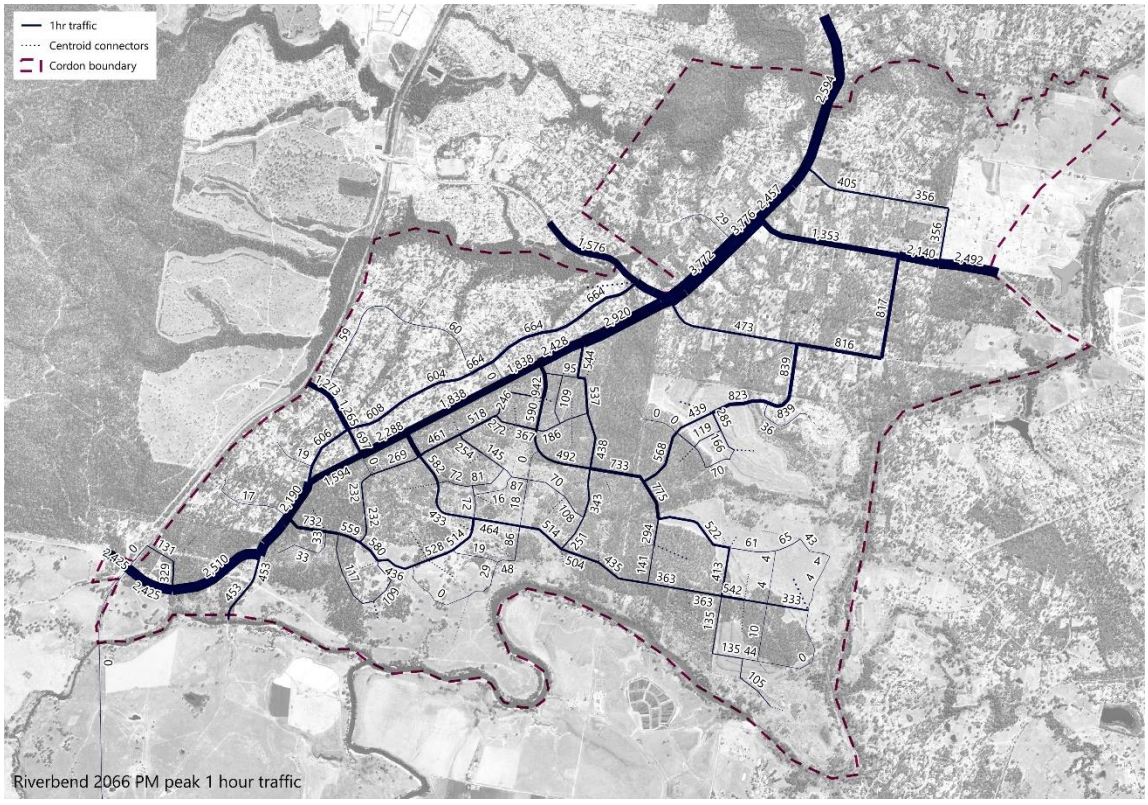


Figure 9: 2066 modelled PM peak 1 hour traffic



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APPENDIX 4 SIDRA MOVEMENT SUMMARIES

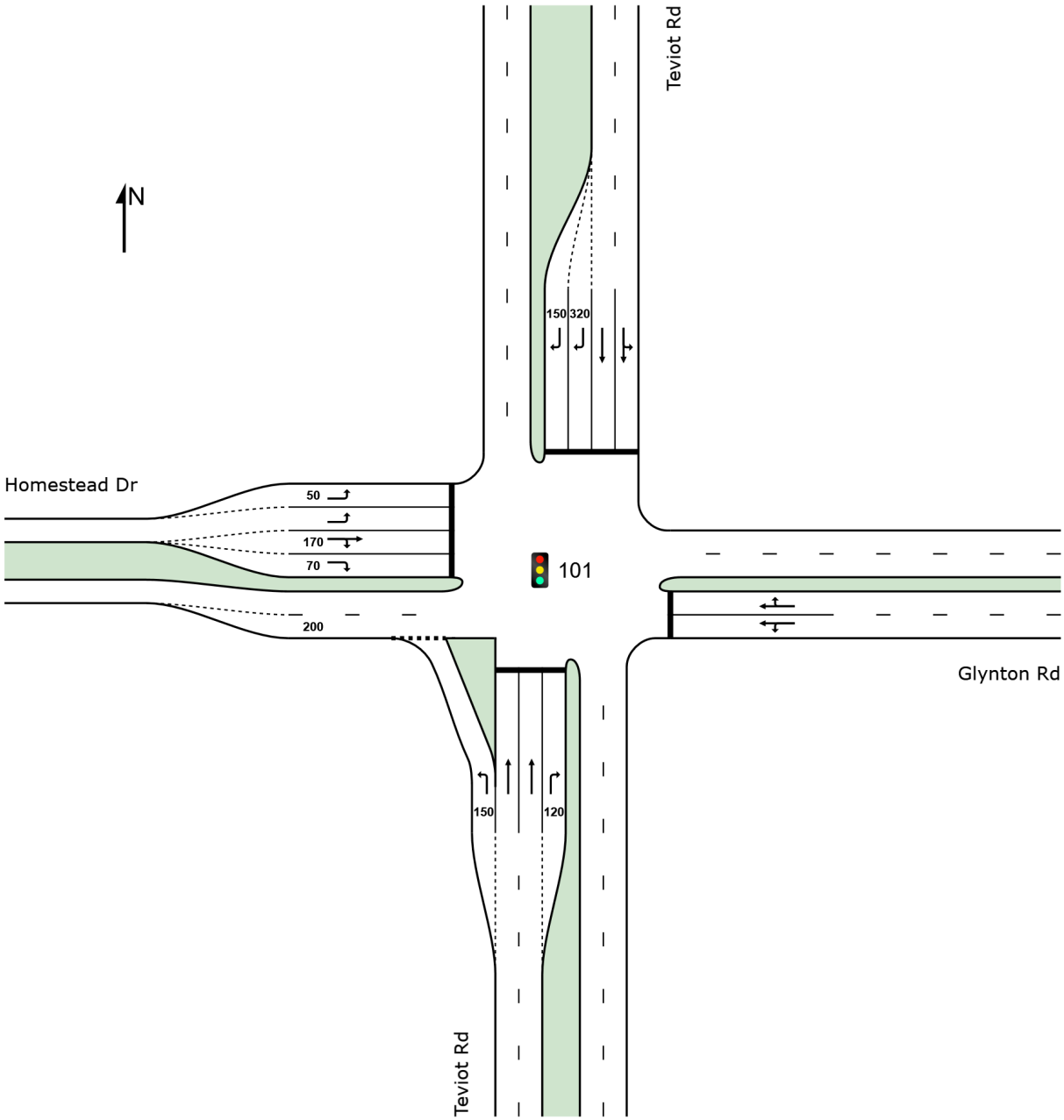
AP04

SITE LAYOUT

Site: 101 [Teviot Rd / Homestead Dr / Glynton Rd (Site Folder: 2031 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



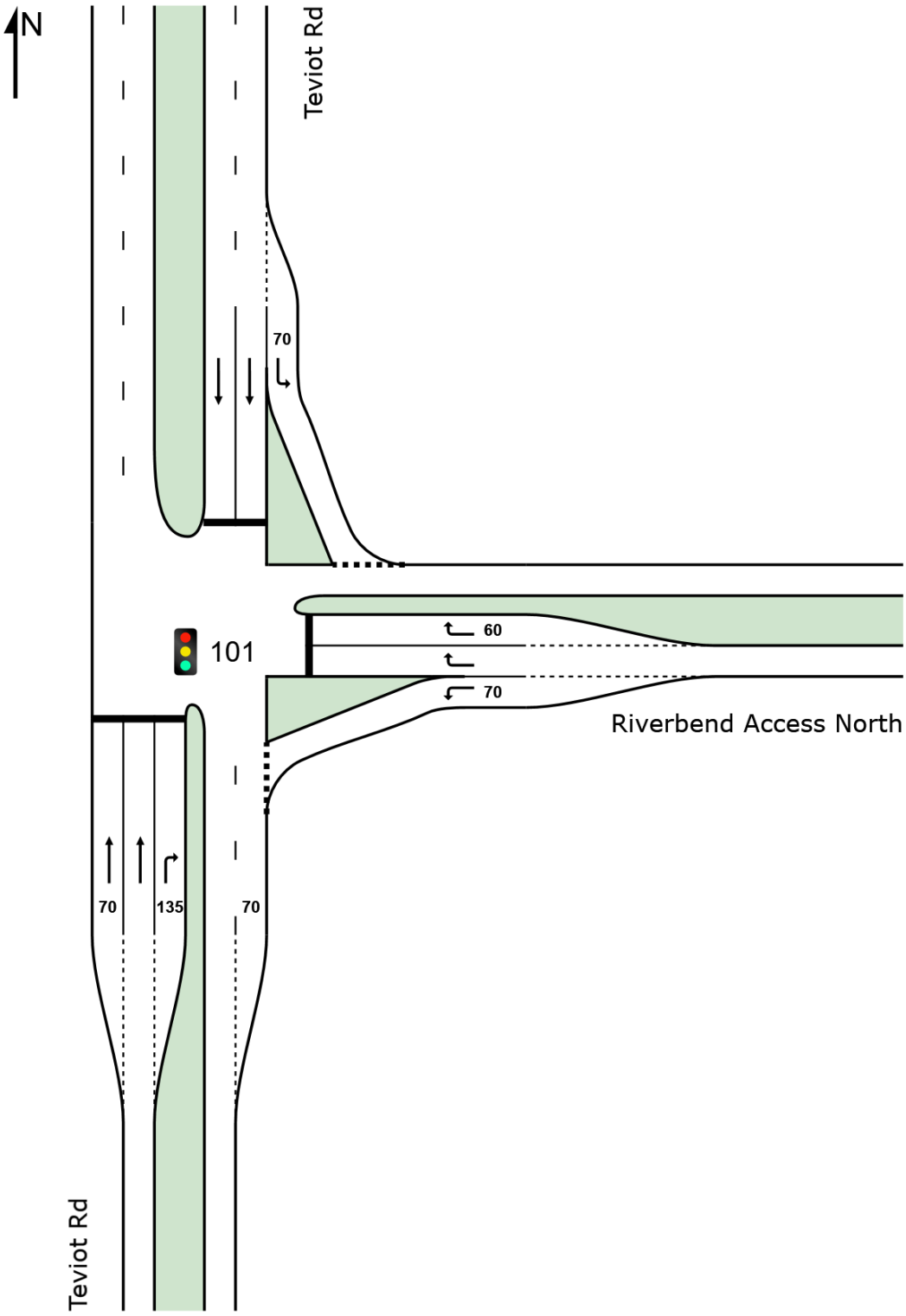
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SITE LAYOUT

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2031 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



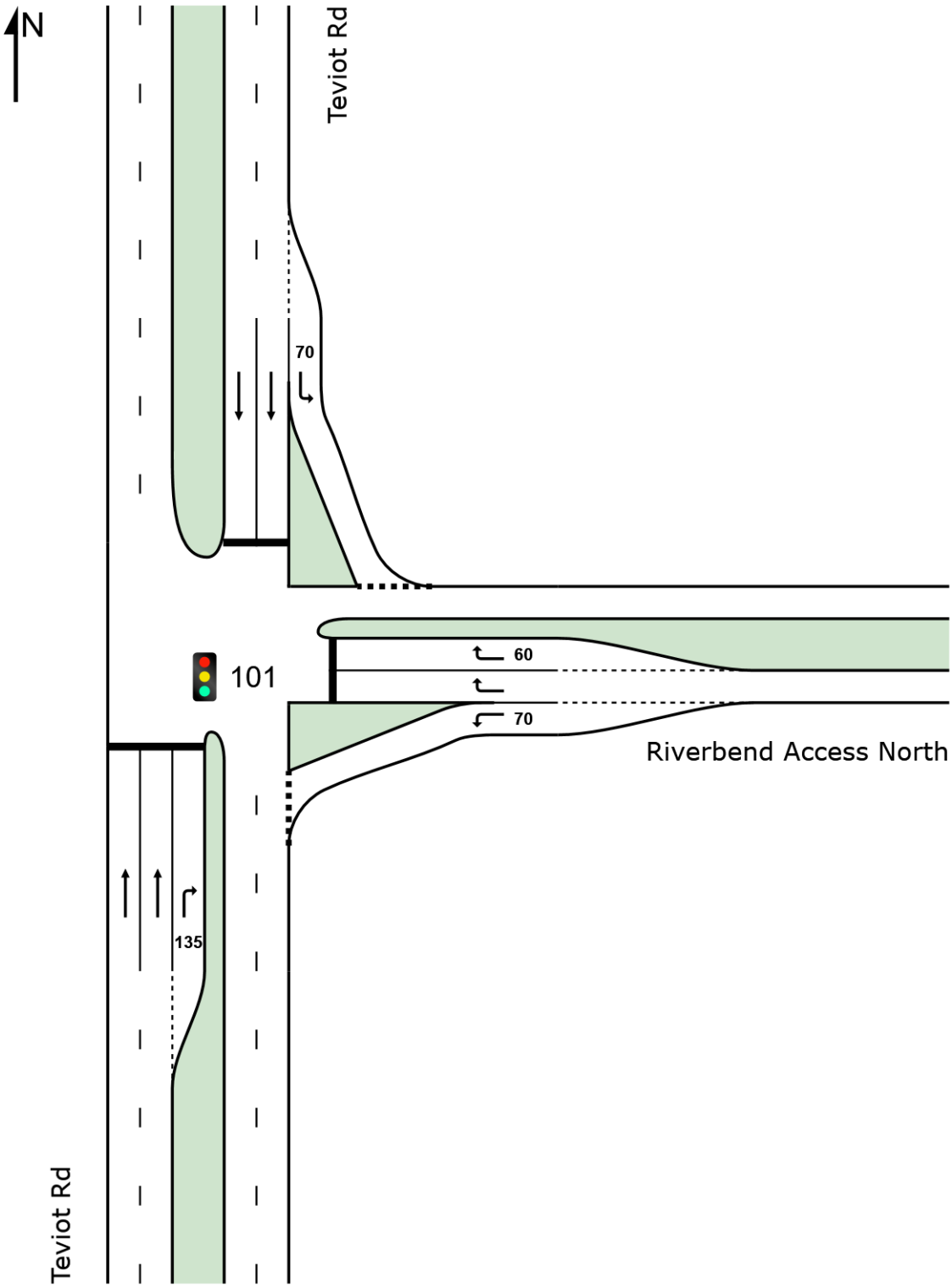
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SITE LAYOUT

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



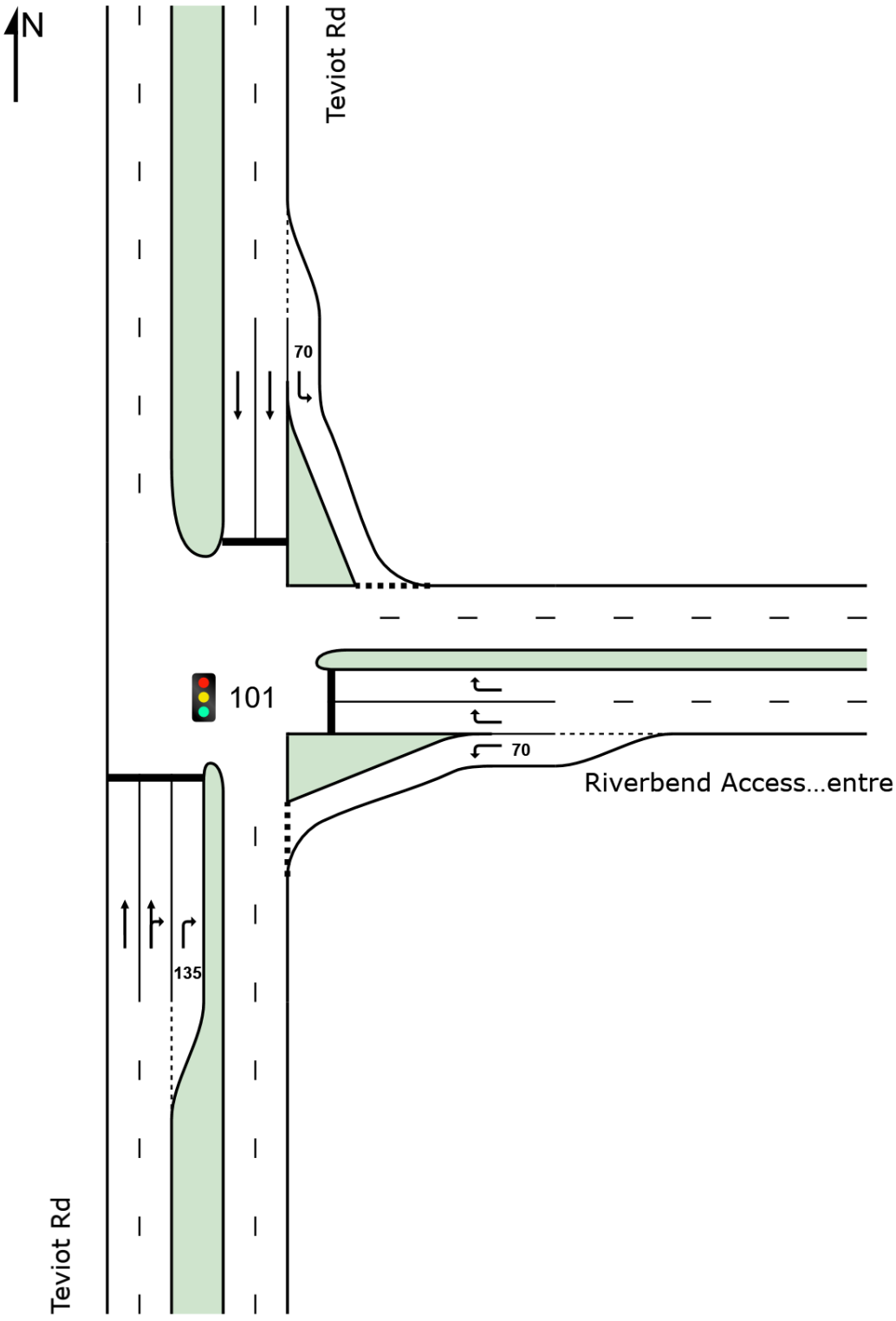
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SITE LAYOUT

Site: 101 [Teviot Rd / Riverbend Access Centre (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



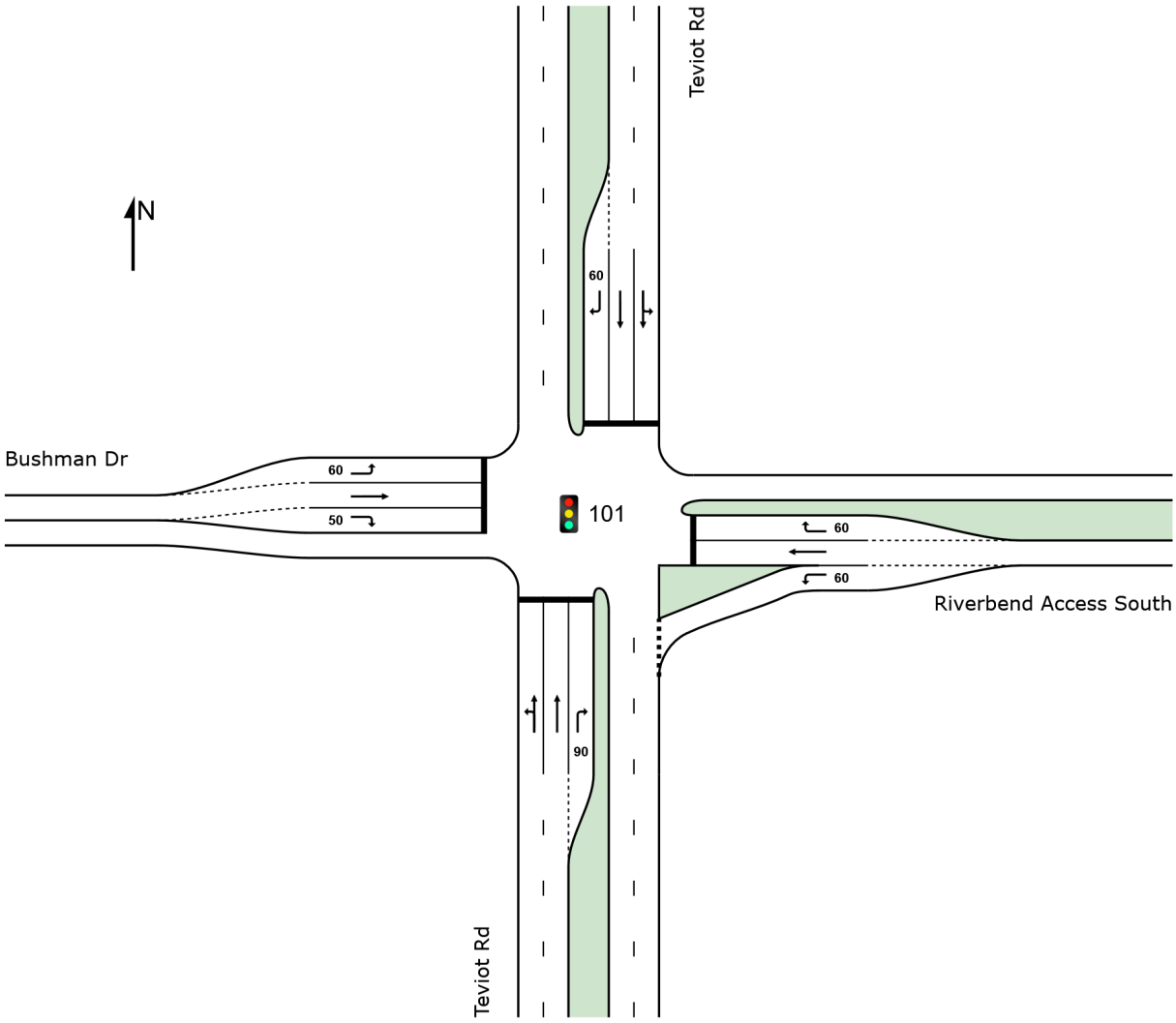
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SITE LAYOUT

Site: 101 [Teviot Rd / Bushman Dr / Riverbend Access South (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.

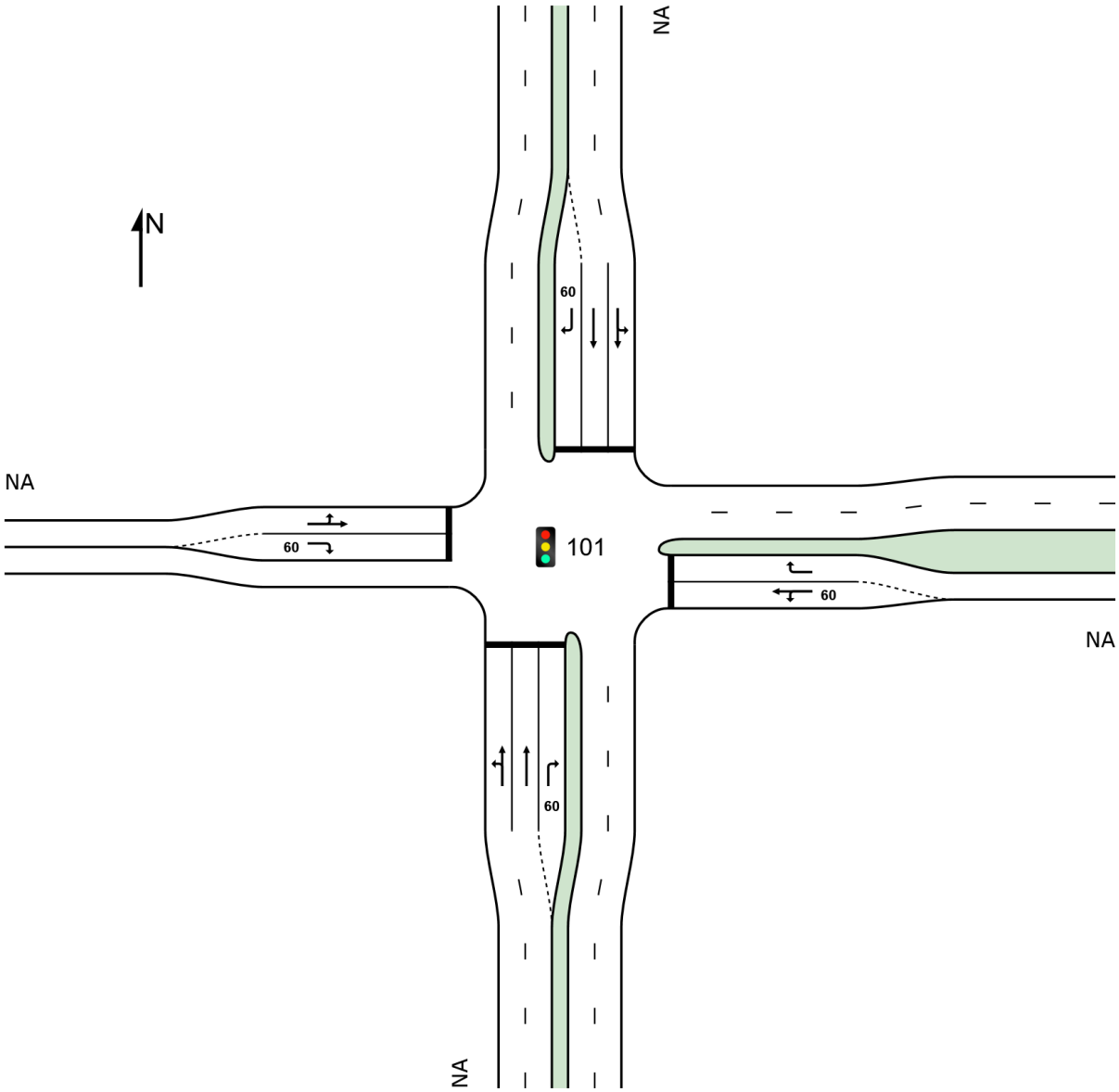


SITE LAYOUT

Site: 101 [Intersection A (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



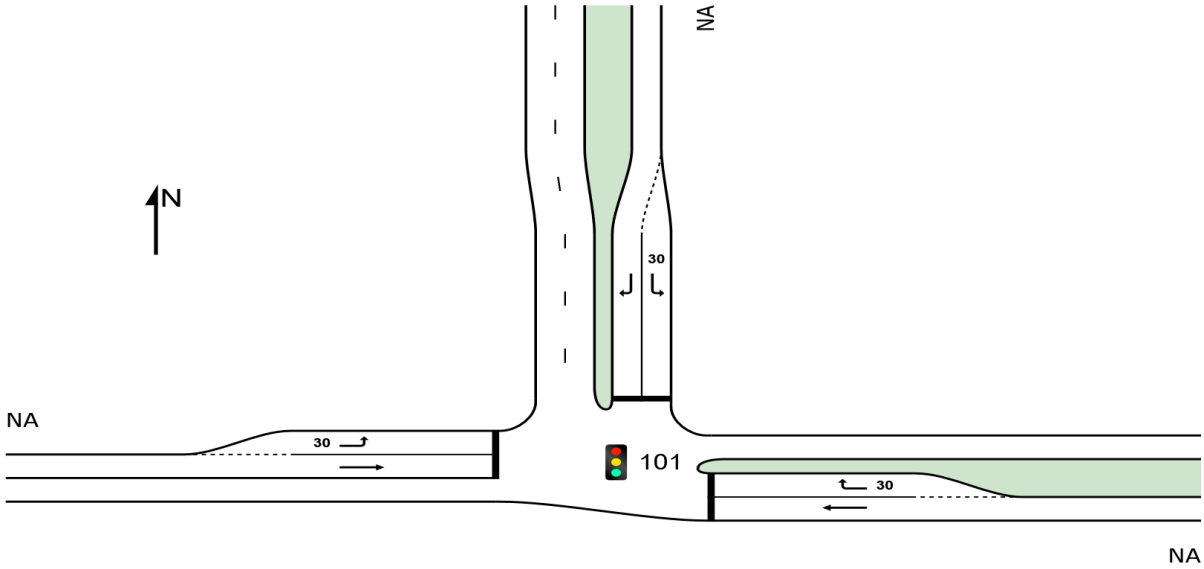
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SITE LAYOUT

Site: 101 [Intersection B (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



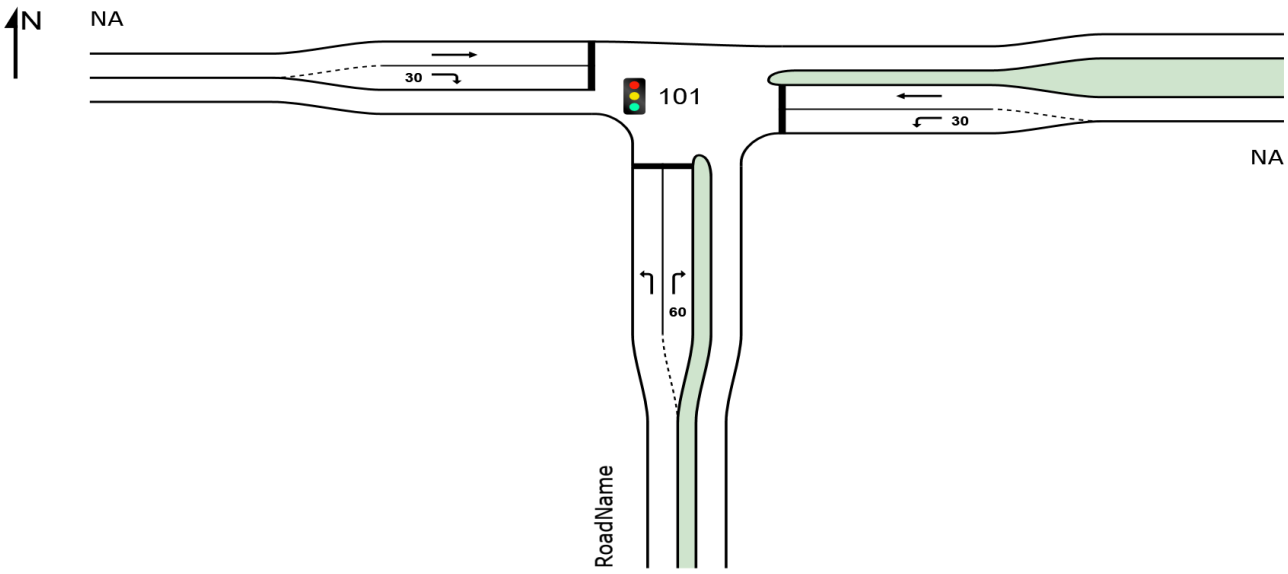
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SITE LAYOUT

Site: 101 [Intersection C (Site Folder: 2066 AM Peak)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Homestead Dr / Glynton Rd (Site Folder: 2031 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	448	0.7	448	0.7	0.324	10.2	LOS B	6.6	46.8	0.36	0.66	0.36	53.3
2	T1	All MCs	835	0.4	835	0.4	* 0.454	20.7	LOS C	14.9	104.5	0.72	0.63	0.72	48.9
3	R2	All MCs	13	0.0	13	0.0	0.125	61.9	LOS E	0.7	4.8	0.98	0.68	0.98	35.2
Approach			1296	0.5	1296	0.5	0.454	17.5	LOS B	14.9	104.5	0.60	0.64	0.60	50.1
East: Glynton Rd															
4	L2	All MCs	4	0.0	4	0.0	0.056	51.5	LOS D	0.4	2.8	0.95	0.65	0.95	36.8
5	T1	All MCs	8	0.0	8	0.0	0.056	57.3	LOS E	0.4	2.8	0.96	0.64	0.96	31.4
6	R2	All MCs	1	0.0	1	0.0	0.056	61.1	LOS E	0.3	2.2	0.97	0.64	0.97	30.7
Approach			14	0.0	14	0.0	0.056	55.8	LOS E	0.4	2.8	0.96	0.64	0.96	33.3
North: Teviot Rd															
7	L2	All MCs	1	0.0	1	0.0	* 0.109	11.1	LOS B	2.9	20.4	0.49	0.41	0.49	47.2
8	T1	All MCs	236	1.8	236	1.8	0.109	12.9	LOS B	2.9	20.5	0.49	0.41	0.49	52.6
9	R2	All MCs	557	4.3	557	4.3	* 1.063	138.2	LOS F	24.7	179.5	1.00	1.33	1.94	18.3
Approach			794	3.6	794	3.6	1.063	100.8	LOS F	24.7	179.5	0.85	1.05	1.51	24.5
West: Homestead Dr															
10	L2	All MCs	697	3.8	697	3.8	* 0.757	42.0	LOS D	14.2	102.9	0.98	0.92	1.04	35.6
11	T1	All MCs	13	8.3	13	8.3	0.817	58.3	LOS E	9.6	67.7	1.00	0.95	1.23	29.5
12	R2	All MCs	317	0.7	317	0.7	0.817	63.9	LOS E	9.6	67.7	1.00	0.94	1.23	34.9
Approach			1026	2.9	1026	2.9	0.817	49.0	LOS D	14.2	102.9	0.99	0.92	1.10	34.6
All Vehicles			3129	2.1	3129	2.1	1.063	49.1	LOS D	24.7	179.5	0.79	0.84	0.99	36.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2031 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	395	9.1	395	9.1	0.214	12.0	LOS B	4.3	32.4	0.59	0.50	0.59	50.2
3	R2	All MCs	8	25.0	8	25.0	* 0.053	42.6	LOS D	0.3	2.6	0.93	0.67	0.93	34.3
Approach			403	9.4	403	9.4	0.214	12.6	LOS B	4.3	32.4	0.60	0.50	0.60	49.7
East: Riverbend Access North															
4	L2	All MCs	76	2.8	76	2.8	0.055	6.7	LOS A	0.4	2.6	0.21	0.60	0.21	52.4
6	R2	All MCs	931	0.2	931	0.2	* 0.766	34.2	LOS C	17.3	121.3	0.95	0.89	1.03	38.0
Approach			1006	0.4	1006	0.4	0.766	32.2	LOS C	17.3	121.3	0.89	0.87	0.97	38.4
North: Teviot Rd															
7	L2	All MCs	341	0.6	341	0.6	0.215	6.2	LOS A	1.3	9.1	0.19	0.61	0.19	52.5
8	T1	All MCs	171	3.7	171	3.7	* 0.194	20.8	LOS C	3.4	24.5	0.75	0.59	0.75	44.8
Approach			512	1.6	512	1.6	0.215	11.1	LOS B	3.4	24.5	0.38	0.60	0.38	49.7
All Vehicles			1921	2.6	1921	2.6	0.766	22.4	LOS C	17.3	121.3	0.70	0.72	0.73	43.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Homestead Dr / Glynton Rd (Site Folder: 2031 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	300	0.4	300	0.4	0.229	11.3	LOS B	4.8	33.8	0.37	0.66	0.37	52.8
2	T1	All MCs	256	0.4	256	0.4	0.190	26.9	LOS C	4.8	33.5	0.74	0.60	0.74	46.4
3	R2	All MCs	4	0.0	4	0.0	* 0.042	60.9	LOS E	0.2	1.6	0.97	0.64	0.97	35.4
Approach			560	0.4	560	0.4	0.229	18.8	LOS B	4.8	33.8	0.54	0.63	0.54	49.5
East: Glynton Rd															
4	L2	All MCs	28	0.0	28	0.0	0.191	52.2	LOS D	1.9	13.0	0.94	0.72	0.94	37.0
5	T1	All MCs	24	0.0	24	0.0	0.191	58.1	LOS E	1.9	13.0	0.97	0.70	0.97	31.2
6	R2	All MCs	4	0.0	4	0.0	0.191	62.3	LOS E	1.1	7.7	0.99	0.69	0.99	30.3
Approach			57	0.0	57	0.0	0.191	55.5	LOS E	1.9	13.0	0.96	0.71	0.96	34.4
North: Teviot Rd															
7	L2	All MCs	2	0.0	2	0.0	* 0.499	17.0	LOS B	16.8	118.1	0.74	0.66	0.74	41.0
8	T1	All MCs	917	0.2	917	0.2	* 0.499	23.6	LOS C	16.8	118.1	0.74	0.66	0.74	47.7
9	R2	All MCs	784	2.1	784	2.1	1.179	230.3	LOS F	45.3	323.0	1.00	1.60	2.47	12.6
Approach			1703	1.1	1703	1.1	1.179	118.8	LOS F	45.3	323.0	0.86	1.09	1.54	23.6
West: Homestead Dr															
10	L2	All MCs	648	3.1	648	3.1	* 0.467	22.8	LOS C	9.8	70.8	0.80	0.80	0.80	42.3
11	T1	All MCs	6	0.0	6	0.0	0.594	43.8	LOS D	10.9	76.8	0.96	0.82	0.96	33.3
12	R2	All MCs	434	0.5	434	0.5	0.594	49.4	LOS D	10.9	76.8	0.96	0.82	0.96	38.4
Approach			1088	2.0	1088	2.0	0.594	33.5	LOS C	10.9	76.8	0.86	0.81	0.86	40.2
All Vehicles			3408	1.3	3408	1.3	1.179	74.1	LOS E	45.3	323.0	0.81	0.92	1.15	30.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2031 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	217	1.0	217	1.0	0.086	5.5	LOS A	1.5	10.9	0.39	0.32	0.39	55.1
3	R2	All MCs	98	2.2	98	2.2	* 0.535	44.9	LOS D	3.9	27.6	0.99	0.78	1.00	33.8
Approach			315	1.3	315	1.3	0.535	17.8	LOS B	3.9	27.6	0.58	0.46	0.58	46.1
East: Riverbend Access North															
4	L2	All MCs	34	6.3	34	6.3	0.030	7.6	LOS A	0.2	1.6	0.25	0.60	0.25	51.8
6	R2	All MCs	349	0.6	349	0.6	* 0.472	37.0	LOS D	6.2	43.7	0.93	0.80	0.93	36.6
Approach			383	1.1	383	1.1	0.472	34.4	LOS C	6.2	43.7	0.87	0.78	0.87	37.5
North: Teviot Rd															
7	L2	All MCs	743	0.3	743	0.3	0.489	7.1	LOS A	5.7	40.0	0.32	0.65	0.32	51.9
8	T1	All MCs	401	1.0	401	1.0	* 0.306	13.6	LOS B	6.7	47.6	0.63	0.53	0.63	49.2
Approach			1144	0.6	1144	0.6	0.489	9.4	LOS A	6.7	47.6	0.43	0.61	0.43	50.9
All Vehicles			1842	0.8	1842	0.8	0.535	16.0	LOS B	6.7	47.6	0.55	0.62	0.55	46.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Homestead Dr / Glynton Rd (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	612	0.5	612	0.5	0.470	24.3	LOS C	11.1	78.3	0.48	0.75	0.48	51.5
2	T1	All MCs	2023	2.0	2023	2.0	* 1.169	212.6	LOS F	121.0	862.0	1.00	2.04	2.32	18.9
3	R2	All MCs	3	0.0	3	0.0	0.031	76.9	LOS E	0.2	1.2	0.97	0.63	0.97	35.4
Approach			2638	1.7	2638	1.7	1.169	168.8	LOS F	121.0	862.0	0.88	1.74	1.89	21.1
East: Glynton Rd															
4	L2	All MCs	5	0.0	5	0.0	0.947	69.0	LOS E	6.8	47.7	1.00	1.06	1.64	32.2
5	T1	All MCs	160	0.0	160	0.0	0.947	77.3	LOS E	6.8	47.7	1.00	1.05	1.64	26.7
6	R2	All MCs	36	0.0	36	0.0	0.947	80.5	LOS F	6.5	45.6	1.00	1.04	1.64	26.2
Approach			201	0.0	201	0.0	0.947	77.6	LOS E	6.8	47.7	1.00	1.05	1.64	26.8
North: Teviot Rd															
7	L2	All MCs	20	0.0	20	0.0	* 0.439	12.4	LOS B	14.0	104.5	0.62	0.57	0.62	45.3
8	T1	All MCs	898	8.1	898	8.1	0.439	16.1	LOS B	14.1	105.4	0.62	0.56	0.62	51.1
9	R2	All MCs	559	5.3	559	5.3	* 1.073	146.9	LOS F	25.5	186.5	1.00	1.35	1.99	17.6
Approach			1477	6.9	1477	6.9	1.073	65.5	LOS E	25.5	186.5	0.77	0.86	1.14	32.8
West: Homestead Dr															
10	L2	All MCs	362	4.4	362	4.4	0.395	30.8	LOS C	6.6	47.9	0.87	0.78	0.87	38.7
11	T1	All MCs	23	0.0	23	0.0	* 0.974	81.9	LOS F	13.9	98.5	1.00	1.17	1.62	24.9
12	R2	All MCs	369	1.1	369	1.1	0.974	87.6	LOS F	13.9	98.5	1.00	1.16	1.62	30.3
Approach			755	2.6	755	2.6	0.974	60.1	LOS E	13.9	98.5	0.94	0.98	1.26	32.9
All Vehicles			5071	3.3	5071	3.3	1.169	118.9	LOS F	121.0	862.0	0.86	1.35	1.57	24.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	1463	2.8	1463	2.8	* 0.764	18.3	LOS B	23.7	170.1	0.87	0.80	0.89	46.2
3	R2	All MCs	58	3.6	58	3.6	0.320	43.8	LOS D	2.2	16.1	0.97	0.75	0.97	34.2
Approach			1521	2.8	1521	2.8	0.764	19.3	LOS B	23.7	170.1	0.88	0.80	0.90	45.6
East: Riverbend Access North															
4	L2	All MCs	69	3.0	69	3.0	0.062	13.4	LOS B	0.8	6.1	0.39	0.64	0.39	50.1
6	R2	All MCs	1168	0.2	1168	0.2	* 1.130	178.9	LOS F	54.2	380.1	1.00	1.70	2.61	15.7
Approach			1238	0.3	1238	0.3	1.130	169.6	LOS F	54.2	380.1	0.97	1.64	2.49	15.8
North: Teviot Rd															
7	L2	All MCs	426	0.7	426	0.7	0.276	6.5	LOS A	2.3	16.1	0.24	0.62	0.24	52.3
8	T1	All MCs	851	8.7	851	8.7	0.709	26.6	LOS C	15.1	113.3	0.94	0.83	0.96	41.8
Approach			1277	6.0	1277	6.0	0.709	19.9	LOS B	15.1	113.3	0.70	0.76	0.72	44.8
All Vehicles			4036	3.1	4036	3.1	1.130	65.6	LOS E	54.2	380.1	0.85	1.05	1.33	28.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access Centre (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	1001	3.3	1001	3.3	0.519	11.8	LOS B	13.4	96.4	0.68	0.61	0.68	49.6
3	R2	All MCs	397	1.3	397	1.3	* 0.519	28.3	LOS C	12.7	91.4	0.82	0.79	0.82	41.1
Approach			1398	2.7	1398	2.7	0.519	16.5	LOS B	13.4	96.4	0.72	0.66	0.72	46.9
East: Riverbend Access Centre															
4	L2	All MCs	329	1.3	329	1.3	0.227	7.2	LOS A	2.5	17.6	0.28	0.63	0.28	51.9
6	R2	All MCs	520	1.8	520	1.8	* 0.516	32.5	LOS C	8.7	62.2	0.90	0.81	0.90	38.3
Approach			849	1.6	849	1.6	0.516	22.7	LOS C	8.7	62.2	0.66	0.74	0.66	42.6
North: Teviot Rd															
7	L2	All MCs	618	7.3	618	7.3	0.539	10.1	LOS B	10.6	78.9	0.57	0.74	0.57	49.6
8	T1	All MCs	295	9.3	295	9.3	* 0.583	36.7	LOS D	5.7	42.9	0.98	0.79	1.00	37.5
Approach			913	8.0	913	8.0	0.583	18.7	LOS B	10.6	78.9	0.70	0.76	0.71	45.0
All Vehicles			3160	3.9	3160	3.9	0.583	18.8	LOS B	13.4	96.4	0.70	0.71	0.70	45.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Bushman Dr / Riverbend Access South (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	46	2.3	46	2.3	* 1.097	133.1	LOS F	50.8	363.6	1.00	1.85	2.36	18.1
2	T1	All MCs	1164	2.7	1164	2.7	1.097	140.5	LOS F	50.8	363.6	1.00	1.85	2.36	18.3
3	R2	All MCs	333	0.6	333	0.6	0.758	42.2	LOS D	13.1	91.9	0.99	0.89	1.10	35.7
Approach			1543	2.3	1543	2.3	1.097	119.0	LOS F	50.8	363.6	1.00	1.64	2.09	20.3
East: Riverbend Access South															
4	L2	All MCs	582	3.1	582	3.1	0.446	10.5	LOS B	7.2	51.5	0.44	0.75	0.44	50.7
5	T1	All MCs	414	0.5	414	0.5	* 1.022	89.6	LOS F	27.4	192.3	1.00	1.49	1.93	24.7
6	R2	All MCs	16	6.7	16	6.7	0.119	46.5	LOS D	0.6	4.5	0.96	0.69	0.96	33.6
Approach			1012	2.1	1012	2.1	1.022	43.4	LOS D	27.4	192.3	0.68	1.05	1.06	34.6
North: Teviot Rd															
7	L2	All MCs	19	5.6	19	5.6	0.690	30.8	LOS C	8.3	61.3	0.99	0.86	1.07	36.5
8	T1	All MCs	404	6.0	404	6.0	0.690	36.7	LOS D	8.3	61.3	0.99	0.86	1.07	37.6
9	R2	All MCs	208	3.0	208	3.0	* 1.019	92.5	LOS F	13.2	94.6	1.00	1.32	2.05	23.5
Approach			632	5.0	632	5.0	1.019	54.9	LOS D	13.2	94.6	1.00	1.01	1.40	31.3
West: Bushman Dr															
10	L2	All MCs	220	2.9	220	2.9	0.293	22.5	LOS C	5.8	41.3	0.71	0.76	0.71	42.4
11	T1	All MCs	276	1.1	276	1.1	0.633	31.0	LOS C	10.0	70.7	0.96	0.80	0.96	39.8
12	R2	All MCs	52	2.0	52	2.0	0.376	46.5	LOS D	2.1	14.7	0.99	0.74	0.99	33.3
Approach			547	1.9	547	1.9	0.633	29.1	LOS C	10.0	70.7	0.86	0.78	0.86	40.1
All Vehicles			3734	2.6	3734	2.6	1.097	74.5	LOS E	50.8	363.6	0.89	1.25	1.51	26.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Homestead Dr / Glynton Rd (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	329	1.3	329	1.3	0.236	8.9	LOS A	4.1	29.2	0.31	0.64	0.31	53.7
2	T1	All MCs	1166	4.5	1166	4.5	0.651	23.6	LOS C	23.7	172.0	0.82	0.74	0.82	47.7
3	R2	All MCs	13	0.0	13	0.0	*0.125	61.9	LOS E	0.7	4.8	0.98	0.68	0.98	35.2
Approach			1508	3.8	1508	3.8	0.651	20.7	LOS C	23.7	172.0	0.71	0.71	0.71	48.7
East: Glynton Rd															
4	L2	All MCs	2	0.0	2	0.0	0.320	50.4	LOS D	1.9	13.3	0.99	0.72	0.99	36.3
5	T1	All MCs	39	0.0	39	0.0	0.320	57.8	LOS E	1.9	13.3	0.99	0.72	0.99	30.9
6	R2	All MCs	26	0.0	26	0.0	0.320	63.2	LOS E	1.8	12.7	1.00	0.72	1.00	29.3
Approach			67	0.0	67	0.0	0.320	59.7	LOS E	1.9	13.3	0.99	0.72	0.99	30.5
North: Teviot Rd															
7	L2	All MCs	102	0.0	102	0.0	*0.991	55.8	LOS E	80.8	571.8	1.00	1.28	1.36	28.2
8	T1	All MCs	2055	1.5	2055	1.5	*0.991	65.8	LOS E	80.8	572.8	1.00	1.27	1.36	35.0
9	R2	All MCs	416	3.8	416	3.8	0.790	60.0	LOS E	11.7	84.6	1.00	0.92	1.16	29.9
Approach			2573	1.8	2573	1.8	0.991	64.4	LOS E	80.8	572.8	1.00	1.22	1.33	34.1
West: Homestead Dr															
10	L2	All MCs	551	3.1	551	3.1	0.595	32.4	LOS C	10.7	76.7	0.93	0.82	0.93	38.0
11	T1	All MCs	169	0.0	169	0.0	*1.911	891.4	LOS F	88.7	622.7	1.00	2.84	4.95	3.9
12	R2	All MCs	611	0.5	611	0.5	1.911	897.1	LOS F	88.7	622.7	1.00	2.76	4.95	5.6
Approach			1331	1.5	1331	1.5	1.911	538.6	LOS F	88.7	622.7	0.97	1.97	3.29	7.3
All Vehicles			5479	2.2	5479	2.2	1.911	167.5	LOS F	88.7	622.7	0.91	1.25	1.63	20.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access North (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	1074	4.6	1074	4.6	0.567	15.0	LOS B	14.6	106.5	0.75	0.66	0.75	48.2
3	R2	All MCs	104	2.0	104	2.0	* 0.569	45.2	LOS D	4.2	29.6	1.00	0.79	1.03	33.7
Approach			1178	4.4	1178	4.4	0.569	17.7	LOS B	14.6	106.5	0.77	0.68	0.77	46.4
East: Riverbend Access North															
4	L2	All MCs	29	7.1	29	7.1	0.028	12.1	LOS B	0.5	3.4	0.46	0.62	0.46	48.4
6	R2	All MCs	436	1.9	436	1.9	* 0.340	26.4	LOS C	6.3	45.0	0.78	0.77	0.78	40.8
Approach			465	2.3	465	2.3	0.340	25.5	LOS C	6.3	45.0	0.76	0.76	0.76	41.2
North: Teviot Rd															
7	L2	All MCs	783	0.4	783	0.4	0.518	20.6	LOS C	6.0	42.4	0.34	0.68	0.34	51.8
8	T1	All MCs	1662	1.8	1662	1.8	* 1.418	420.0	LOS F	134.9	958.8	1.00	3.29	4.41	7.7
Approach			2445	1.3	2445	1.3	1.418	292.1	LOS F	134.9	958.8	0.79	2.45	3.11	10.4
All Vehicles			4088	2.3	4088	2.3	1.418	182.7	LOS F	134.9	958.8	0.78	1.75	2.17	15.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Riverbend Access Centre (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
2	T1	All MCs	573	5.5	573	5.5	0.337	10.6	LOS B	7.5	54.7	0.61	0.54	0.61	49.9
3	R2	All MCs	289	1.5	289	1.5	* 0.337	27.4	LOS C	7.0	51.2	0.75	0.74	0.75	42.0
Approach			862	4.2	862	4.2	0.337	16.2	LOS B	7.5	54.7	0.66	0.61	0.66	46.9
East: Riverbend Access Centre															
4	L2	All MCs	392	1.6	392	1.6	0.276	7.6	LOS A	3.5	24.5	0.31	0.63	0.31	51.5
6	R2	All MCs	606	3.0	606	3.0	* 0.606	33.4	LOS C	10.5	75.5	0.92	0.83	0.92	37.9
Approach			998	2.4	998	2.4	0.606	23.3	LOS C	10.5	75.5	0.68	0.75	0.68	42.3
North: Teviot Rd															
7	L2	All MCs	618	7.3	618	7.3	0.501	8.2	LOS A	7.5	56.1	0.44	0.70	0.44	50.9
8	T1	All MCs	788	2.1	788	2.1	* 1.491	485.7	LOS F	64.6	460.5	1.00	2.75	4.82	6.7
Approach			1406	4.4	1406	4.4	1.491	275.9	LOS F	64.6	460.5	0.76	1.85	2.90	10.9
All Vehicles			3266	3.7	3266	3.7	1.491	130.2	LOS F	64.6	460.5	0.71	1.19	1.63	19.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Teviot Rd / Bushman Dr / Riverbend Access South (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Phase Times)

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: Teviot Rd															
1	L2	All MCs	63	1.7	63	1.7	0.640	23.3	LOS C	12.1	88.0	0.92	0.80	0.92	40.1
2	T1	All MCs	637	4.8	637	4.8	0.640	27.9	LOS C	12.1	88.0	0.93	0.80	0.93	41.4
3	R2	All MCs	458	0.2	458	0.2	* 1.040	104.1	LOS F	32.0	224.7	1.00	1.38	2.02	21.9
Approach			1158	2.8	1158	2.8	1.040	57.8	LOS E	32.0	224.7	0.96	1.03	1.36	30.6
East: Riverbend Access South															
4	L2	All MCs	531	1.0	531	1.0	0.435	10.7	LOS B	8.3	58.4	0.51	0.70	0.51	49.4
5	T1	All MCs	256	0.8	256	0.8	0.586	30.6	LOS C	9.1	64.5	0.95	0.79	0.95	40.0
6	R2	All MCs	20	5.3	20	5.3	0.149	45.4	LOS D	0.8	5.7	0.97	0.70	0.97	33.6
Approach			806	1.0	806	1.0	0.586	17.9	LOS B	9.1	64.5	0.66	0.73	0.66	45.5
North: Teviot Rd															
7	L2	All MCs	24	4.3	24	4.3	* 1.523	507.0	LOS F	81.0	576.2	1.00	2.98	4.96	6.3
8	T1	All MCs	932	1.8	932	1.8	1.523	518.4	LOS F	81.0	576.2	1.00	2.98	4.96	6.4
9	R2	All MCs	211	2.0	211	2.0	1.022	103.6	LOS F	13.4	95.6	1.00	1.32	2.06	23.3
Approach			1166	1.9	1166	1.9	1.523	443.3	LOS F	81.0	576.2	1.00	2.68	4.44	7.3
West: Bushman Dr															
10	L2	All MCs	195	2.2	195	2.2	0.258	22.2	LOS C	5.0	35.7	0.70	0.75	0.70	42.6
11	T1	All MCs	319	0.7	319	0.7	* 0.730	33.3	LOS C	12.3	86.5	0.98	0.88	1.06	38.9
12	R2	All MCs	64	4.9	64	4.9	0.477	47.0	LOS D	2.6	19.0	1.00	0.75	1.00	33.1
Approach			578	1.6	578	1.6	0.730	31.1	LOS C	12.3	86.5	0.89	0.82	0.93	39.3
All Vehicles			3708	2.0	3708	2.0	1.523	166.2	LOS F	81.0	576.2	0.89	1.45	2.11	16.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Intersection A (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site User-Given Phase Times)

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: NA															
1	L2	All MCs	86	0.0	86	0.0	*0.762	15.5	LOS B	10.3	71.9	0.97	0.94	1.13	42.9
2	T1	All MCs	755	0.1	755	0.1	*0.762	21.9	LOS C	10.5	73.4	0.97	0.93	1.13	44.5
3	R2	All MCs	16	0.0	16	0.0	0.142	32.3	LOS C	0.4	2.8	0.97	0.68	0.97	38.2
Approach			857	0.1	857	0.1	0.762	21.5	LOS C	10.5	73.4	0.97	0.93	1.13	44.2
East: NA															
4	L2	All MCs	44	0.0	44	0.0	0.291	16.1	LOS B	1.0	7.1	0.94	0.72	0.94	45.0
5	T1	All MCs	16	6.7	16	6.7	0.291	22.0	LOS C	1.0	7.1	0.94	0.72	0.94	46.5
6	R2	All MCs	86	0.0	86	0.0	*0.775	35.9	LOS D	2.5	17.3	1.00	0.90	1.46	36.9
Approach			146	0.7	146	0.7	0.775	28.5	LOS C	2.5	17.3	0.98	0.83	1.25	40.0
North: NA															
7	L2	All MCs	9	0.0	9	0.0	0.221	12.2	LOS B	2.7	19.2	0.67	0.56	0.67	49.4
8	T1	All MCs	335	0.3	335	0.3	0.221	10.6	LOS B	2.8	19.7	0.68	0.56	0.68	51.1
9	R2	All MCs	179	5.3	179	5.3	*0.833	35.1	LOS D	5.2	37.7	1.00	1.00	1.49	37.0
Approach			523	2.0	523	2.0	0.833	19.0	LOS B	5.2	37.7	0.79	0.71	0.96	45.2
West: NA															
10	L2	All MCs	247	1.7	247	1.7	0.396	18.6	LOS B	4.7	33.6	0.79	0.78	0.79	44.4
11	T1	All MCs	4	0.0	4	0.0	0.396	24.7	LOS C	4.7	33.6	0.79	0.78	0.79	45.9
12	R2	All MCs	27	0.0	27	0.0	0.123	28.2	LOS C	0.6	4.5	0.92	0.70	0.92	40.0
Approach			279	1.5	279	1.5	0.396	19.7	LOS B	4.7	33.6	0.80	0.77	0.80	43.9
All Vehicles			1805	0.9	1805	0.9	0.833	21.1	LOS C	10.5	73.4	0.89	0.83	1.04	44.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Intersection B (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 52 seconds (Site User-Given Phase Times)

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
East: NA															
5	T1	All MCs	475	0.0	475	0.0	0.384	5.0	LOS A	5.8	40.9	0.52	0.45	0.52	55.5
6	R2	All MCs	203	0.5	203	0.5	* 0.277	11.5	LOS B	2.2	15.5	0.69	0.74	0.69	48.7
Approach			678	0.2	678	0.2	0.384	6.9	LOS A	5.8	40.9	0.57	0.54	0.57	53.3
North: NA															
7	L2	All MCs	60	0.0	60	0.0	0.062	12.2	LOS B	0.8	5.3	0.52	0.68	0.52	48.2
9	R2	All MCs	72	1.5	72	1.5	* 0.289	28.9	LOS C	1.8	12.4	0.94	0.75	0.94	39.6
Approach			132	0.8	132	0.8	0.289	21.3	LOS C	1.8	12.4	0.75	0.72	0.75	43.1
West: NA															
10	L2	All MCs	192	0.5	192	0.5	0.207	13.4	LOS B	2.7	19.3	0.59	0.72	0.59	47.5
11	T1	All MCs	228	0.0	228	0.0	* 0.469	18.6	LOS B	5.1	35.9	0.90	0.74	0.90	46.0
Approach			420	0.3	420	0.3	0.469	16.2	LOS B	5.1	35.9	0.76	0.73	0.76	46.7
All Vehicles			1229	0.3	1229	0.3	0.469	11.6	LOS B	5.8	40.9	0.65	0.62	0.65	49.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Intersection C (Site Folder: 2066 AM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 52 seconds (Site User-Given Phase Times)

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: RoadName															
1	L2	All MCs	248	1.3	248	1.3	* 1.003	66.8	LOS E	11.1	78.7	1.00	1.39	2.33	28.0
3	R2	All MCs	100	1.1	100	1.1	0.403	29.4	LOS C	2.5	17.6	0.96	0.77	0.96	39.3
Approach			348	1.2	348	1.2	1.003	56.1	LOS E	11.1	78.7	0.99	1.21	1.93	30.5
East: NA															
4	L2	All MCs	127	0.0	127	0.0	0.089	7.1	LOS A	0.8	5.6	0.26	0.64	0.26	51.7
5	T1	All MCs	424	0.2	424	0.2	* 0.420	8.4	LOS A	6.7	47.0	0.66	0.57	0.66	52.7
Approach			552	0.2	552	0.2	0.420	8.1	LOS A	6.7	47.0	0.57	0.58	0.57	52.5
West: NA															
11	T1	All MCs	220	0.5	220	0.5	0.163	3.0	LOS A	1.9	13.6	0.37	0.31	0.37	57.2
12	R2	All MCs	303	2.1	303	2.1	* 0.601	13.4	LOS B	3.9	27.5	0.75	0.80	0.75	47.4
Approach			523	1.4	523	1.4	0.601	9.0	LOS A	3.9	27.5	0.59	0.59	0.59	51.1
All Vehicles			1423	0.9	1423	0.9	1.003	20.2	LOS C	11.1	78.7	0.68	0.74	0.91	44.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Intersection A (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site User-Given Phase Times)

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: NA															
1	L2	All MCs	13	0.0	13	0.0	0.491	16.9	LOS B	3.9	27.4	0.94	0.79	0.94	41.4
2	T1	All MCs	334	0.3	334	0.3	* 0.491	23.2	LOS C	4.0	28.1	0.94	0.78	0.94	43.7
3	R2	All MCs	36	0.0	36	0.0	0.321	33.0	LOS C	0.9	6.6	0.99	0.71	0.99	38.0
Approach			382	0.3	382	0.3	0.491	23.9	LOS C	4.0	28.1	0.95	0.77	0.95	43.0
East: NA															
4	L2	All MCs	89	0.0	89	0.0	0.288	12.1	LOS B	1.9	13.2	0.83	0.72	0.83	48.0
5	T1	All MCs	52	2.0	52	2.0	0.288	13.7	LOS B	1.9	13.2	0.83	0.72	0.83	49.7
6	R2	All MCs	20	0.0	20	0.0	0.179	32.5	LOS C	0.5	3.6	0.98	0.69	0.98	38.3
Approach			161	0.7	161	0.7	0.288	15.1	LOS B	1.9	13.2	0.85	0.72	0.85	47.0
North: NA															
7	L2	All MCs	33	0.0	33	0.0	* 0.604	16.4	LOS B	7.5	52.6	0.90	0.81	0.90	43.1
8	T1	All MCs	676	0.2	676	0.2	0.604	19.2	LOS B	7.6	53.6	0.91	0.79	0.91	45.8
9	R2	All MCs	154	3.4	154	3.4	* 0.706	31.8	LOS C	4.1	29.5	1.00	0.88	1.22	38.3
Approach			862	0.7	862	0.7	0.706	21.3	LOS C	7.6	53.6	0.92	0.81	0.96	44.2
West: NA															
10	L2	All MCs	123	6.0	123	6.0	0.281	11.6	LOS B	1.9	14.0	0.79	0.73	0.79	48.0
11	T1	All MCs	32	3.3	32	3.3	* 0.281	15.6	LOS B	1.9	14.0	0.79	0.73	0.79	49.9
12	R2	All MCs	26	0.0	26	0.0	0.236	32.7	LOS C	0.7	4.8	0.98	0.70	0.98	38.1
Approach			181	4.7	181	4.7	0.281	15.4	LOS B	1.9	14.0	0.81	0.72	0.81	46.5
All Vehicles			1586	1.1	1586	1.1	0.706	20.6	LOS C	7.6	53.6	0.91	0.78	0.93	44.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

MOVEMENT SUMMARY

Site: 101 [Intersection B (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 52 seconds (Site User-Given Phase Times)

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
East: NA															
5	T1	All MCs	151	0.0	151	0.0	0.134	5.4	LOS A	1.8	12.3	0.48	0.39	0.48	55.1
6	R2	All MCs	47	0.0	47	0.0	* 0.098	13.8	LOS B	0.7	4.7	0.68	0.68	0.68	47.3
Approach			198	0.0	198	0.0	0.134	7.4	LOS A	1.8	12.3	0.53	0.46	0.53	53.0
North: NA															
7	L2	All MCs	225	0.5	225	0.5	0.288	16.3	LOS B	3.8	26.9	0.70	0.75	0.70	45.7
9	R2	All MCs	157	0.7	157	0.7	* 0.339	23.5	LOS C	3.4	23.9	0.86	0.77	0.86	42.0
Approach			382	0.6	382	0.6	0.339	19.3	LOS B	3.8	26.9	0.76	0.76	0.76	44.1
West: NA															
10	L2	All MCs	79	1.3	79	1.3	0.056	7.1	LOS A	0.5	3.4	0.25	0.63	0.25	51.7
11	T1	All MCs	302	0.3	302	0.3	* 0.384	12.0	LOS B	5.5	38.8	0.75	0.63	0.75	50.1
Approach			381	0.6	381	0.6	0.384	11.0	LOS B	5.5	38.8	0.65	0.63	0.65	50.5
All Vehicles			961	0.4	961	0.4	0.384	13.6	LOS B	5.5	38.8	0.67	0.65	0.67	48.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

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MOVEMENT SUMMARY

Site: 101 [Intersection C (Site Folder: 2066 PM Peak)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 52 seconds (Site User-Given Phase Times)

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: RoadName															
1	L2	All MCs	305	1.4	305	1.4	* 0.785	30.7	LOS C	8.5	59.9	1.00	0.94	1.25	38.7
3	R2	All MCs	71	1.5	71	1.5	0.181	24.4	LOS C	1.5	10.8	0.86	0.74	0.86	41.5
Approach			376	1.4	376	1.4	0.785	29.5	LOS C	8.5	59.9	0.97	0.90	1.17	39.2
East: NA															
4	L2	All MCs	105	0.0	105	0.0	0.095	10.4	LOS B	1.1	8.0	0.45	0.68	0.45	49.4
5	T1	All MCs	207	0.5	207	0.5	* 0.396	17.4	LOS B	4.5	31.4	0.86	0.71	0.86	46.7
Approach			313	0.3	313	0.3	0.396	15.0	LOS B	4.5	31.4	0.72	0.70	0.72	47.6
West: NA															
11	T1	All MCs	302	0.3	302	0.3	0.278	6.5	LOS A	4.0	28.4	0.56	0.47	0.56	54.2
12	R2	All MCs	406	0.8	406	0.8	* 0.680	15.5	LOS B	6.6	46.5	0.89	0.84	0.94	46.2
Approach			708	0.6	708	0.6	0.680	11.7	LOS B	6.6	46.5	0.75	0.68	0.78	49.3
All Vehicles			1397	0.8	1397	0.8	0.785	17.2	LOS B	8.5	59.9	0.80	0.75	0.87	45.8

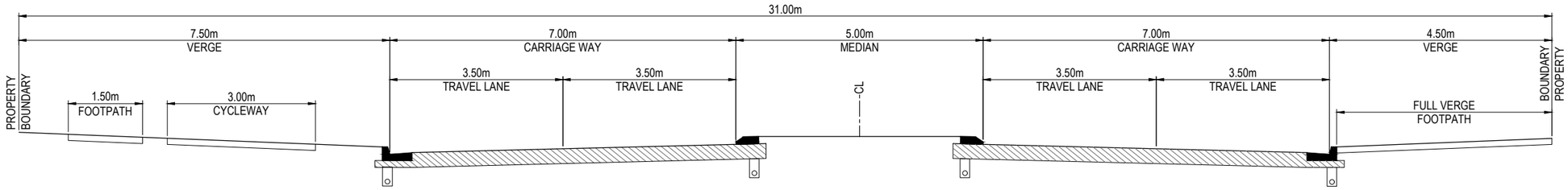
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

SIDRA INTERSECTION 9.1 | Copyright © 2000-2024 Akcelik and Associates Pty Ltd | sidrasolutions.com

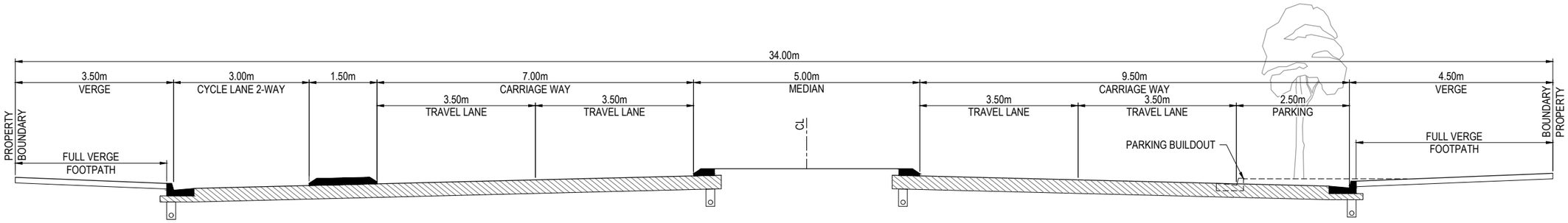
APPENDIX 5 CALIBRE ROAD HIERARCHY CROSS SECTION

AP05



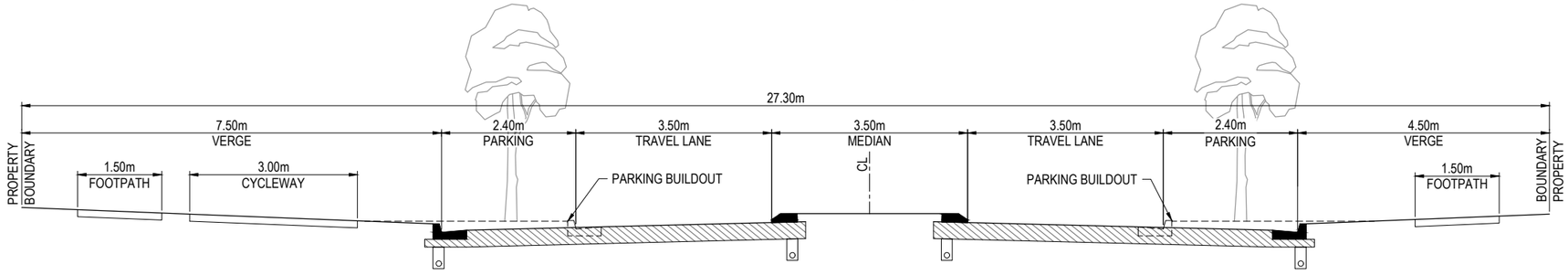
TYPE 1, CENTRE CONNECTOR

SCALE 1:50 (A1)
SCALE 1:100 (A3)



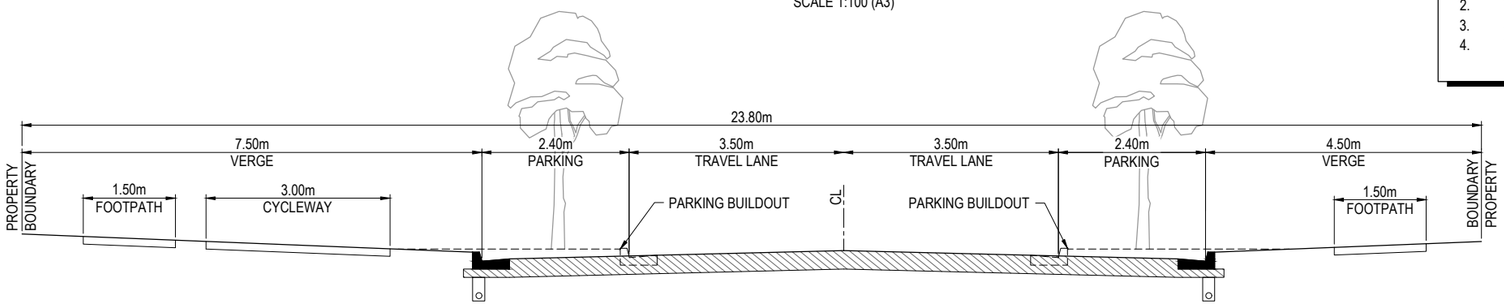
TYPE 2, CENTRE CONNECTOR

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 3, TRUNK CONNECTOR (PARKING) (7,500 - 9,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 4, TRUNK CONNECTOR (PARKING) (7,500 - 9,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)

NOTES:

1. TYPICAL CROSS SECTIONS PRESENT THE MINIMUM WIDTHS IDENTIFIED.
2. WITHIN THE OVERALL ROAD RESERVE, VERGES MAY VARY.
3. SUBJECT TO URBAN DESIGN, ROADS MAY HAVE WIDER VERGES OR PARKING LANES ADDED.
4. WIDTH OF MEDIAN TO INCREASE FROM 3.5m TO 5.5m AT SIGNALISED INTERSECTIONS TO ACCOMMODATE TURNING LANE AND SHELTER SIGNAL PEDESTALS OR LIGHTING POLE.

DRAFT
07.09.17

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REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	02.03.17	ORIGINAL ISSUE ON NEW PROJECT NUMBER	BF	AM
2	07.09.17	TYPICAL SECTIONS AMENDED AS PER EDQ DISCUSSION	LS	AM
3				
4				
5				
6				
7				
8				

DRAWN
DESIGN

STATUS: **NOT FOR CONSTRUCTION**
APPROVED

SCALE
1:50 1 0.5 0 1 2 A1
1:100 A3

CLIENT: Riverside CELESTINO

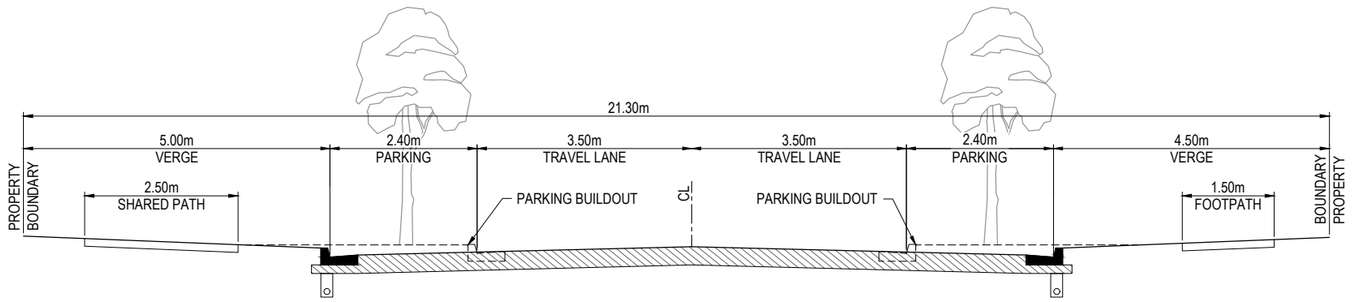
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PROJECT
RIVERSIDE CELESTINO JIMBOOMBA

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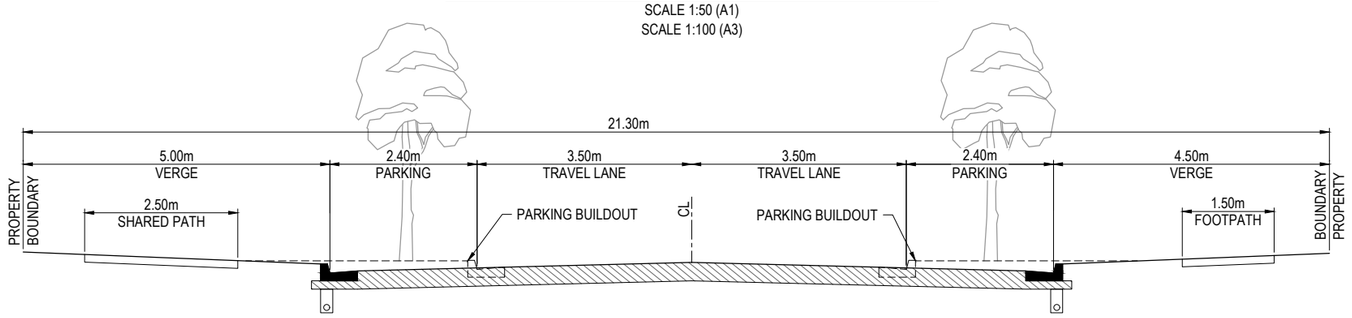
DRAWING TITLE
INTERNAL ROADS TYPICAL CROSS SECTIONS SHEET 1 OF 4

PROJECT No.	DRAWING No.	REVISION
16-003350	SK03	2



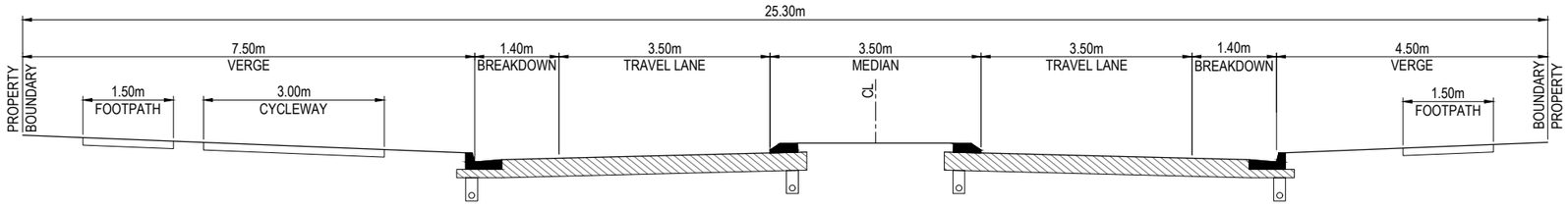
TYPE 5, TRUNK CONNECTOR (PARKING) (7,500 - 9,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



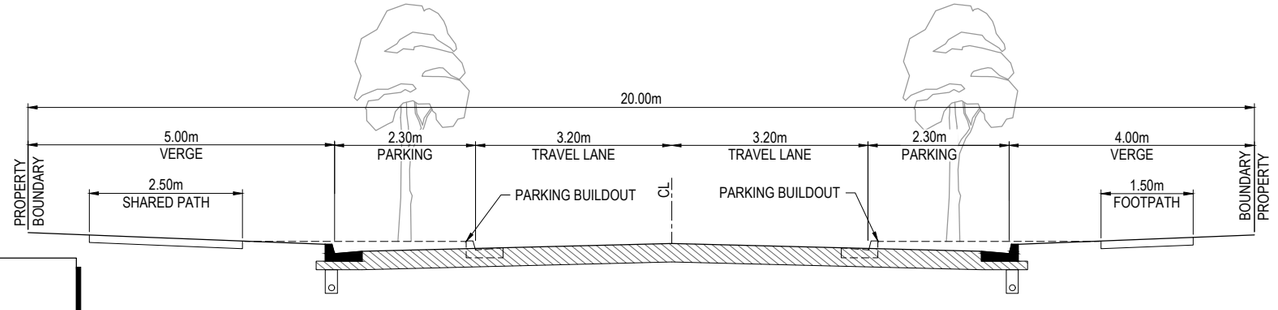
TYPE 6, TRUNK CONNECTOR (PARKING) (7,500 - 9,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 7, TRUNK CONNECTOR (NO PARKING) (7,500 - 14,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 8, NEIGHBOURHOOD CONNECTOR - MAJOR (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)

NOTES:

1. TYPICAL CROSS SECTIONS PRESENT THE MINIMUM WIDTHS IDENTIFIED.
2. WITHIN THE OVERALL ROAD RESERVE, VERGES MAY VARY.
3. SUBJECT TO URBAN DESIGN, ROADS MAY HAVE WIDER VERGES OR PARKING LANES ADDED.
4. WIDTH OF MEDIAN TO INCREASE FROM 3.5m TO 5.5m AT SIGNALISED INTERSECTIONS TO ACCOMMODATE TURNING LANE AND SHELTER SIGNAL PEDESTALS OR LIGHTING POLE.

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19.09.17

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REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	02.03.17	ORIGINAL ISSUE ON NEW PROJECT NUMBER	BF	AM
2	07.09.17	TYPICAL SECTIONS AMENDED AS PER EDQ DISCUSSION	LS	AM
3	19.09.17	TYPE 5 SHARED PATH AMENDED	AG	AG
4				
5				
6				
7				
8				

DRAWN
DESIGN

STATUS
NOT FOR CONSTRUCTION

APPROVED

SCALE
1:50 1 0.5 0 1 2 A1
1:100 A3

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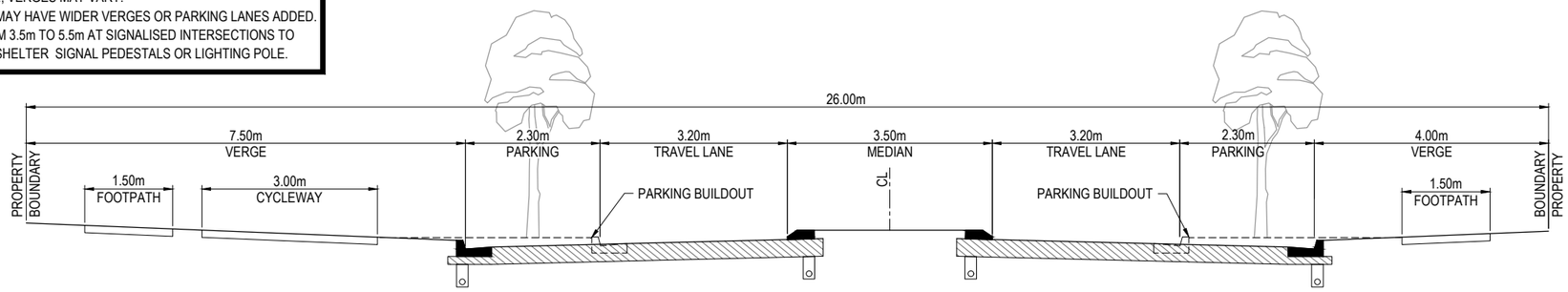
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DRAWING TITLE
INTERNAL ROADS TYPICAL CROSS SECTIONS SHEET 2 OF 4

PROJECT No.	DRAWING No.	REVISION
16-003350	SK04	3

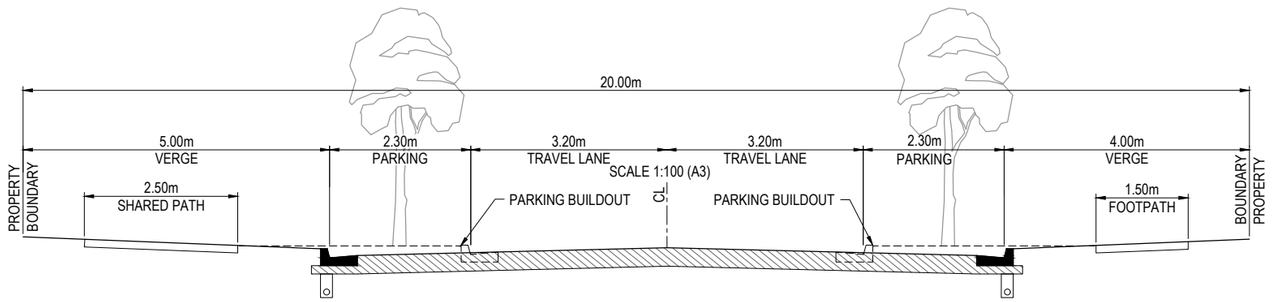
NOTES:

1. TYPICAL CROSS SECTIONS PRESENT THE MINIMUM WIDTHS IDENTIFIED.
2. WITHIN THE OVERALL ROAD RESERVE, VERGES MAY VARY.
3. SUBJECT TO URBAN DESIGN, ROADS MAY HAVE WIDER VERGES OR PARKING LANES ADDED.
4. WIDTH OF MEDIAN TO INCREASE FROM 3.5m TO 5.5m AT SIGNALISED INTERSECTIONS TO ACCOMMODATE TURNING LANE AND SHELTER SIGNAL PEDESTALS OR LIGHTING POLE.



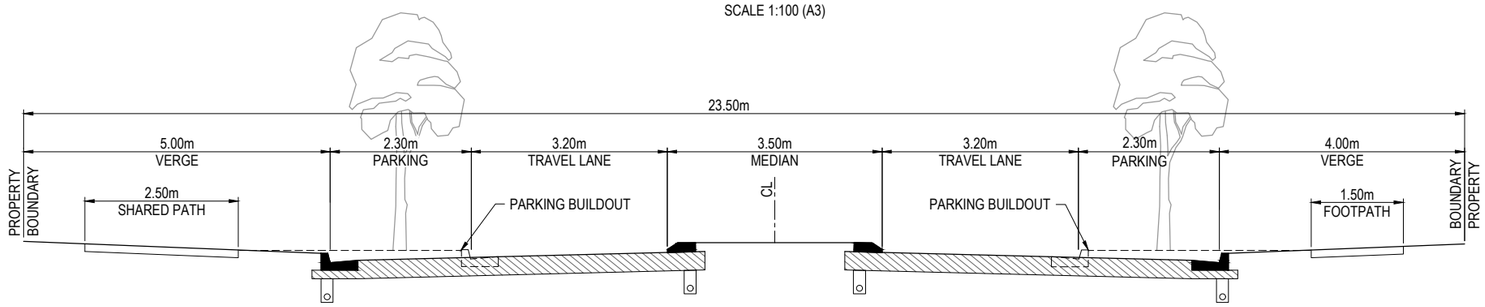
TYPE 9, NEIGHBOURHOOD CONNECTOR - MAJOR
WITH 3.5m MEDIAN (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



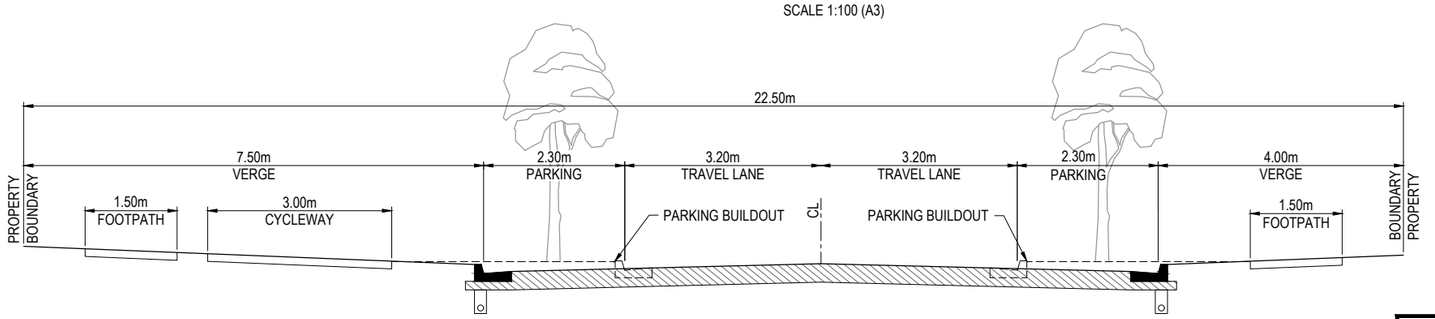
TYPE 10, NEIGHBOURHOOD CONNECTOR - MAJOR (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 11, NEIGHBOURHOOD CONNECTOR - MAJOR
WITH 3.5m MEDIAN (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 12, NEIGHBOURHOOD CONNECTOR - MAJOR (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)

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19.09.17

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REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	02.03.17	ORIGINAL ISSUE ON NEW PROJECT NUMBER	BF	AM
2	13.03.17	ROAD RESERVE WIDTH FOR TYPE 4 CROSS SECTION REVISED	AG	AM
3	07.09.17	TYPICAL SECTIONS AMENDED AS PER EDQ DISCUSSION	LS	AM
4	19.09.17	TYPE 10, 11 & 12 PATH WIDTHS AMENDED	AG	AG
5				
6				
7				
8				

DRAWN

DESIGN

STATUS: **NOT FOR CONSTRUCTION**

APPROVED

SCALE: 1:50 / 1:100 — 1 0.5 0 1 2 — A1 / A3

CLIENT: Riverside CELESTINO

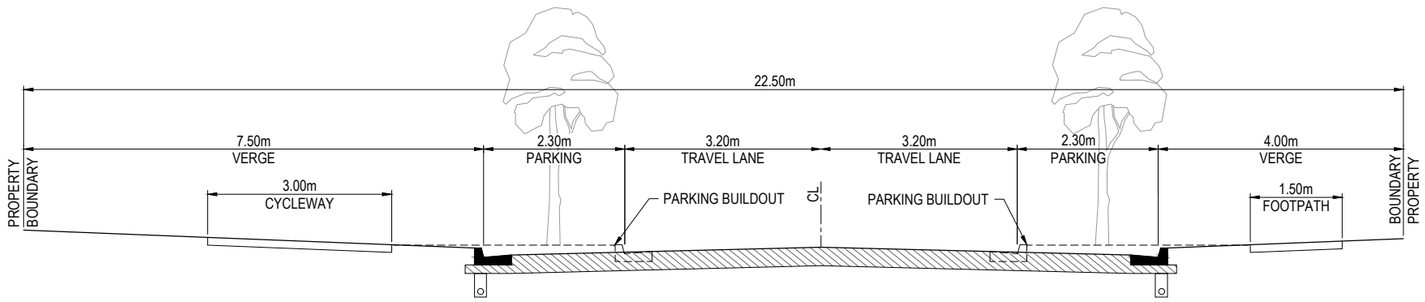
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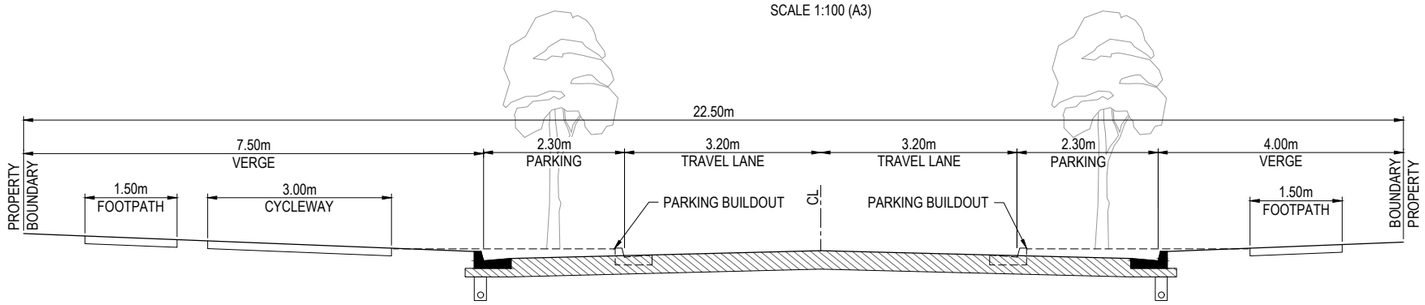
DRAWING TITLE: **INTERNAL ROADS TYPICAL CROSS SECTIONS SHEET 3 OF 4**

PROJECT No.	DRAWING No.	REVISION
16-003350	SK05	4



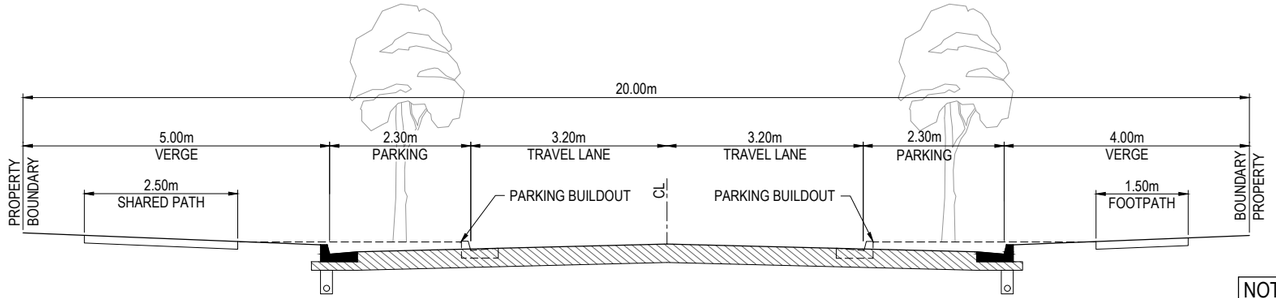
TYPE 13, NEIGHBOURHOOD CONNECTOR - MAJOR (3,000 - 7,499vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



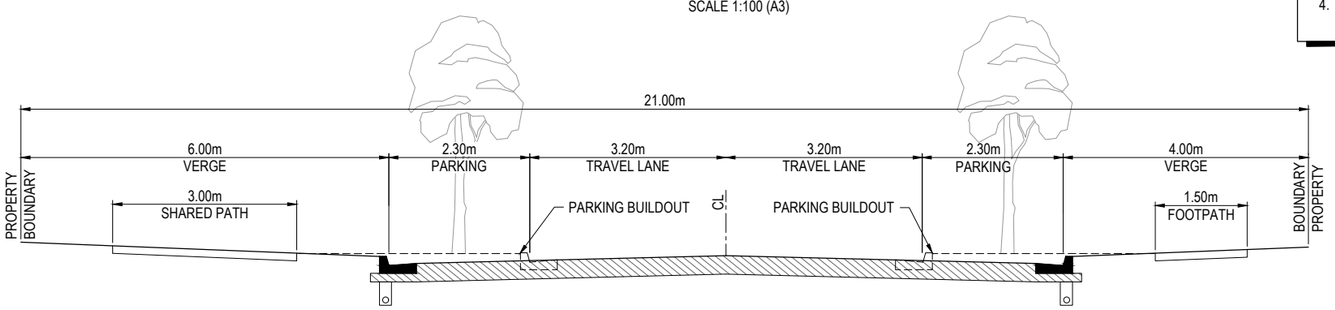
TYPE 14, NEIGHBOURHOOD CONNECTOR - MINOR (1,000 - 2,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 15, NEIGHBOURHOOD CONNECTOR - MINOR (1,000 - 2,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)



TYPE 16, NEIGHBOURHOOD CONNECTOR - MINOR (1,000 - 2,999vpd)

SCALE 1:50 (A1)
SCALE 1:100 (A3)

NOTES:

1. TYPICAL CROSS SECTIONS PRESENT THE MINIMUM WIDTHS IDENTIFIED.
2. WITHIN THE OVERALL ROAD RESERVE, VERGES MAY VARY.
3. SUBJECT TO URBAN DESIGN, ROADS MAY HAVE WIDER VERGES OR PARKING LANES ADDED.
4. WIDTH OF MEDIAN TO INCREASE FROM 3.5m TO 5.5m AT SIGNALISED INTERSECTIONS TO ACCOMMODATE TURNING LANE AND SHELTER SIGNAL PEDESTALS OR LIGHTING POLE.

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19.09.17

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REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	07.09.17	ORIGINAL ISSUE	LS	AM
2	19.09.17	TYPE 13 DISUSED	AG	AG
3	08.02.19	TYPE 13 ADDED	SR	SR
4				
5				
6				
7				
8				

DRAWN
DESIGN

STATUS
NOT FOR CONSTRUCTION
APPROVED

SCALE
1:50 1 0.5 0 1 2 A1
1:100 A3

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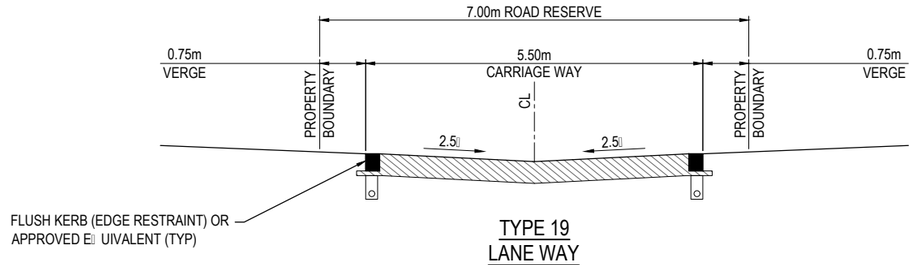
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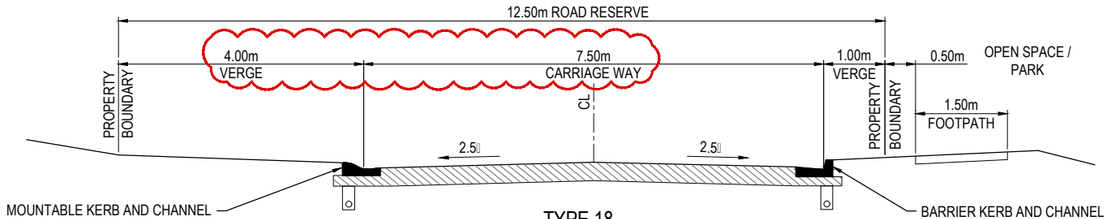
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DRAWING TITLE
INTERNAL ROADS TYPICAL CROSS SECTIONS SHEET 4 OF 4

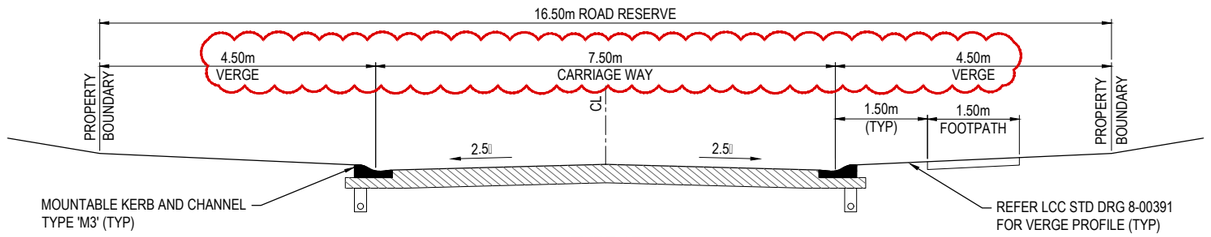
PROJECT No.	DRAWING No.	REVISION
16-003350	SK06	3



TYPE 19
LANE WAY
LANEWAY 1 TO 6 (CH 0 TO END)
TEMP ROAD 1 (CH 0 TO END)



TYPE 18
URBAN PARK SIDE ROAD
ROAD 13 (CH 0 TO END)
ROAD 14 (CH 460 TO 720)
ROAD 11 (CH 325 TO END)



TYPE 17
URBAN ACCESS ROAD
ROAD 4, 5, 6, 7, 9, 10, 12, 15 (CH 0 TO END)
ROAD 2 (CH 620 TO END)
ROAD 14 (CH 0 TO 460, 720 TO END)
ROAD 11 (CH 0 TO 325)

NOTES
1. FOR TYPICAL TRUNK AND CONNECTOR ROAD SECTIONS, REFER TO DRGS 16-003350-SK03 TO SK09.
2. TYPICAL CROSS SECTIONS PRESENT THE MINIMUM WIDTHS IDENTIFIED.
3. SUBJECT TO URBAN DESIGN, ROADS MAY HAVE WIDER VERGES OR PARKING LANES ADDED.
4. WIDTH OF MEDIAN MAY INCREASE FROM 3.5m TO 5.5m AT SIGNALISED INTERSECTIONS TO ACCOMMODATE TURNING LANE AND SHELTER SIGNAL PEDESTALS OR LIGHTING POLES. REFER ROAD FUNCTIONAL PLANS FOR FURTHER DETAILS.

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	8.12.17	ORIGINAL ISSUE	CH	CH
2	10.09.18	AMENDED TO ED RE UIREMENTS	CH	CH
3	20.02.18	CARRIAGEWAY WIDTH AMENDED	JP	AS

DRAWN CHECK

DESIGN CHECK

STATUS
NOT FOR CONSTRUCTION

APPROVED
DANIEL COLLINS RPE 18631

FOR & ON BEHALF OF CALIBRE CONSULTING (LD) PTY LTD

SCALE
1:50 1 0.5 0 1 2 A1(m)
1:100 A3(m)

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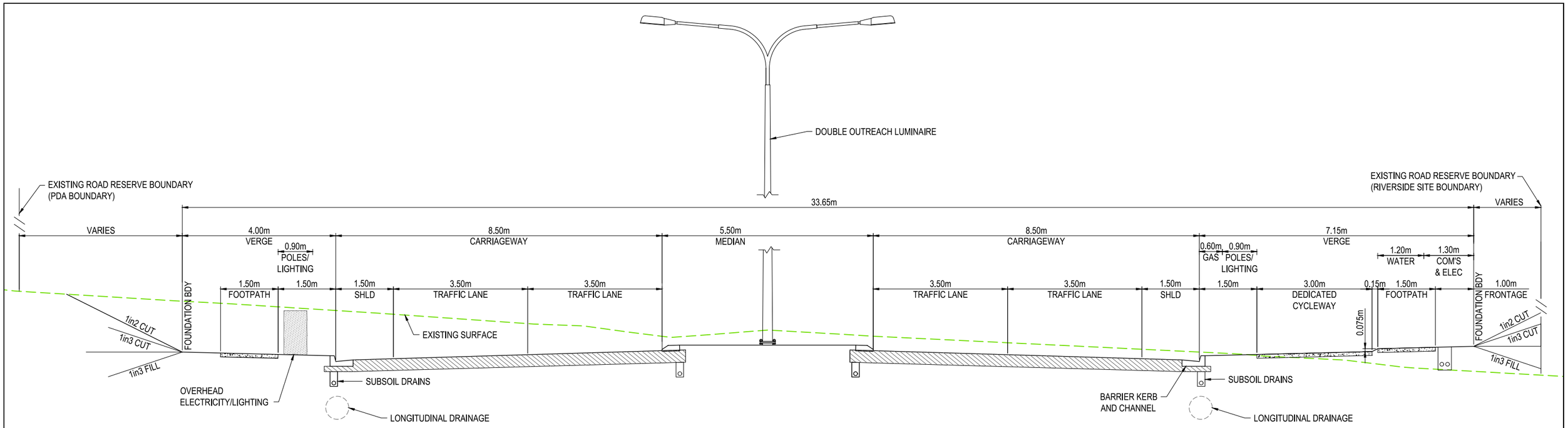
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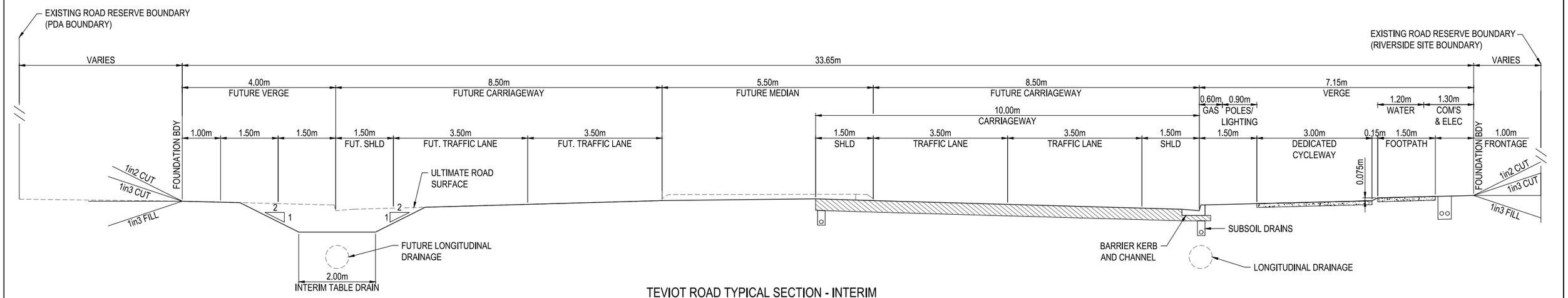
DRAWING TITLE
TYPICAL ROAD CROSS SECTIONS

PROJECT No.	DRAWING No.	REVISION
16-003350	SK322	3



TEVIOT ROAD TYPICAL SECTION - ULTIMATE

N.T.S



TEVIOT ROAD TYPICAL SECTION - INTERIM

N.T.S

REVISION	DATE	ISSUE DETAILS	DRAWN	DESIGN
1	02.03.17	ORIGINAL ISSUE ON NEW PROJECT NUMBER	BF	AM
2	05.09.18	CYCLEWAY/FOOTPATH GAP REVISED	CH	CH
3				
4				
5				
6				
7				
8				

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DESIGN

STATUS
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APPROVED

SCALE

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DRAWING TITLE
TEVIOT ROAD TYPICAL CROSS SECTIONS

PROJECT No.	DRAWING No.	REVISION
16-003350	SK07	2

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PO Box 10824 Adelaide Street Brisbane Qld 4000