
Mt Atkinson Major Town Centre Urban Design Framework Plan (UDF)

Technical Transport Report

Prepared for: Mensch

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Revision

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For and on behalf of

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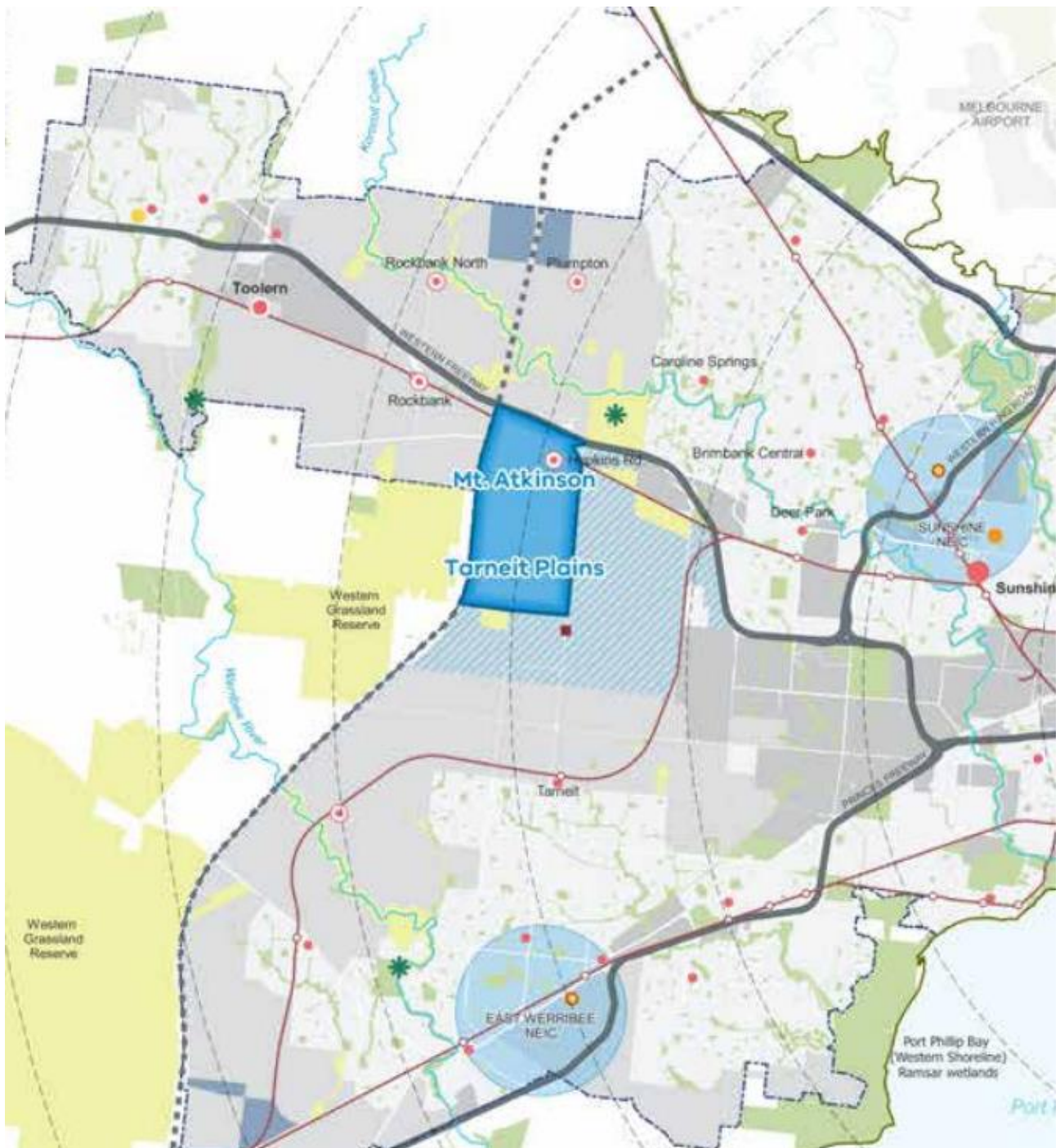
1. Introduction

1.1 Background

The Mt Atkinson and Tarneit Plains Precinct Structure Plan (PSP) area is located 25km west of Melbourne's CBD, on the urban fringe of metropolitan Melbourne and has been identified to be a suitable area for new urban development, along with several other greenfield precincts.

The location of the Atkinson and Tarneit Plains PSP is shown at Figure 1.1. It comprises some 1,050 hectares of land, generally bounded by the Western Freeway to the north, the future Outer Metropolitan Ring Road (OMR) road reservation to the west, Middle Road to the south and Hopkins Road to the east.

Figure 1.1: Mt Atkinson Precinct and adjacent Western Growth Area Greenfield PSP Area



Source: Mt Atkinson & Tarneit PSP

The Mt Atkinson and Tarneit Plans Precinct Structure Plan (PSP) and Infrastructure Contributions Plan (ICP) was developed by the Victorian Planning Authority (VPA) and Melton City Council (MCC), and subsequently approved by the Minister for Planning under Amendment C162 to the Melton Planning Scheme in 2017 and Amendment C201 (through Schedule 3 to Clause 45.11 – Infrastructure Contributions Overlay) to the Melton Planning Scheme in 2020, respectively.

The Mt Atkinson and Tarneit Plains precincts were developed as one PSP with no clear and obvious border between the two of them. The resulting PSP guides what development mix and densities will be accommodated across them, and the ICP identifies, costs and sets out the funding arrangements for the key infrastructure that will support the proposed urban structure.

The Mt Atkinson Major Town Centre (MTC) is located within the northeastern portion of the PSP and will serve as the primary commercial centre and transport hub for the PSP and surrounds. The Mt Atkinson MTC is now being advanced through the preparation of an Urban Design Framework (UDF) to provide a clear and integrated strategic vision for how the Mt Atkinson MTC will be developed over the coming years.

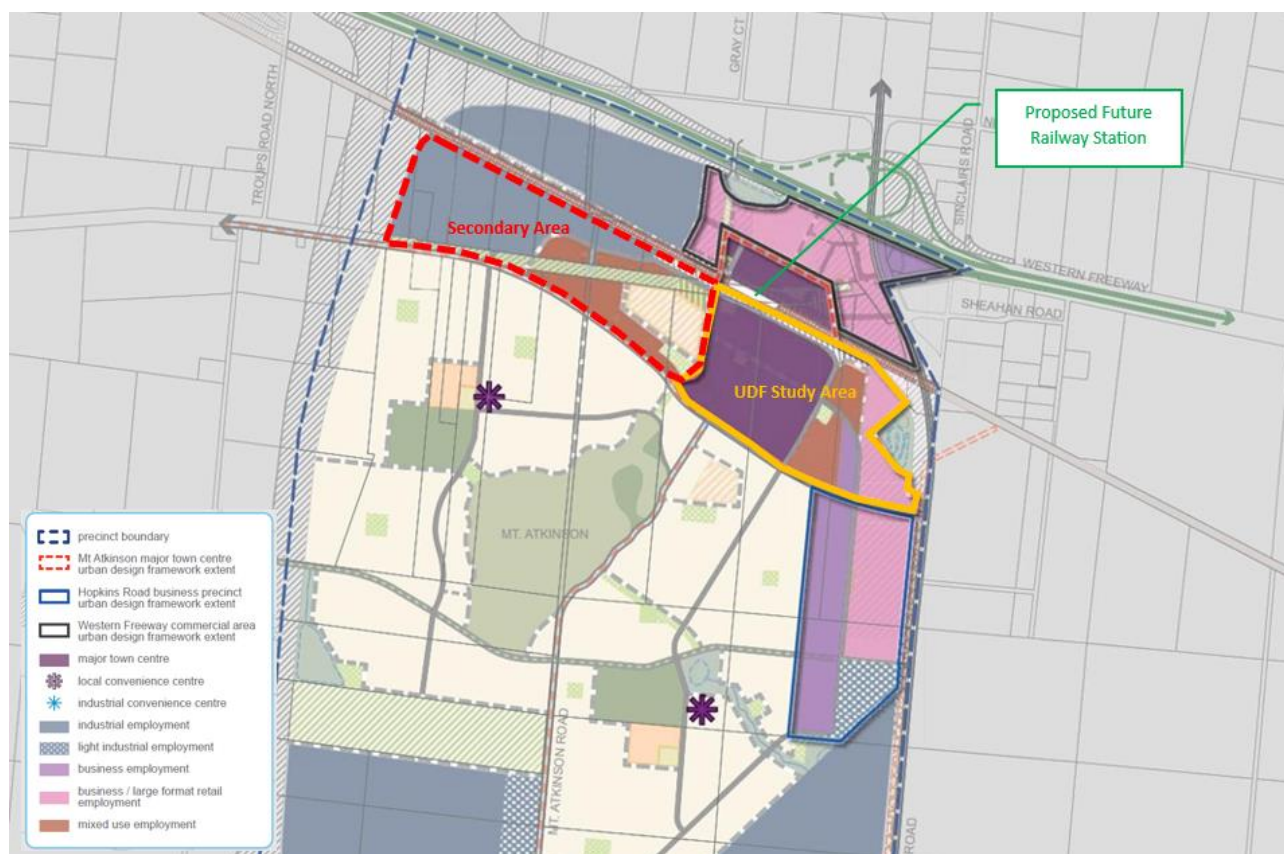
The development of the Mt Atkinson MTC accompanied by the future delivery of the Mt Atkinson Railway Station provides significant opportunity to encourage users to undertake more sustainable travel behaviours to, from and within the PSP and surrounds. The emergence of a heavy rail station, connecting bus services and other transformative road-based infrastructure improvements over the delivery of proposed land use in the Mt Atkinson MTC provides a wide and lengthy window within which planning can adapt to this changing environment. The likely implications of these changes are considered in our assessment of the likely effects of the proposal.

Stantec has been commissioned by Mensch to prepare this technical transport report as a background document to the Mt Atkinson MTC UDF.

1.2 Project overview

The Mt Atkinson MTC, as outlined in the Mt Atkinson and Tarneit Plains PSP, will consist of a diverse mix of retail, commercial, residential, civic, health and community uses. It is located on both sides of the Melbourne – Ballarat Line around the proposed site of a future Mt Atkinson Railway Station as shown at Figure 1.2. The area which this report considers includes the UDF precinct south of the railway line (shown as a yellow outline) as well as a secondary area to the south-west of the railway line and north of Grand Boulevard. The secondary area has been included for analytic evaluation purposes only, with further commentary setting out the rationale for its inclusion set out later in this report.

Figure 1.2: UDF Study Area Location and Surrounds (Source: PSP Extract)



1.3 Purpose of this report

This technical transport report sets out a summary of the relevant background information, as well as any key transport issues and opportunities that have been identified.

This report provides a high-level transport evaluation of the likely effects of the proposed Urban Design Framework plan on the adjacent transport system. It includes detailed traffic analysis which evaluates the transport system's redundancy and resilience for a 2041 planning horizon (i.e. approximately 20 years from now). This planning horizon seeks to strike a balance between the likely (extended) delivery timeframes of land use within the precinct as well as access to modelling tools, namely the Melton Integrated Transport Model (MITM) that includes strategic inputs for the entire Melton municipality for this (same) design year.

Accordingly, this report includes consideration of the following:

- Key transport policies influencing the project and land use in the study area,
- Existing and future known demographics and land uses for the study area,
- Existing and future known transport conditions for the study area (up to and including the 2041 planning horizon),
- Transport system performance in the study area for the 2041 planning horizon including key intersection performance and configuration requirements which exceed those currently contemplated within the approved PSP,
- Daily traffic demand estimates for the study area road network and how adopted roadway cross-sections align with these traffic forecasts, and
- Strategic transport considerations around the future likely effects of the delivery of Mt Atkinson Railway Station within the precinct (currently understood to occur beyond 2041).



2. Strategic Planning Context

2.1 State Government Policy

2.1.1 Transport Integration Act

The Transport Integration Act (Act) is the primary transport statute for Victoria and has contributed to significant change to the way in which transport and land use authorities make decisions and work together. The Act enshrines a triple bottom line approach to decision making about transport and land use matters.

The Act has been effective to date in changing the focus of individual transport organisations or agencies, such as the Department of Transport and Planning (DTP) that traditionally considered or focused on a single transport mode at a time, to require all transport agencies to work together to achieve an integrated and sustainable transport system. Moreover, it requires all transport agencies to take account of land use policy matters in transport decisions.

The Transport Integration Act:

- Unifies all elements of the transport portfolio to ensure that agencies work together towards the common goal of an integrated transport system,
- Provides a framework for integrated and sustainable transport policy and operations,
- Recognises that the transport system should be conceived and planned as a single system performing multiple tasks rather than separate transport modes,
- Integrates land use and transport planning and decision-making by extending the framework to land use agencies whose decisions can significantly impact on transport ("interface bodies"),
- Re-constitutes transport agencies and aligns their charters to make them consistent with the framework.

The Act forms an overarching legislative framework for transport related state planning policy decisions and has been integrated within the Victorian Planning Provisions (VPP).

2.1.2 Plan Melbourne

The Victorian Government released the Metropolitan Planning Strategy, Plan Melbourne in 2017 (refresh of the previous plan released in 2014). The Plan looks to build on Melbourne's reputation as a global city of opportunity and choice, as it caters for an almost doubling of the population over the next 35 years (i.e., out to 2050).

The Plan provides guidance on the way housing, commercial and industrial development will be provided, based off the following key seven outcomes, and are supported by a range of actions:

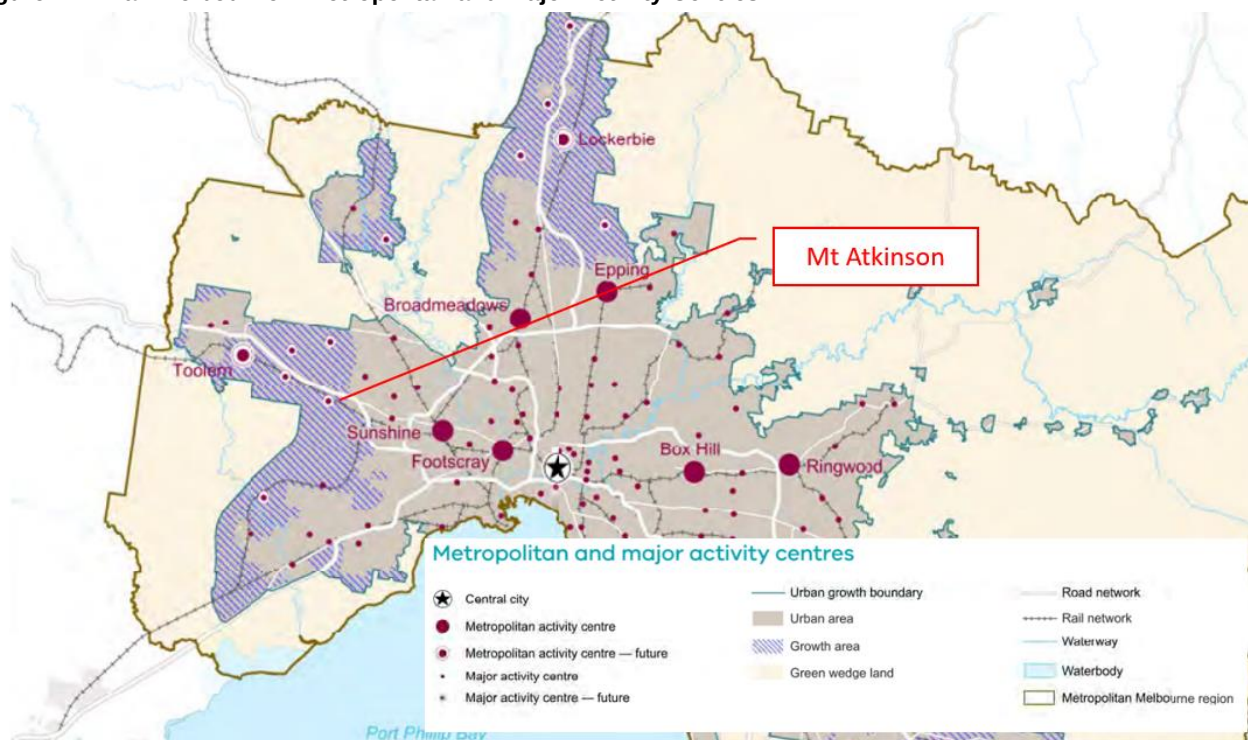
- Being a productive city that attracts investment, supports innovation and creates jobs,
- Provide housing choice in locations close to jobs and services,
- Have an integrated transport system that connects people to jobs and services and goods to market,
- Be a distinctive and liveable city with quality design and amenity,
- City of inclusive, vibrant and healthy neighbourhoods,
- A sustainable and resilient city, and
- Regional Victoria is productive, sustainable and supports jobs and economic growth.

The Plan discusses the importance of locating medium and high-density development near jobs, services and public transport to improve housing and transit choices, road space allocation, as well as achieve 20minute neighbourhoods; places where people have access to local shops, schools, parks, jobs and a range of community services within 20 minutes of their home.

In outer suburban areas, this can be achieved through the development of major activity centres and employment precincts, preferably clustered around existing or proposed railway stations, such as the opportunity that is proposed with the Mt Atkinson MTC and Railway Station.

An excerpt from The Plan is shown in Figure 2.1 on the following page that indicates the Mt Atkinson MTC as a future Major Activity Centre (listed as the Hopkins Road future Major Activity Centre in Plan Melbourne).

Figure 2.1: Plan Melbourne – Metropolitan and Major Activity Centres



2.1.3 Movement and Place

Movement & Place (M&P) is a relatively new assessment framework adopted by the DTP and other affiliated agencies to assist with evaluating infrastructure project proposal outcomes. It provides an ability to guide transport projects, land use development and operational initiatives in a coordinated, holistic and integrated manner.

The 'Movement and Place in Victoria' document published by DTP dated February 2019 includes the following commentary on the framework:

"The Movement and Place Framework takes a future-focused, multi-modal approach to network planning. It takes into consideration the diverse role places play in planning the types of transport modes appropriate to a local road or street.

In this new language, roads and streets are defined by the context of a local place and assigned various 'movement' and 'place' classifications."

Based on current available M&P classifications through the online DTP M&P viewer, there has been limited associated network planning work for the Mt Atkinson and Tarneit Plains PSP. Only the existing arterial roads have aspirational classifications indicated, and they remain highly general traffic and freight focused (limited walking, cycling, bus and interchange arrangements considered). It would be expected that these and additional M&P classifications will be refined and developed based on the detail developed through the Urban Design Framework process. As such, we are cognisant of the aspirations and objectives of the M&P framework, and these have been used as inputs when developing the UDF.

2.1.4 Growing Our Network (2018-2025)

The DTP has prepared a Rail Network Plan for when the Metro Tunnel opens in 2025. This Plan includes an updated network map outlining how the rail network across the state will function when current major projects – including the Metro Tunnel, high-capacity signalling, High-Capacity Metro Trains and the level crossing removal program – are completed.

The Plan has several key future projects which will continue to improve peak capacity and off-peak services on the Melton Line. This includes the electrification of the rail line from Deer Park to Melton, which comes off the back of the recent duplication of the line and delivery of an additional train station at Toolern (now Cobblebank).

Figure 2.2 reproduces the western portion of the Rail Network Plan with the future Mt Atkinson Railway Station proposed to be positioned on the Ballarat Line between Rockbank and Caroline Springs as indicated (noting the figure is not to scale).

Figure 2.2: Victorian Rail Network Plan (2025) – Western Melbourne



Based on relevant background material, such as the strategic transport modelling completed as part of the Mt Atkinson and Tarneit Plains PSP, the Mt Atkinson Railway Station is part of the long-term rail network arrangements. Recent enquiries with DTP indicate there is no current commitment to deliver the Mt Atkinson Railway Station before 2041, noting that this is the selected design year for the UDF transport evaluation, so analysis has been undertaken based on it not being implemented, as well as suitable consideration and support for people accessing it when it eventual is.

2.2 Moving Melton – Integrated Transport Strategy

The **Moving Melton – Integrated Transport Strategy** (the Strategy) was adopted by Melton City Council (MCC) in 2015 to provide guidance on how the transport network within the municipality will need to change in the future to accommodate the anticipated population growth and development. The Strategy identifies the current high car dependency and low level of public and active transport options currently available within Melton. The key policies outlined in the Strategy most relevant to this project are reproduced in the following report sub-sections.

2.2.1 Active Transport

The Strategy discusses how active transport modes should be made more available and accessible to everyone in the community. The Council intends to ensure that neighbourhood facilities are accessible by bike, and local facilities are accessible by foot. The Council also intends to work in conjunction with the Victorian Planning Authority (VPA) to develop principal pedestrian and bicycle networks in the PSPs. Extracts from the example principal pedestrian and bicycle networks shown in the Strategy for the proximate area to the Mt Atkinson and Tarneit Plains PSP are shown in Figure 2.3 and Figure 2.4, respectively.

Figure 2.3: Example Principal Pedestrian Network Extract

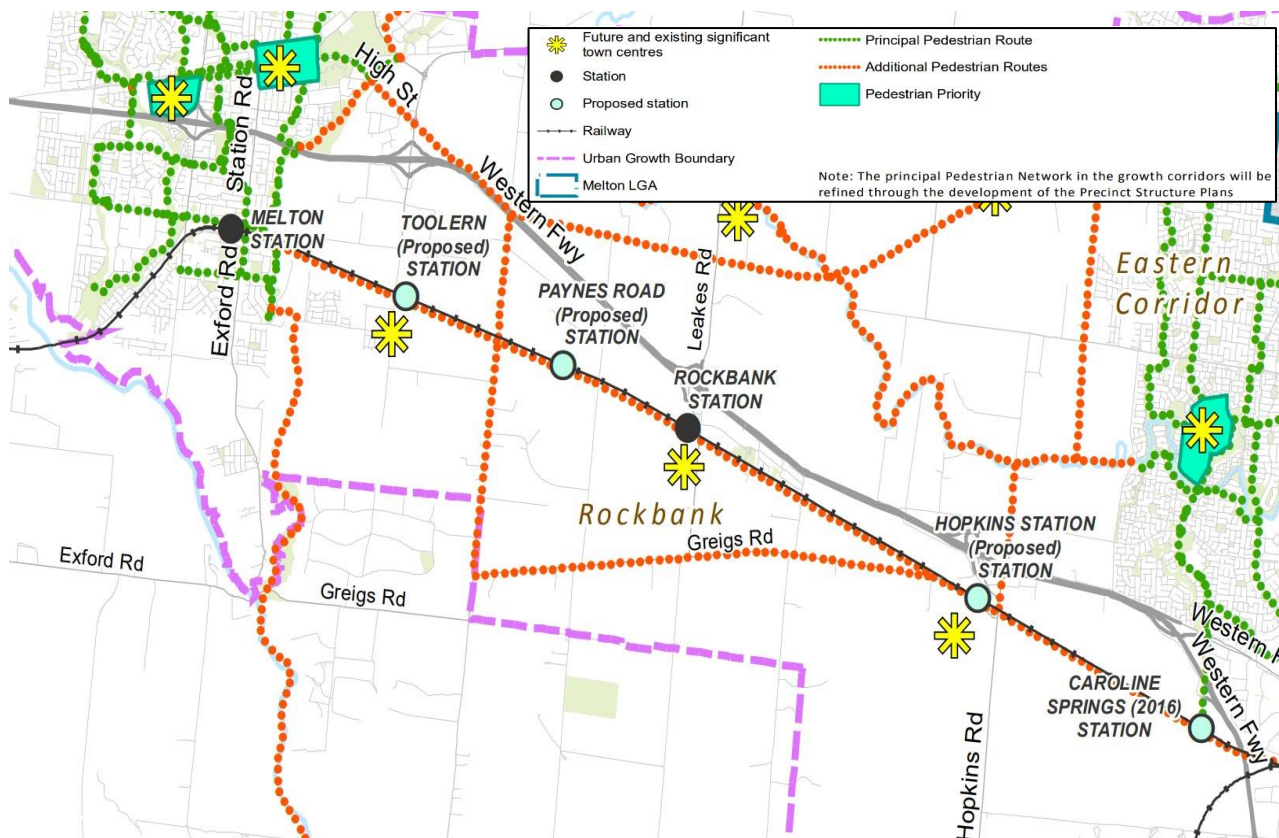
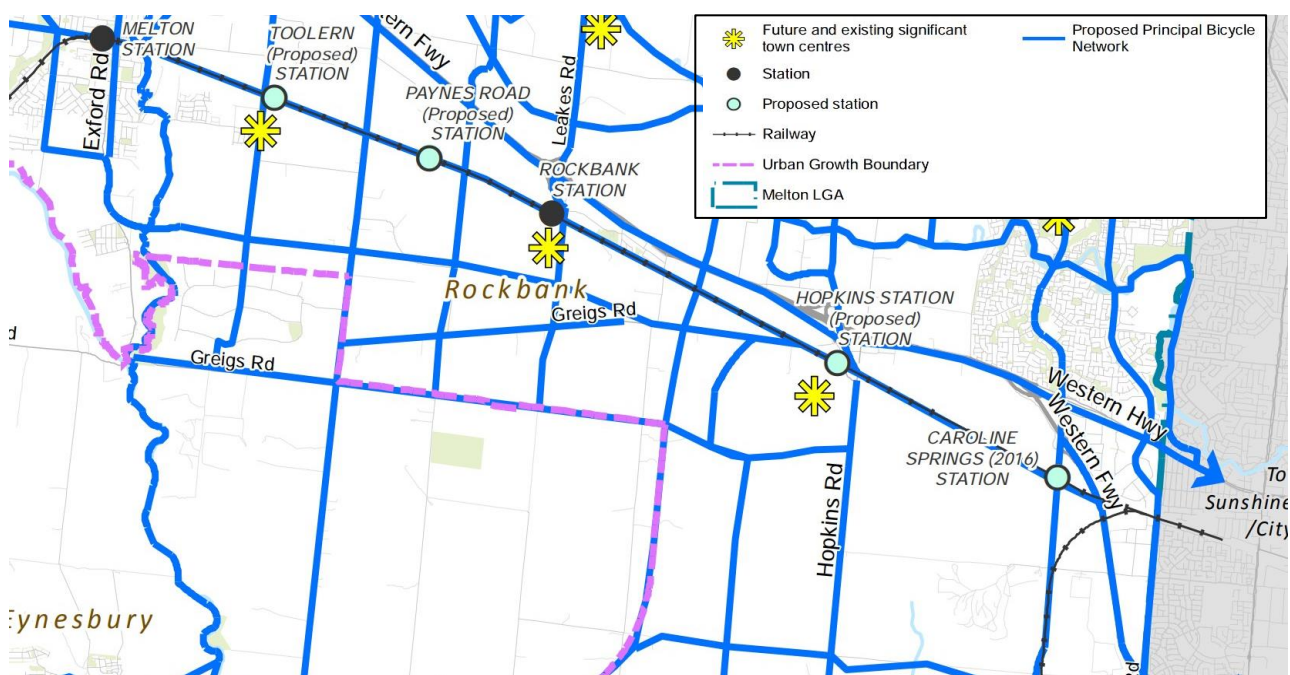


Figure 2.4: Example Principal Bicycle Network Extract

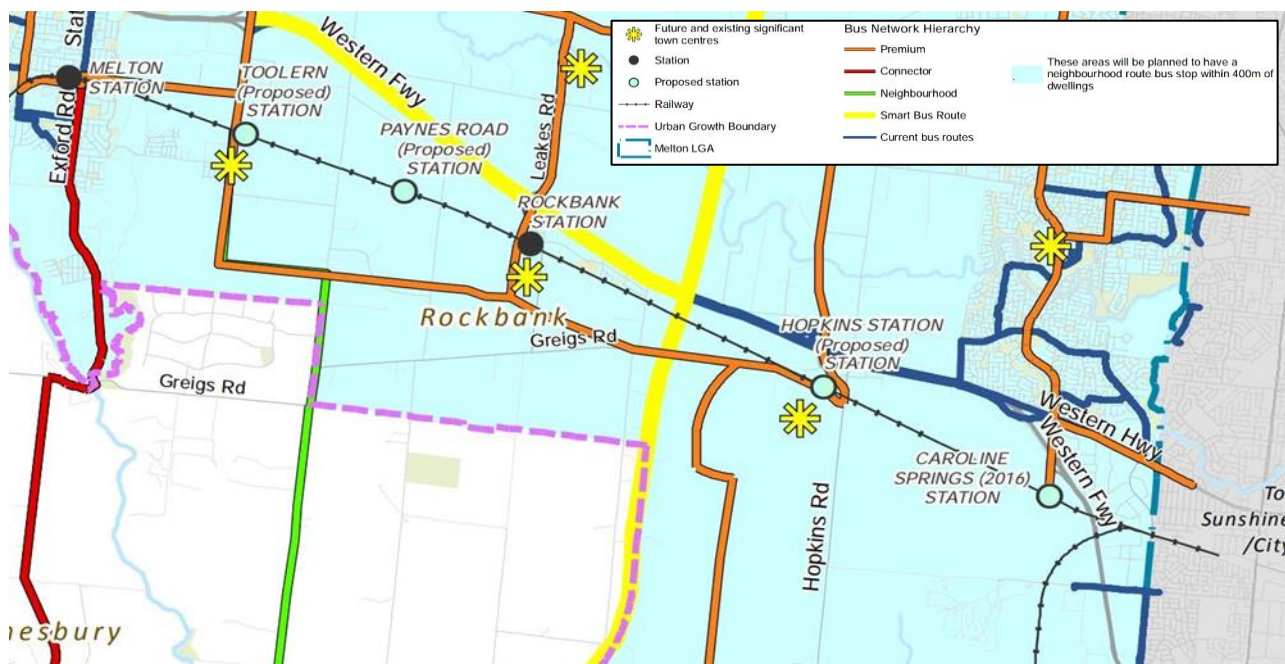


2.2.2 Public transport

The Strategy outlines how the provision of reliable and frequent public transport services is a key objective of the Council in supporting the anticipated population growth in the municipality. The Strategy discusses how access to town centres will be especially critical in enhancing their commercial viability and delivering appropriate access to services for the local community. The Council will advocate for upgrades to and new stations on the Melbourne - Ballarat rail corridor and the implementation of an expanded bus network through the municipality to cater for the anticipated urban growth. This includes the creation of new bus routes connecting local areas to the Mt Atkinson Major Town Centre and a proposed new railway station.

An extract of the proposed bus network and route hierarchy from the Strategy for the proximate area to the Mt Atkinson and Tarneit Plains PSP is shown in Figure 2.5.

Figure 2.5: Proposed Bus Network and Route Hierarchy Extract

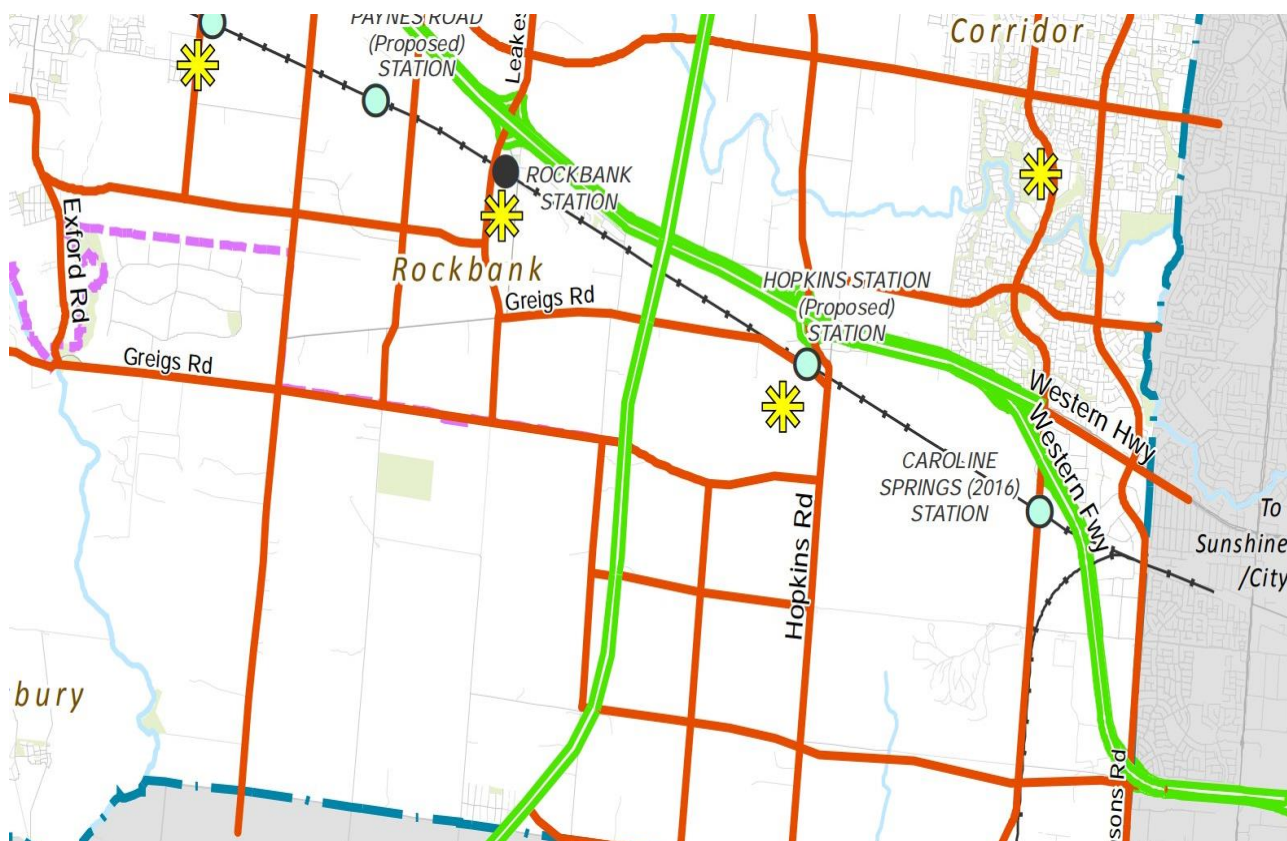


2.2.3 Road Network

Council recognises that although a key objective of the Strategy is to reduce car dependency, road transport is still a necessary mode of travel through the municipality. Council will advocate for connectivity to the metropolitan area and Melbourne Airport through the delivery of key pieces of road infrastructure beyond what is proposed in the PSPs. The planning of local road networks will utilise the existing grid layout in the greenfield areas between Melton and Caroline Springs.

An extract of the proposed arterial road network from the Strategy for the proximate area to the Mt Atkinson & Tarneit Plains PSP is shown in Figure 2.6.

Figure 2.6: Proposed Arterial Road Network Extract



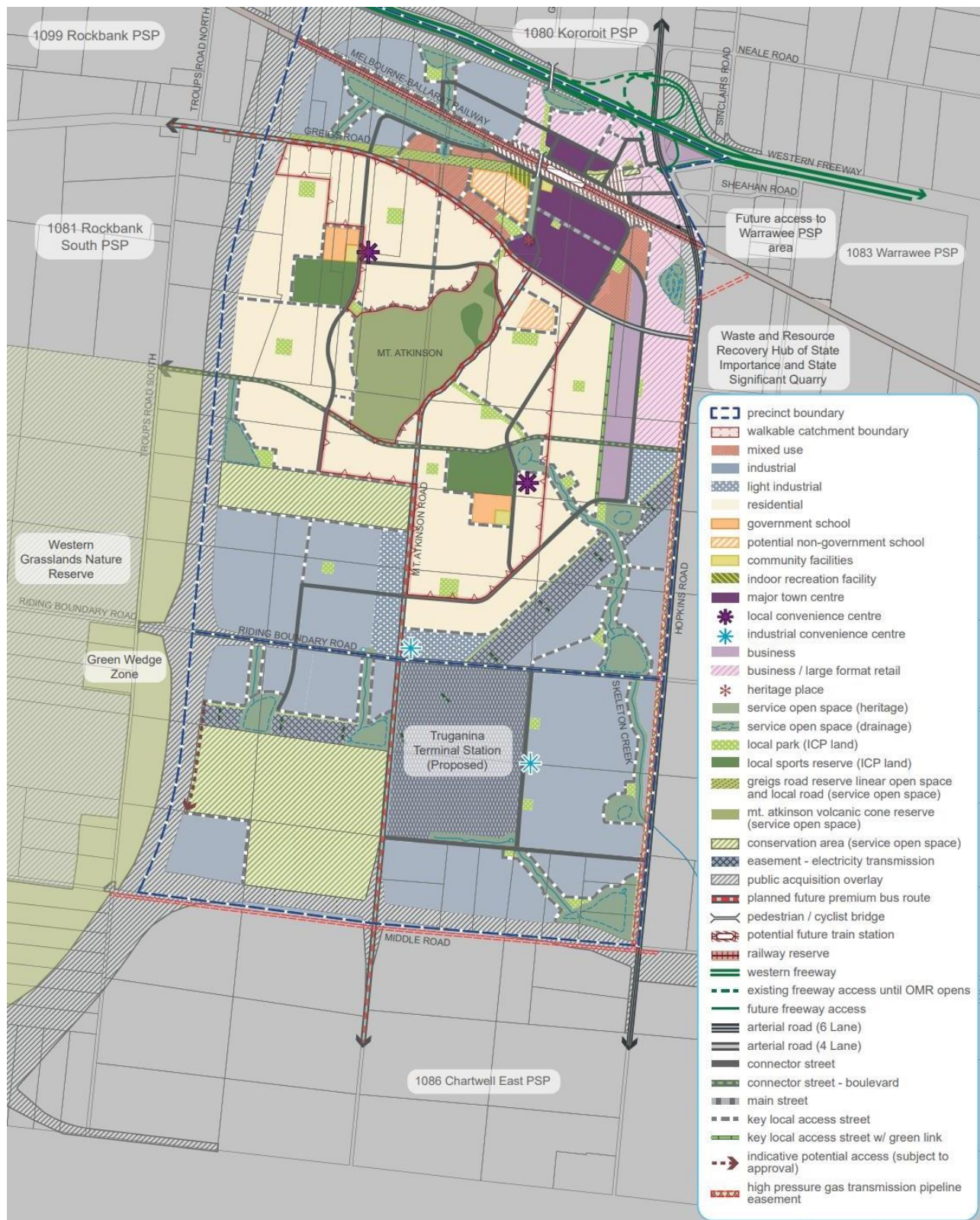
2.3 Mt Atkinson & Tarneit Plains PSP

The Mt Atkinson and Tarneit Plains PSP was developed by the VPA in consultation with MCC and relevant government agencies to guide their urban development. There is no obvious boundary between the two areas, hence the reasoning behind the preparation of a joint PSP. The PSP applies to land bounded by the Western Freeway to the north, Hopkins Road to the east, Middle Road to the south and Outer Metropolitan Ring (OMR) reservation to the west, as shown at Figure 2.7.

The Mt Atkinson MTC will be established as the key centre for shopping and services as well as hub for transport infrastructure, including train station and bus terminal. Further detail around the land use and transport network arrangements included in the PSP are included and discussed in Section 4.1.

Furthermore, strategic transport modelling was undertaken in support of the development of the PSP. Further relevant details about the modelling are included and discussed in Section 4.5.1.

Figure 2.7: Future Urban Structure for Broader Precinct



Source: Mt Atkinson & Tarneit Plains Precinct Structure Plan, p.8

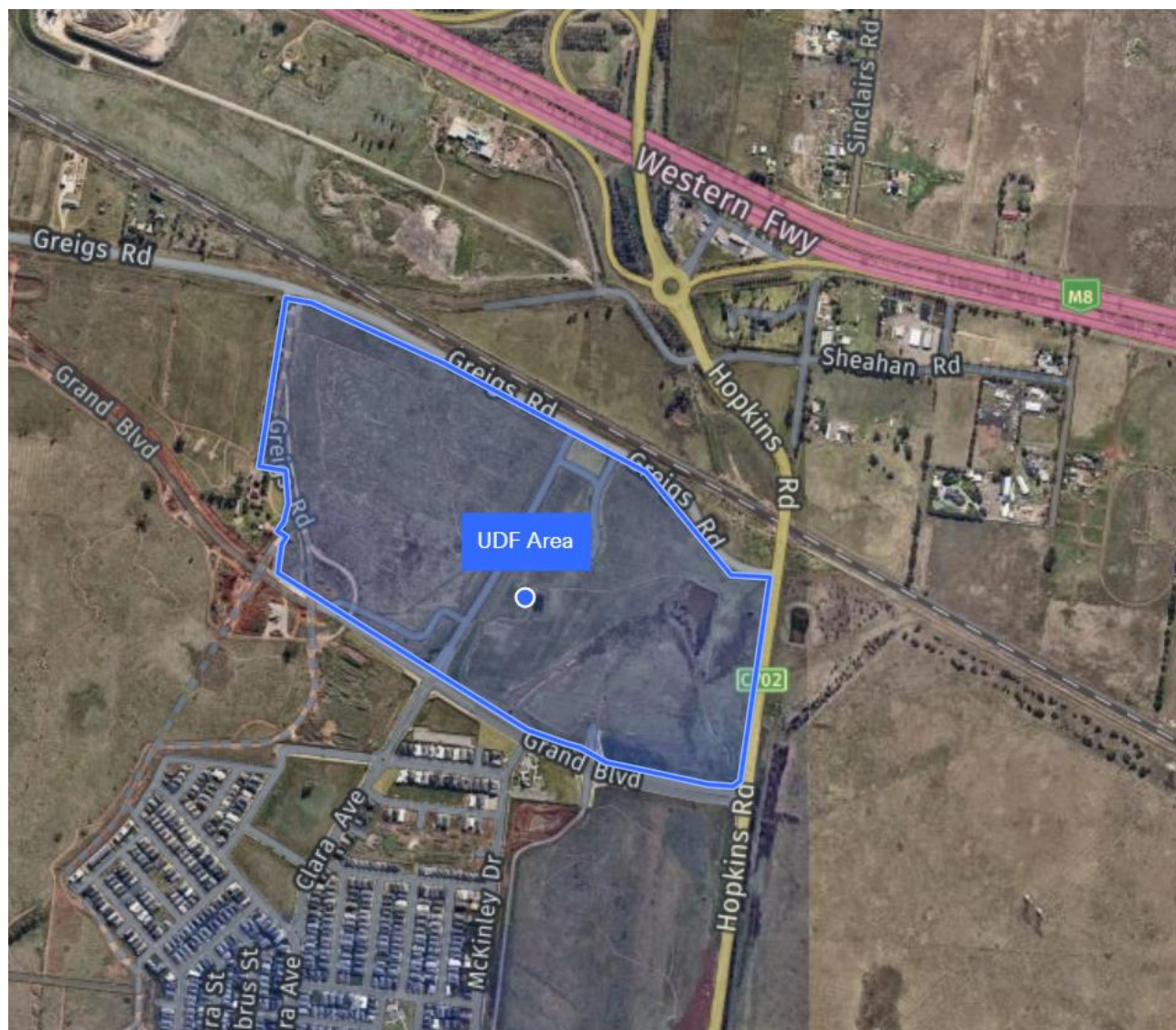
3. Existing Conditions

3.1 Precinct Development

Aerial nearmap imagery captured on Thursday 20 July 2023 and reproduced in Figure 3.1 indicated the UDF area and an adjacent emerging urban pattern of housing and road network and transport systems consistent with the approved Mt Atkinson and Tarneit Plains PSP.

Figure 3.1 reveals the delivery of Grand Boulevard (part), Clara Avenue and McKinley Drive. It also shows Greigs Road to be operational and connected with Hopkins Road. It is understood that the Greigs Road connection with Hopkins Road is to be removed as part of grade separating Hopkins Road over the Railway Line.

Figure 3.1: Existing Conditions Transport Network



3.2 Active Transport

The pattern of roads delivered at the time of preparing this report include provisions for walking and cycling to the extent proposed in approved functional layout plans. Grand Boulevard includes provision for 3.0m shared paths and 2.0m in carriageway bicycle lanes.

3.3 Public Transport

3.3.1 Train Services

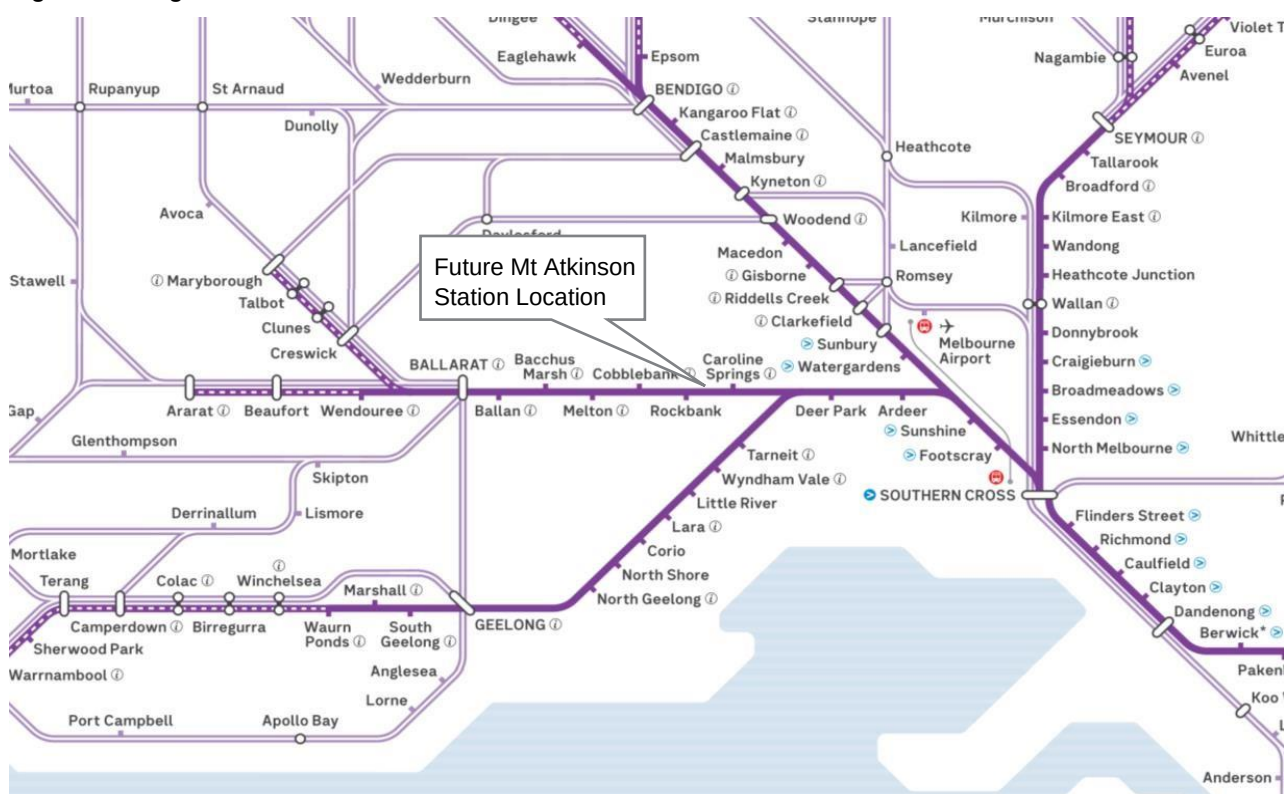
As outlined earlier within this report, the Mt Atkinson Railway Station forms part of the long-term rail network. However, at present the closest railway stations are located at Rockbank (to the west) and Caroline Springs (to the east), which provide direct connections to Sunshine, Footscray and Southern Cross Station to the east, and Melton and Ballarat to the west.

A summary of existing key information regarding the train services at Rockbank and Caroline Springs Stations connect to is presented in Table 3.1, and the broader V/Line network illustrated at Figure 3.2.

Table 3.1: Melbourne to Maryborough V/Line

Station	Duration to Melbourne	Daily services (each direction)	Service Span	Frequency
Caroline Springs	30 min	32	5:00am – 12:45am	15-20 minutes (peak) 20-40 minutes (off peak)
Rockbank	35 min	24	5:00am – 12:45am	15-30 minutes (peak) 30-60 minutes off peak)

Figure 3.2: Reginal Rail Network



Source: V/Line

3.3.2 Bus Services

The only existing bus route that operates in the vicinity of the UDF study area is Route 456. The route operates between Sunshine Station to the east and Woodgrove Shopping Centre in Melton to the west, via the Western Freeway and Caroline Springs. All services stop at the intersection of Neale Rd/Hopkins Rd on the northern side of Western Freeway, which is about 2km north of the Mt Atkinson MTC UDF area. Bus bays and signage are provided at this stop, although no bus shelters are provided.

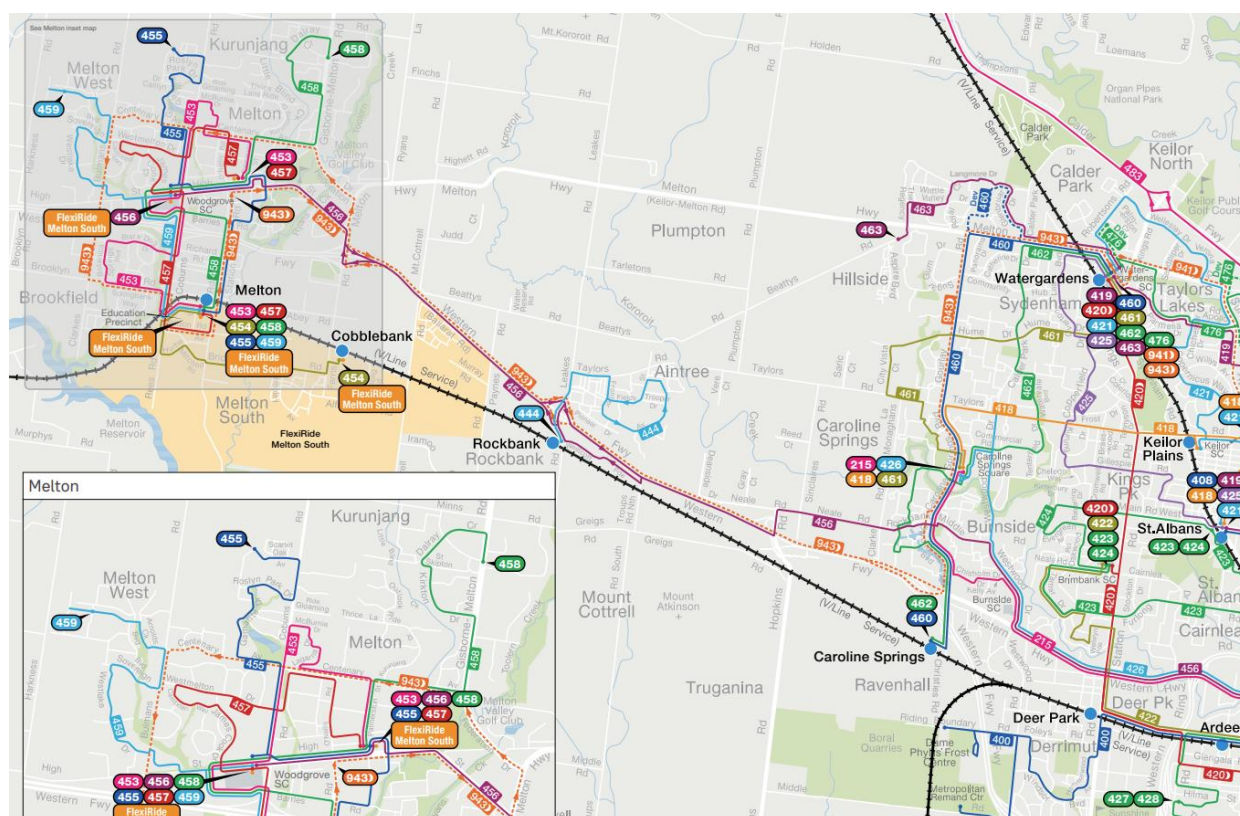
A summary of key information regarding the bus service in the vicinity of the UDF study area is presented in Table 3.2 and the broader bus network illustrated in Figure 3.3.



Table 3.2: Bus Service Summary

Route	Duration to Sunshine (from Neale Rd / Hopkins Rd)	Duration to Melton (from Neale Rd / Hopkins Rd)	Daily services (each direction)	Service Span	Frequency
456 - Melton to Sunshine via Caroline Springs	31 minutes	24 minutes	26	5:30am – 9:30pm	20-40 minutes

Figure 3.3: Existing Public Transport

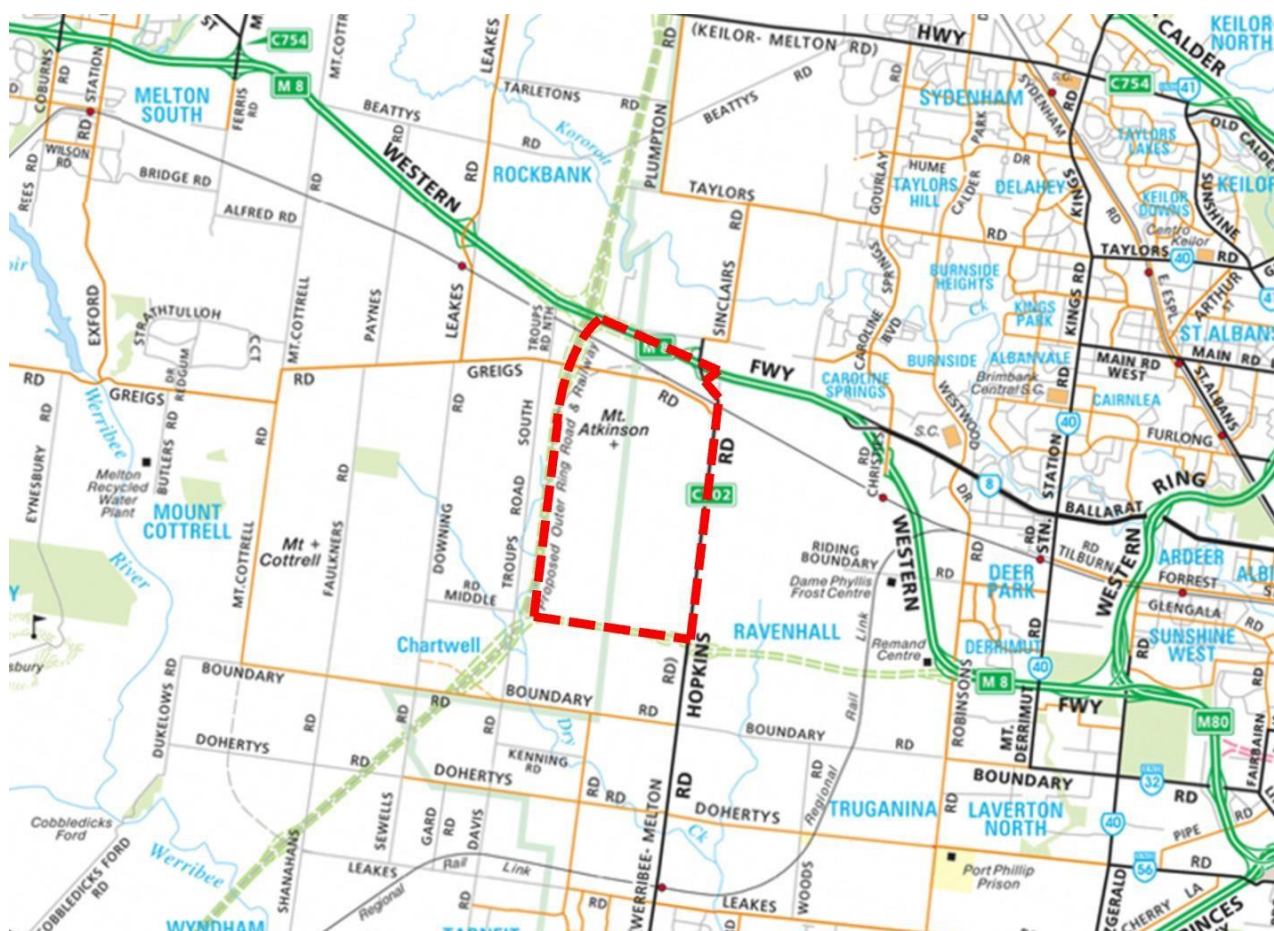


Source: PTV

3.4 Road Network

The existing road network within and connecting the study area is shown in Figure 3.4 on the following page. A description of key roads in the vicinity of the subject site is provided in the ensuing report sub-sections.

Figure 3.4: Existing Road Network (Source: Melway online) – PSP area shown within red box



3.4.1 Western Freeway

The Western Freeway is a DTP controlled Freeway and is the primary road connection between Melbourne and Adelaide. The Freeway connects to the Western Ring Road in the east, which provides direct access to Melbourne's western suburbs, northern suburbs and CBD (via the West Gate Freeway or the under-construction West Gate Tunnel Project). It also connects to Melton and Ballarat in the west, after which it is designated as a highway. Access to the Western Freeway from Hopkins Road is provided via a full diamond interchange.

In the vicinity of the UDF study area, the Western Freeway is a two-way road aligned in an east-west direction and configured with two lanes in each direction (separated by a central reservation) with a sign-posted speed limit of 110km/h. The Freeway carries approximately 60,000 vehicles per day¹.

While the Western Freeway is located outside the boundaries of the UDF study areas, its transport implications are significant for Mt Atkinson and Tarneit Plains PSP as it provides motorists and freight with access to Melbourne's CBD (to the east) and Melton (to the west).

The State Government recently announced funding for a business case to investigate an upgrade of the Western Freeway to manage traffic growth along and accessing the corridor. The timing of the results of this study is currently unknown. The 2041 Melton Integrated Transport Model (MITM) anticipates the Western Freeway will be upgraded from four lanes to six by 2041.

3.4.2 Hopkins Road

Hopkins Road extends between Neale Road in the north and Boundary Road in the south. The road provides connection to the Western Freeway and to adjoining roads that lead to Rockbank Station to the west and various townships to the east.

¹ Source: VicRoads Open-Source Traffic Volume Data from 2020

Hopkins Road (an arterial road) is currently a two-way semi-rural road aligned in a north-south direction and configured with a two-lane, 7.0m wide carriageway set with a 20m wide road reserve (approximately). Currently there are no pedestrian or cyclist facilities.

The State Government have announced a commitment to grade separate Hopkins Road with the Ballarat Railway Line, which is expected to occur by 2028. The 2041 Melton Integrated Transport Model (MITM) anticipates that Hopkins Road will be upgraded from two lanes to six south of the Ballarat Railway Line and from two lanes to four lanes north of the Railway Line and at the interchange with the Western Freeway by 2041.

Approximately 17,000 vehicles² presently use the road daily. Hopkins Road runs along the eastern boarder of the UDF and will continue to function as an arterial road and the major connection to the Western Freeway.

3.4.3 Greigs Road

Greigs Road extends between Hopkins Road in the east and Werribee River in the west (continues into Exford Road). The road provides a direct connection to Melton Railway Station and South Melton.

Greigs Road is currently a two-way rural collector road aligned in an east-west direction and configured with a two-lane, 7.6m wide carriageway set with an 20m wide road reserve (approximately). Approximately 1,700 vehicles² use the road daily.

Greigs Road runs along the northern border of the Mt Atkinson MTC UDF area. It is proposed to be upgraded to a connector street as part of the Mt Atkinson and Tarneit Plains PSP and will serve as an east-west access route to the Mt Atkinson MTC. It will provide direct access to the future Mt Atkinson Train Station. However, it is also understood from the Mt Atkinson and Tarneit Plains PSP that the Greigs Road connection with Hopkins Road is to be removed as part of grade separating Hopkins Road over the Railway Line.

3.4.4 Grand Boulevard

Grand Boulevard is a two-way divided road aligned in an east-west direction. As outlined earlier in this report at Section 3.1, Grand Boulevard has partly been delivered, with the current configuration of Grand Boulevard connecting between Hopkins Road (to the east) and Clara Avenue (to the west).

Grand Boulevard runs along the southern border of the Mt Atkinson MTC UDF area. It is proposed to be upgraded to a four lane arterial street as part of the Mt Atkinson and Tarneit Plains PSP and will serve as the major east-west access route to the Mt Atkinson MTC. It will connect to Hopkins Road (to the east) and Rockbank (to the west). The Melton Integrated Transport Model (MITM) anticipates that the upgrade of Grand Boulevard from two lanes to four will occur by 2041.

² Source: VicRoads Open-Source Traffic Volume Data from 2020

4. Future Conditions

4.1 Mt Atkinson & Tarneit Plains Precinct Structure Plan

The Mt Atkinson and Tarneit Plains Precinct Structure Plan (PSP) envisages the transition of this agricultural area into a vibrant suburb with a diversity of housing choices, provision of jobs, services and commercial opportunities and excellent transport connectivity. The Mt Atkinson and Tarneit Plains PSP area is forecasted to support a population of approximately 22,400 people and provide employment for 19,000 people. An average minimum housing density of approximately 16.5 dwellings per net developable hectare will be delivered across the Mt Atkinson and Tarneit Plains PSP. A summary of the demographic data outlined in the PSP is summarised in Table 4.1.

Table 4.1: Summary of Mt Atkinson & Tarneit Plains PSP future development

Location	Item	Figure	Source
Mt Atkinson & Tarneit Plains PSP	Population	22,400	Mt Atkinson & Tarneit Plains PSP (2017), p. 13
	Dwellings (total)	8,000	Mt Atkinson & Tarneit Plains PSP (2017), p. 13
	Dwellings (density)	16.5 per net developable hectare	Mt Atkinson & Tarneit Plains PSP (2017), p. 23
	Jobs	19,000	Mt Atkinson & Tarneit Plains PSP (2017), p. 13

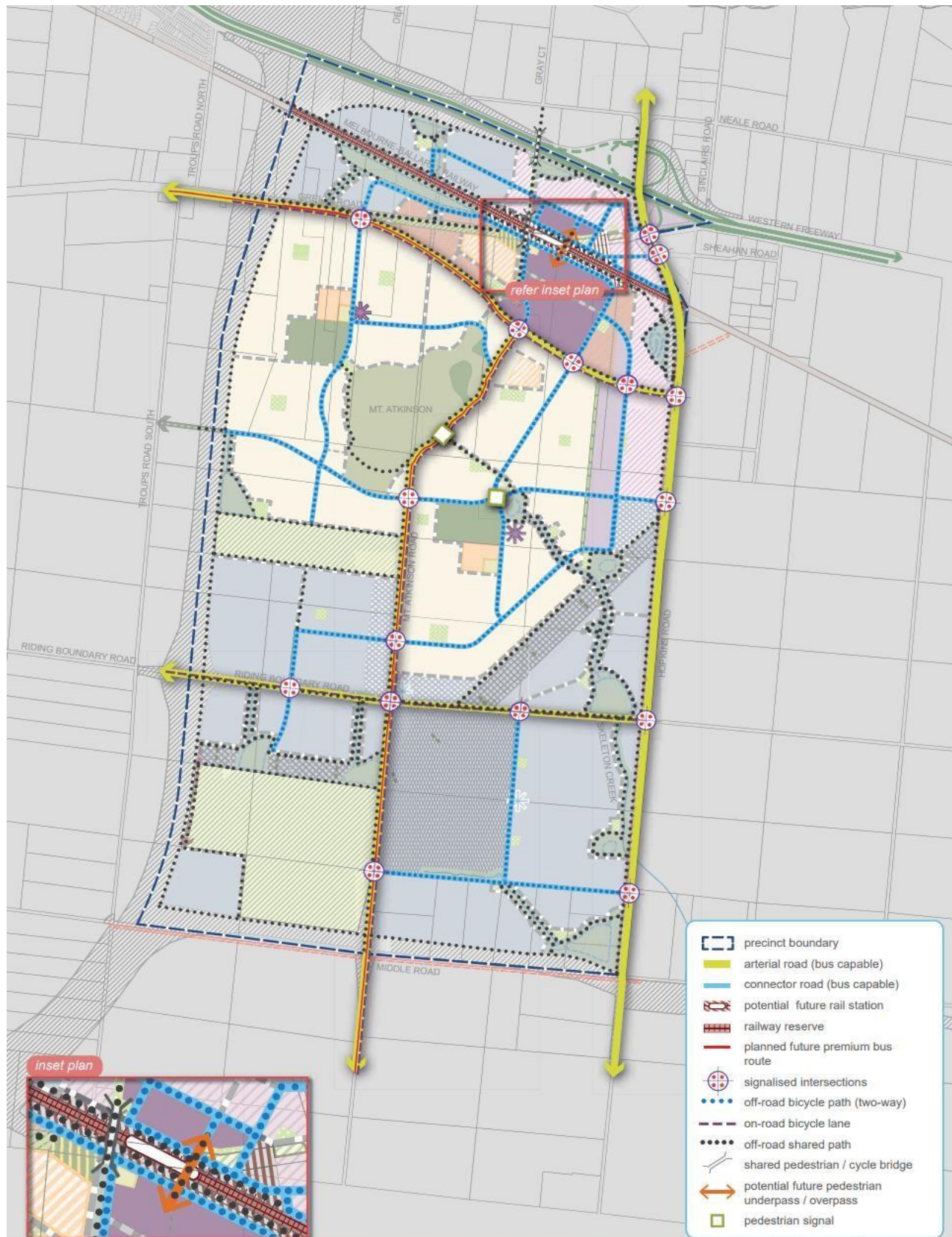
Further to the above, the Mt Atkinson and Tarneit Plains PSP sets out the proposed transport network to support the future development. In this regard, the Road Network Plan, and the Public Transport and Path Network is presented in Figure 4.1 and Figure 4.2, respectively.

Figure 4.1: Mt Atkinson & Tarneit Plains PSP – Road Network Plan



Source: Mt Atkinson & Tarneit Plains PSP, June 2017 – Plan 9, pg.52

Figure 4.2: Mt Atkinson & Tarneit Plains PSP – Public Transport and Path Network



Source: Mt Atkinson & Tarneit Plains PSP, June 2017 – Plan 10, pg.56

4.2 Mt Atkinson Major Town Centre

The Mt Atkinson Major Town Centre (MTC) will serve as the core activity centre of the Mt Atkinson and Tarneit Plains PSP area. The Mt Atkinson MTC will consist of residential, commercial and retail premises, civic buildings, services, leisure facilities and urban parks. The UDF will provide strong connections to the proposed Mt Atkinson Railway Station, providing commuters with direct mass transit to Melbourne's CBD, and other key metropolitan and regional destinations, such as Cobblebank, Sunshine and Ballarat. Provisions for cycling and pedestrian movements will also be emphasised in the implementation of the Mt Atkinson MTC to promote the use of alternative modes of transport to private cars. Higher density housing will be provided within and surrounding the Mt Atkinson MTC, which will deliver housing diversity in the Mt Atkinson and Tarneit Plains PSP and the option to affordably live within walking distance to the Mt Atkinson MTC and Railway Station.

A summary of the available demographic data for Mt Atkinson MTC is summarised in Table 4.2.

Table 4.2: Summary of Mt Atkinson Major Town Centre UDF future development

Location	Item	Figure	Source
Mt Atkinson Major Town Centre UDF	Population	4,360 ³	See footnote
	Dwellings (total)	1,548	Mt Atkinson & Tarneit Plains PSP (2017), p. 13
	Dwellings (density)	25 per net developable hectare	Mt Atkinson & Tarneit Plains PSP (2017), p. 23
	Jobs	10,500 ⁴	See footnote

In Section 3.6.4 of the Mt Atkinson and Tarneit Plains PSP there are a number of transport and movement requirements and guidelines that relate to the development of the Mt Atkinson MTC, which are reproduced below in Figure 4.3. These guidelines and requirements relate to all modes of transport and will be a key reference for the development of the UDF.

³ Assumption based on Mt Atkinson & Tarneit Plains PSP, p.13 & 25. Number of residents (22,400) / total number of dwellings (7,952) multiplied by the number of Major Town Centre dwellings (1,548).

⁴ Reviewing p. 8 & 9 of the Mt Atkinson & Tarneit Plains PSP, where public transport connections, industrial areas etc. are located, it is assumed that the Major Town Centre will contain all the retail (assume 1,500 jobs), home based industry (assume 500 jobs) and community and education jobs (assume 2,500 jobs) plus approximately two thirds of the commercial / mixed use jobs (6,000 jobs).

Figure 4.3: Mt Atkinson & Tarneit Plains PSP – Major Town Centre transport, access and connectivity

REQUIREMENTS	
R82	Heavy vehicle movements (loading and deliveries) must not utilise the main streets and should be located to the rear and/or side street and screened, or 'sleeved' by more active uses.
R83	Main streets must be designed for a low speed environment of 30km/h or less such that vehicles and cyclists share the carriageway and pedestrians can safely cross the road.
R84	Increased permeability in the road network within and surrounding the town centre should be delivered via shorter block lengths and the avoidance of culs-de-sac.
R85	Safe and easy access for pedestrian and cycle trips must be provided to the town centre through the layout and design of the surrounding street network, including connections to the Mt Atkinson Homestead Heritage Reserve, Greigs Road and paths along waterways and the Melbourne–Ballarat rail corridor.
GUIDELINES	
G63	Pedestrian priority should be provided across all side roads along main streets and all car park entrances.
G64	Bicycle parking should be provided at entry points to the town centre and designed to include weather protection, passive surveillance and lighting to the satisfaction of the responsible authority.
G65	Car park entrances directly from main streets should be minimised and alternative access should be provided from other streets.
G66	Car parking should be provided efficiently through use of shared, consolidated parking areas.
G67	A safe, clearly identified and continuous path of pedestrian travel should be provided throughout all car parking areas.

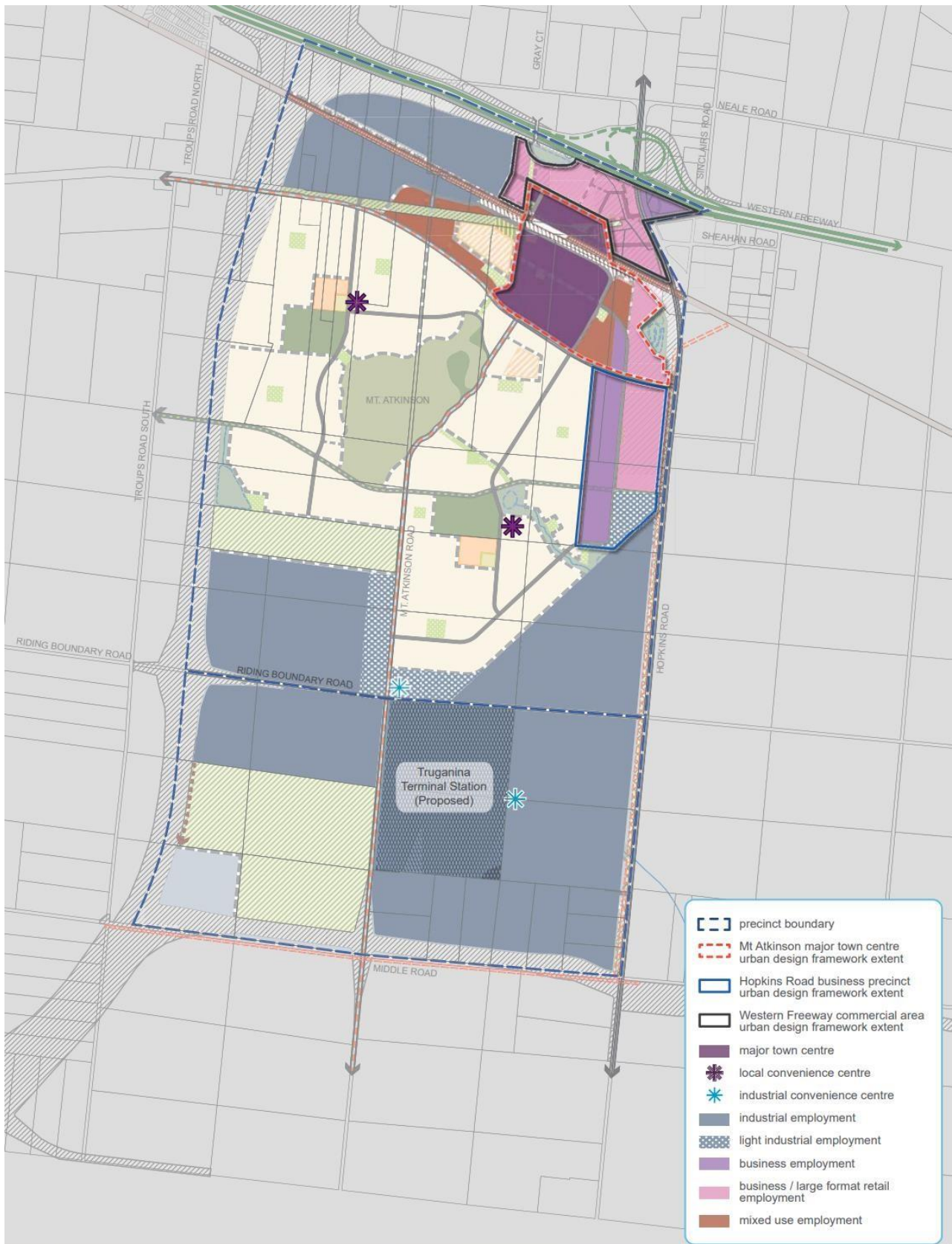
4.3 Mt Atkinson Employment and Mixed-Use land

There are other employment areas within the Mt Atkinson and Tarneit Plains PSP, outside of the Mt Atkinson MTC. As seen in Table 4.2, it is expected that half of the jobs will be spread throughout the rest of the precinct. These areas are mainly expected to be the Hopkins Road business precinct, Western Freeway commercial area and the mixed-use employment precincts as seen in Figure 4.4.

The 19,000 jobs expected to be created within the Mt Atkinson and Tarneit Plains PSP within a developable area of 500 hectares distributed between the following sectors:

- Commercial / mixed use (over 8,500 jobs)
- Industry (over 6,000 jobs)
- Community and education (over 2,300 jobs)
- Retail (over 1,300 jobs)
- Home based industries (approx. 400 jobs)

Figure 4.4: Future Urban Structure Plan



Source: Mt Atkinson & Tarneit Plains PSP, June 2017 – Plan 6, pg.24

4.4 Transport Infrastructure Projects

Table 4.3 sets out the proposed or committed transport infrastructure projects that will affect the transport outcomes of the UDF study area in the future.

Over and above the defined transport projects described in Table 4.3 below, Mt Atkinson and Tarneit Plains PSP – Table 9, p.72, sets out specific transport infrastructure upgrades required to support the buildout of the Mt Atkinson and Tarneit Plains PSP area, such as the internal road and active travel network as well as items such as intersections.

Table 4.3: Transport infrastructure projects affecting the UDF study area

Infrastructure	Project	Description	Funding commitment?	Source
Rail	Melton Line Electrification	Potential future electrification of the railway from Deer Park to Melton to establish a new metropolitan commuter service. Expected post Metro Tunnel (after 2025).	Yes	Melbourne Metro Rail Authority
Road	Outer Metropolitan Ring / E6 Transport Corridor	The Outer Metropolitan Ring / E6 reservation will accommodate a 100 kilometre long high-speed transport link for people and freight in Melbourne's north and west. The alignment is expected to be located west of the Mt Atkinson & Tarneit Plains PSP area.	No	Department of Transport and Planning
Road	Outer Suburban Arterial Roads - Western Roads Upgrade (WRU)	The Western Roads Upgrade will improve 8 main roads across Melbourne's western suburbs. It will also repair and resurface 37 roads and strengthen seven structures, mostly bridges.	Yes	Major Roads Projects Victoria
Rail	Suburban Rail Loop West	The Suburban Rail Loop West will connect Sunshine to Werribee through an underground rail link. The alignment is not expected to connect to the close vicinity of Mt Atkinson but will however connect into the Ballarat line at Sunshine.	No	Suburban Rail Loop Authority

4.4.1 Outer Metropolitan Ring (OMR) / E6 Transport Corridor

The Outer Metropolitan Ring (OMR) Transport Corridor is proposed to accommodate a 100km long high-speed transport link for people and freight in Melbourne's north and west, through Werribee, Melton, Tullamarine, Craigieburn / Mickleham and Epping / Thomastown.

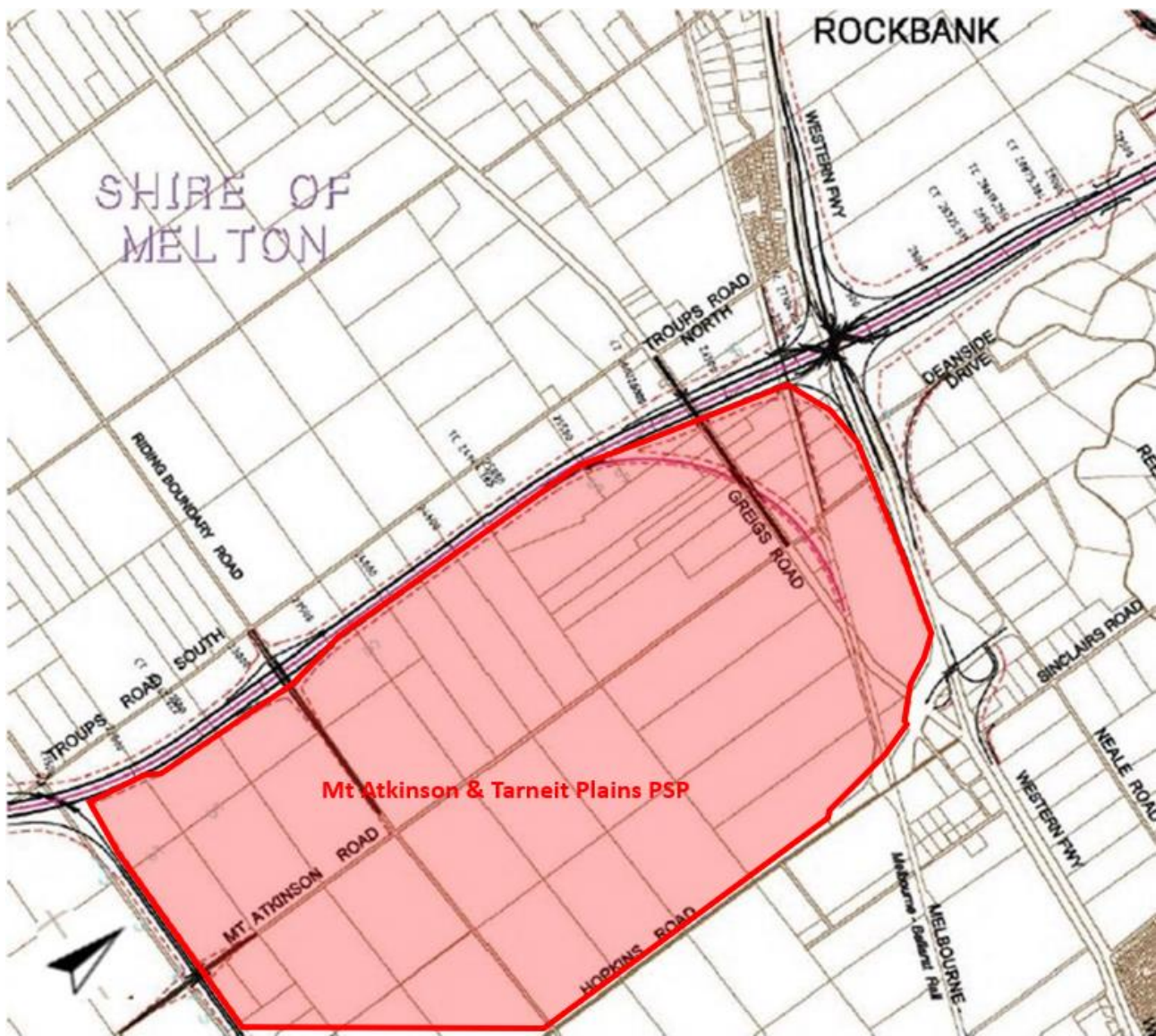
The OMR Transport Corridor is proposed to consist of the following transport facilities:

- Freeway standard road, capable of up to six lanes in each direction (only up to four lanes where rail is being accommodated),
- Railway line in the median, capable of up to four tracks that will support interstate freight and high-speed passenger trains,
- The purpose of the OMR Transport Corridor, as stated on the Department of Transport and Planning website, is to provide the following:

- Create better connections to key international transport hubs such as Melbourne Airport, Avalon Airport and the Port of Geelong
- Improve access to the proposed Donnybrook/Beveridge Interstate Rail Terminal
- Serve as an important travel and freight route to interstate and regional destinations
- Link residential and employment growth areas in the north and west of Melbourne
- Improve access in this major employment corridor, which includes Avalon Airport, Werribee, Melton, Melbourne Airport, Mickleham and Donnybrook.

Moreover, Amendment VC68, gazetted on 6 August 2010, reserved the OMR Transport Corridor in municipal planning schemes, through a Public Acquisition Overlay. Further work and approval stages are required before any construction activities occur, but at this time and proximate to the Mt Atkinson and Tarneit Plains PSP, the OMR Transport Corridor interchange arrangement with the Western Freeway is expected to broadly be as per the layout shown at Figure 4.5.

Figure 4.1: OMR Transport Corridor Interchange Arrangement with the Western Freeway



4.5 Previous Transport Modelling Work

4.5.1 Jacobs Transport Modelling Assessment (2016)

In 2016 Jacobs prepared a report that reviewed the transport modelling that had been undertaken for the Mt Atkinson and Tarneit Plains PSP. The report investigated, in the context of the Mt Atkinson and Tarneit Plains PSP, the suitability of the Victorian Integrated Transport Model (VITM) modelling that had been completed in 2012 by AECOM as part of the Western Growth Corridor Model, and subsequently updated in 2014 by Jacobs as to review PSPs in the surrounding area.

The modelled transport network was in accordance with the Future Urban Structure as presented in the Mt Atkinson and Tarneit Plains PSP, in different stages of build out in 2026 and 2046.

The conclusions from the assessment were that there was no existing suitable model to evaluate the transport impacts for Mt Atkinson and Tarneit Plains PSP for the 2026 year, however that the Rockbank PSP model is suitable and a 'fair representation' of 2046. There were some differences in land use assumptions, although no major changes to the transport network were observed. The 2046 model showed that the internal network still has capacity, but the external arterial network is nearing capacity, particularly along Hopkins Road around the Western Ring Road and Boundary Road.

4.5.2 Melton Integrated Transport Model

The Melton Integrated Transport Model (MITM) is a Council-owned mesoscopic transport model. It was originally deployed in June 2022 and includes modelled weekday time periods of 7-9am and 3-6pm. Since its development, it has been used for several projects including planning for the Western Freeway Upgrade and the Melton Highway Upgrade.

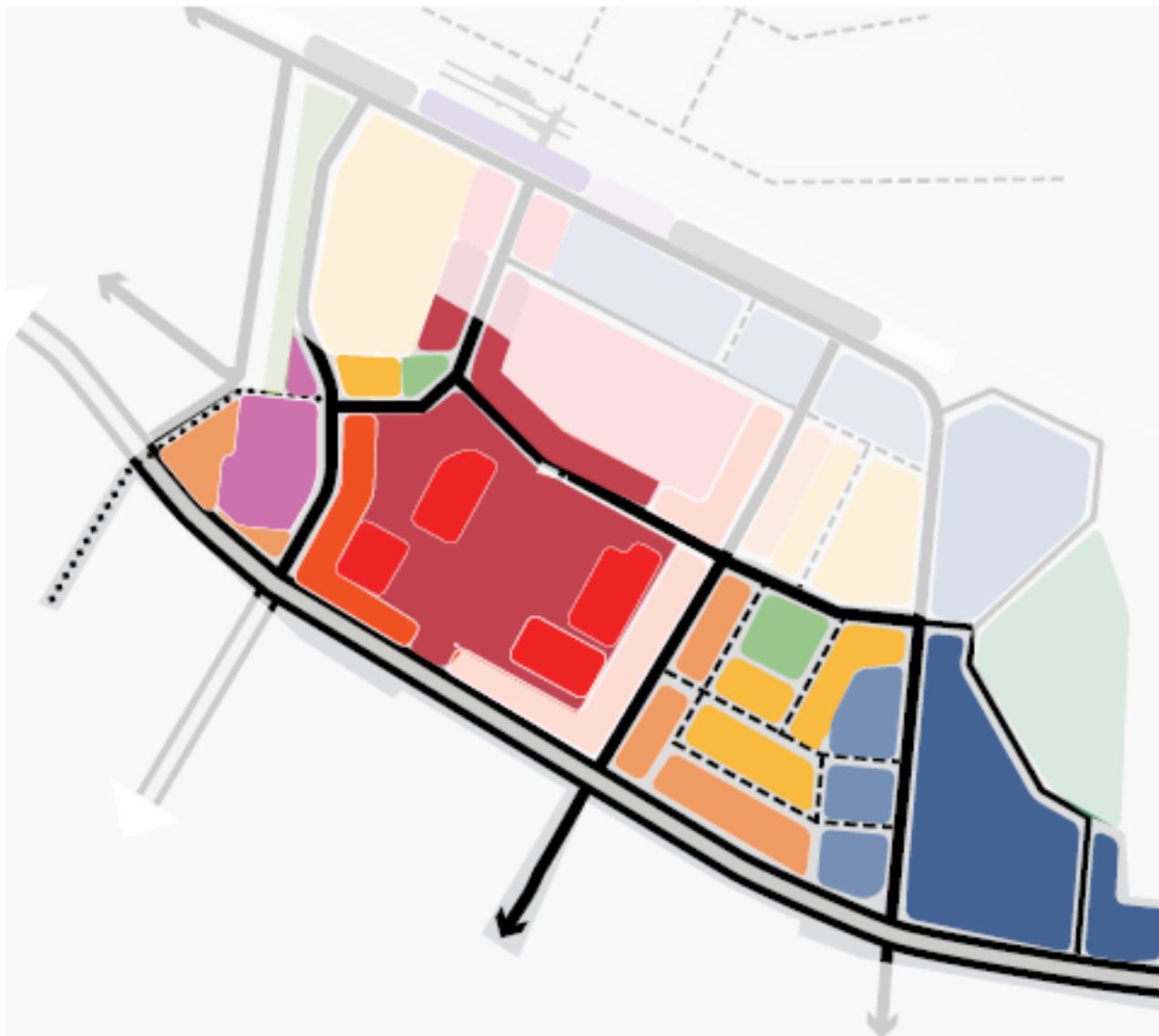
Council has given Stantec consent to interrogate and run the model for the purposes of this project. Further details about this model and how it was used for this project are provided at Section 6.5.2.

5. Mt Atkinson Major Town Centre

5.1 Urban Structure

The proposed urban structure for the Mt Atkinson MTC, as provided by Mesh, is shown in Figure 5.1. It highlights the extent of the Mt Atkinson MTC that is proposed to be delivered by 2041, with the remaining greyed-out areas that will form part of future stages of development that are expected to be delivered beyond 2041.

Figure 5.1: Mt Atkinson Major Activity Centre Urban Structure



In terms of some of the key design aspects of the proposed urban structure, they include the following:

- Has a shopping centre at its core that will focus on providing a high quality place-based user focus, and thus limiting vehicle intrusion and conflict with people spending time there.
- Peripheral and internal streets around the shopping centre will prioritise pedestrian in the form of shared street environment or similar.
- High density mixed use on the eastern and western portions that are accessed via peripheral street network that helps collect accessing vehicles as they approach the area from and east and west along Gran Boulevard.
- Consideration of and provision for local pedestrian movements accessing the future Mt Atkinson Railway Station, as well as buses.

5.2 Land Use

The indicative land use yields for each precinct expected to be delivered by 2041 are outlined at **Error! Reference source not found.**. The traffic associated with these yields is what has been assessed in Section 6.

Table 5.1: Indicative Land Use Yields used for Traffic Impact Assessment

Land Use	Size			
	Town Centre	Western Precinct	Eastern Precinct	Total
Retail	50,000sqm	-	-	50,000sqm
Office	15,000sqm	-	32,000sqm	47,000sqm
Community	2,500sqm	-	-	2,500sqm
Residential (apartments)	320 dwellings	-	150 dwellings	470 dwellings
Residential (dwelling)	-	240 dwellings	200 dwellings	440 dwellings
Employment (Industrial)	-	36,000sqm (3.6ha)	-	36,000sqm (3.6ha)
School	-	750 students (6ha)	-	750 students (6ha)
Indoor Recreation Facility	-	2,500sqm (0.67ha)	-	2,500sqm (0.67ha)
Large Format Retail	-	-	43,000sqm	43,000sqm

6. Transport Evaluation

6.1 Preamble & Context

Melbourne's western growth corridor has been subject to rapid and sustained growth in the past few decades and is expected to continue well into the future. This growth will account for a meaningful proportion of Melbourne's population increase as the broader metropolitan area approaches a planned population of 8.4 million by 2051 (Plan Melbourne).

In support, new transport infrastructure investment including the Metro Melbourne, Regional Rail Link, Western Rail Plan, Level Crossing Removal Project, the Western Freeway Upgrade, the Outer Suburban Roads Upgrade, Westgate Tunnel, the Suburban Rail Loop, Bus Network Reform and other emerging transport network reforms and programs will contribute to significant improvements in accessibility by a range of modes across Melbourne's western region. More locally, the Mt Atkinson Railway Station will provide improved accessibility for the local station catchment population created by the proposed mixed land uses within and around the Mt Atkinson MTC.

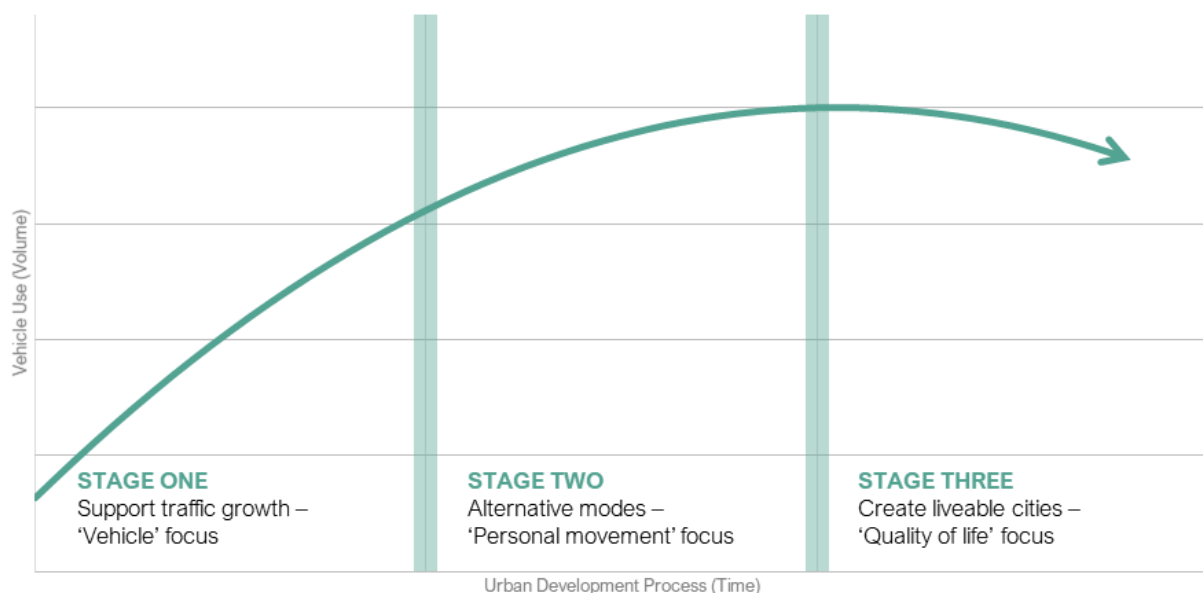
Given this premise, the planning and design of developments in rapidly changing environments should consider a longer-term outlook and how travel behaviours will evolve, particularly when transport accessibility by various modes increases.

6.2 Urban Development Evolution on Transport Usage

In city regions, transport perspectives and economic and social priorities have been observed to change over time, particularly since the mid twentieth century where car ownership was seen as a crutch for accessibility and consequential urban sprawl. To this day, urban sprawl has struggled with the lagged delivery of transport infrastructure capable of moving higher concentrations of commuters and others seeking avenues for cross-precinct, sub-regional and regional movement patterns.

Contemporary planning policy is presently underwritten by a range of ambitions including the delivery of 20 minute neighbourhoods where services and jobs are available within a 20 minute walk resulting in high levels of trip containment and use of more sustainable transport modes, especially for short trips. These policies and the lagged delivery of transport infrastructure capable of moving higher concentrations of people more efficiently are delivering a series of observed evolutionary urban transport behaviours. These behaviours when mapped reveal three key stages of development or maturation. These three key stages are shown graphically in Figure 6.1, and each discussed thereafter.

Figure 6.1: The Three Stages of Urban Development⁵



⁵ Source: Professor Peter Jones, Centre for Transport Studies, UCL

Stage 1 – Vehicle Focussed Travel

Stage 1 is where the initial urban form and transport network are developed. The urban form is usually low density, and the network is not congested. Because of these two factors, private vehicles tend to be the predominant mode as it is the most convenient and cost-effective mode of transport. Other modes of transport are often not well provided during this stage and are thus only typically used by those that do not have access to a vehicle or choose them for other non-utility based factors.

Stage 2 – Consideration of Alternate Modes

As both population density and vehicle congestion rise, the proportional use of cars tends to decrease, but over traffic volumes still increase. Eventually, the number of cars on the network will hit a “peak use” where all available road capacity is fully utilised. Other modes become increasingly more convenient and cost-effective as road network congestion increases and improved facilities and services for other modes are provided. This can be influenced by achieving competitive travel times, the cost of car parking and/or other charges and taxes that influence travel decisions.

Stage 3 – Quality of Life Focus

When land use densities and travel demand go beyond “peak use” for private vehicles, more space-efficient travel modes need to be prioritised to move more people within the available road corridors that make up the ground network. In this instance, since a single occupant car use has the lowest modal space efficiency available to the general community, the reallocation of road space to support other and more space efficient transport modes tends to occur, resulting in a reduction in car based network capacity and traffic volumes.

Along with population densities and changing transport network priorities, research indicates that there are five urban form factors that tend to influence travel behaviours. These five factors are indicated in Figure 6.2 and then each discussed thereafter.

Figure 6.2: The Five D's: Urban form factors that influence travel behaviour⁶



⁶ Source: https://umanitoba.ca/faculties/management/ti/media/docs/cervero_-_5Ds_and_transit-Winnepeg-Nov2011.pdf

Density – The movement of people generate trips and the accumulation of them tends to lead to what stage of urban development an area is in. This aspect has been used to help consider what the likely modal splits will be at the different stages of development for the Mt Atkinson MTC. This is done by looking at other existing urban areas with similar population densities to what is proposed for the Mt Atkinson MTC and applying the mode shares that are being achieved in these existing comparable urban areas.

Land Use Diversity – The relative mix of land use types drives a greater diversity of choice for a local community's trip purposes, be it jobs, homes or recreation. An area with greater land use diversity facilitates shorter distance journeys and trip-chaining that are conducive to non-car trips.

Distance to Transit – Ensuring that public transport is highly accessible, frequent and aligns with movement flows provides confidence and attractiveness for it as a means of travelling.

Destination Accessibility – Trips by public transport that are at least comparable in overall journey time to private vehicle trips are more likely to establish public transport as a credible alternative for the associated trips.

Pedestrian Orientated Design – A permeable and comfortable walking environment creates both an attractive place to dwell in as well as encouraging walking-based trips.

The above understanding can be used to compare (i.e. benchmark) the Mt Atkinson MTC against other existing (developed) activity centres to help understand what the future travel behaviour in accessing and moving around within it. With this understanding and an appreciation of the future development of the surrounding transport network, it is possible to observe these urban developmental stages '*in action*' within a Melbourne context and the development of the Mt Atkinson MTC from a transport perspective.

6.3 A Melbourne-Based Context for Transport Usage

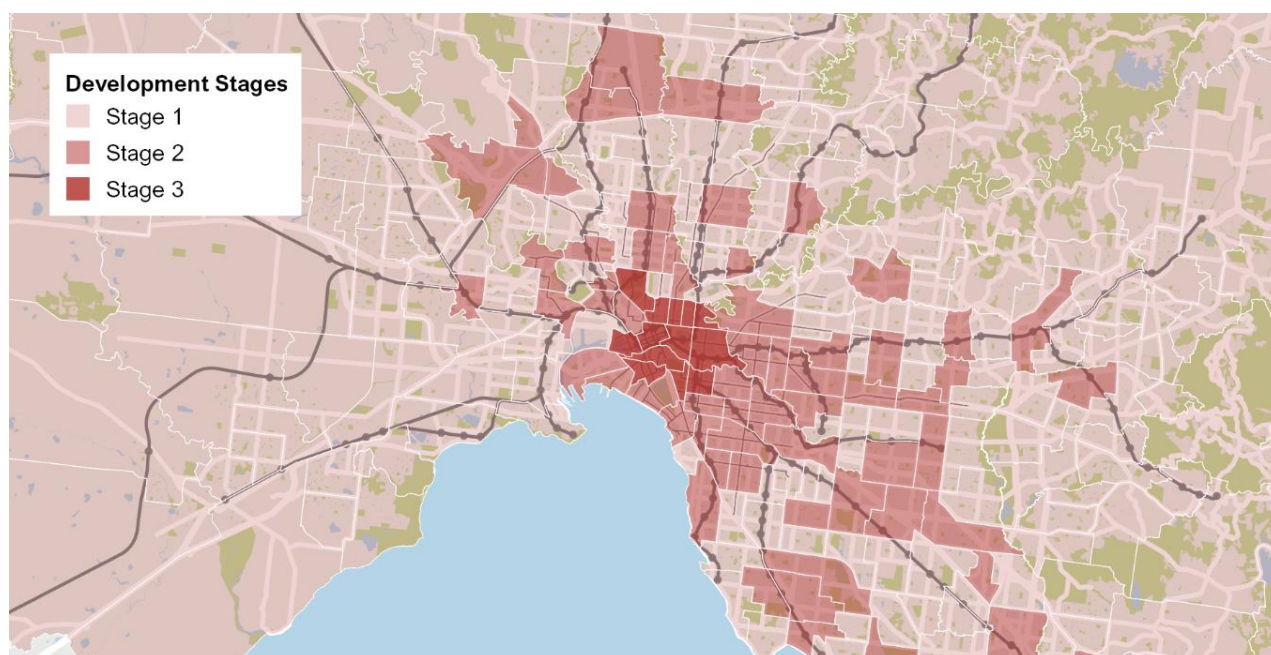
Melbourne has a broadly varying spread of population densities. As such, private car mode share for journeys to work can be linked to the nature of the area they are accessing. Using a higher-level analysis of these travel patterns and employment densities, it is possible to see the three stages of urban development in practice across Melbourne. A tipping point is observed at approximately 1,000 jobs per square kilometre and can be summarised as follows:

- Stage 1 – Low population and employment density areas (Vehicle Focussed Travel)
- Stage 2 – Transition areas (Consideration of Alternate Modes)
- Stage 3 – High population and employment areas (Quality of Life Focus).

As these areas become denser over time, private vehicle usage for trips to work decrease substantially and are undertaken via public and active transport modes as a more feasible option for journeys.

Figure 6.3 shows Melbourne mapped against the three stages of urban development, with each stage discussed further thereafter as they relate to Melbourne.

Figure 6.3: Geographic Spread of Urban Development in Melbourne



Stage 1 – Low Population and Employment Density Areas

These areas are typically lower density suburban centres and industrial areas such as Melton and Truganina. These places tend to have little to no restrictions on car parking and suffer from a lack of public transport due to the difficulty and cost of providing services in an area with a limited catchment. Public transport access here is mainly about providing access to those who do not own a vehicle or strongly choose to use public transport.

Stage 2 – Transition Areas

Transition areas form the middle ring of Melbourne's suburbs and some major activity centres. These areas have an increasing density of jobs and residents, placing pressure on the transport network. This makes public transport in these areas increasingly more attractive, shifting away from private vehicle usage.

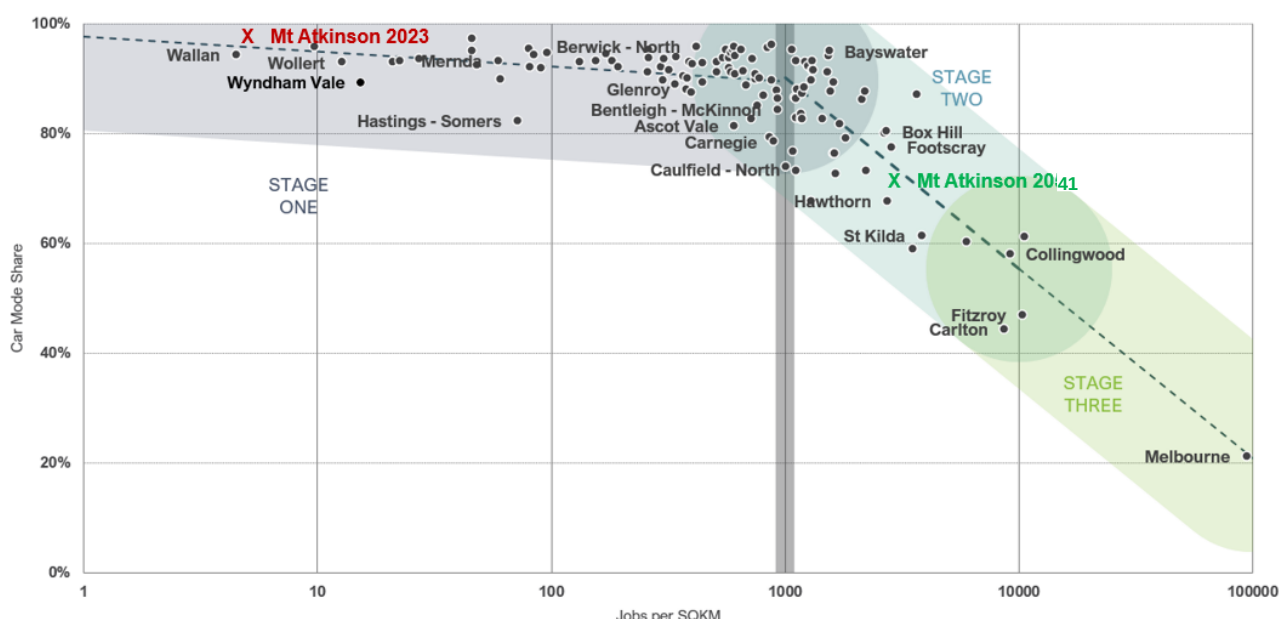
Stage 3 – High population and employment areas

These areas consist mainly of the Melbourne CBD, the immediate inner-city suburbs, and some transport rich suburban centres such as Box Hill. These areas are heavily congested but have little to no opportunity to expand road capacity, are subject to a number of car parking restrictions and are well serviced by multiple modes of transport.

6.4 Mt Atkinson Mode Share Over Time

By illustrating the relationship of various urban development stages along an axis it is evident that metropolitan Melbourne has an emerging developmental and transport usage progression as density increases. Relative to the relationship shown in Figure 6.4, Mt Atkinson in **2023** currently sits comfortably within Stage 1, with Stage 2 commencing at around 1,000 jobs per square kilometre and Stage 3 occurring approximately at 10,000 jobs per square kilometre. By **2041**, the Mt Atkinson MTC is forecast to deliver a density of almost 6,000 jobs per square kilometre⁷. It would seem quite reasonable that the further proposed land use intensification of the Mt Atkinson MTC beyond 2041 could even see it move into Stage 3 type urban development conditions.

Figure 6.4: Mode Share and Job Density in Melbourne (ABS, 2016)



Given the expected growth of the Mt Atkinson MTC, as well as the number of transport infrastructure projects to be commissioned over the coming decades, it will over its 30-year planning horizon have the potential to deliver modal transport behaviour consistent with that presently observable in Footscray and Hawthorn based on 2041 development levels, and even lower car mode shares with the further proposed land use intensification beyond.

Whilst this will facilitate a far lower car mode share over time, travel behaviour in the Mt Atkinson MTC's formative years is likely to be largely car based, especially before bus networks are established with high rates of frequency servicing the local catchment and the Mt Atkinson Train Station is delivered.

⁷ Calculated as 25,000 jobs (source: Location IQ Economists) divided by 4.1 square kilometres of developed employment land.

To facilitate a mode shift away from private car use to other modes of transport, the UDF has been developed to harness the benefits of a range of PSP locational attributes and by ensuring that the UDF design responds cohesively with the five “D’s” set out earlier at Section 6.2, including ensuring that the urban form delivers a pedestrian orientated design.

Based on the foregoing, we have sought to apply a hybrid evaluation model which recognises the likely changing travel behaviours of people living and working in the area over time. For early planning, and in the absence of any genuine mass transport options, this assessment has maintained a traditional **‘predict-and-provide’** bottom-up predictive approach to transport generation and network resilience and redundancy testing. A paradigm shift is expected in the fullness of time and as development staging and land use delivery progresses. This shift would include the adoption of a **‘vision-and-validate’** top-down approach to manage traffic and transport outcomes.

Our analysis with the above in mind is set out in the following report sub-section.

6.5 Transport (Traffic) Management

6.5.1 Analysis Methodology

Transport analysis has been undertaken to assess the impact of the indicative development traffic on the performance of intersections within the vicinity of the Town Centre. The assessment methodology was as follows:

1. Interrogate the Melton Integrated Transport Model (MITM) to understand the zoning system, transport infrastructure inputs and land use assumptions for the 2041 model year.
2. Determine the critical period (i.e. weekday AM or PM) for transport modelling assessment.
3. Understand indicative land use assumptions for the Mt Atkinson MTC in 2041.
4. For the critical period, remove traffic demand associated with the Mt Atkinson MTC and then run the MITM for the 2041 year. The results of this model will then form a ‘Future Base’ scenario.
5. Prepare intersection traffic movement diagrams for the ‘Future Base’ scenario.
6. Using SIDRA, assess the performance of key intersections within the ‘Future Base’ scenario.
7. Determine the likely traffic to be generated by the indicative 2041 land use assumptions during the critical analysis period and distribute this traffic through the network.
8. Using SIDRA, assess the impact of the above development traffic on the performance of key intersections within the network and the need for any mitigating road works.

The results of the above analysis methodology are detailed in the following sub-sections.

6.5.2 Melton Integrated Transport Model (MITM) Interrogation

Council provided Stantec consent to interrogate and run the MITM for this project. Key information extracted from the MITM for the 2041 model year included:

- The model extent and zoning system
- Transport network assumptions, including:
 - If the Mt Atkinson Train Station was assumed to be delivered
 - If the Outer Metropolitan Ring Road was assumed to be delivered
 - The number of lanes and speed limits on key roads
- Land use assumptions (i.e. population, employment and enrolments) for the Mt Atkinson MTC.
- The modelled outputs for the weekday AM and PM peak period, including:
 - Traffic volumes and volume to capacity ratios for modelled periods
 - Inbound and outbound traffic distributions
 - Public transport mode share.

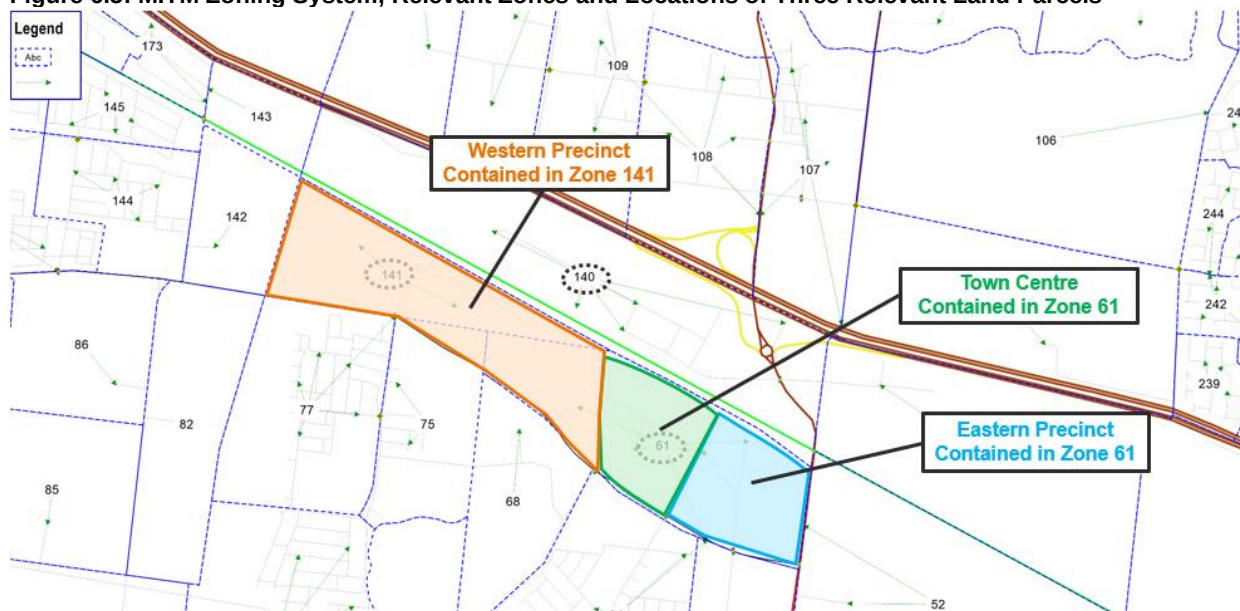
Noting the above, a summary of the information extracted is provided in the following subsections. Full details of the information extracted by Stantec from the model are provided in Appendix A of this report.

Zoning System

A review of the MITM zoning system indicated that zone 61 contained the three relevant parcels of the Mt Atkinson MTC as set out in Table 5.1, namely the Town Centre, Eastern Precinct and Western Precinct, noting some of the Western Precinct is also contained within zone 141. Figure 6.5 shows an extract from MITM showing the relevant zones. This figure also shows the locations of the three aforementioned land parcels of the Mt Atkinson MTC.



Figure 6.5: MITM Zoning System, Relevant Zones and Locations of Three Relevant Land Parcels



Transport Network Assumptions

A review of the MITM transport network indicated the following for the 2041 model year:

- Both Troups Road and Mt Atkinson Road are shown to connect to the south to Riding Boundary Road and Boundary Road.
- Greigs Road is shown to connect to Mount Cottell Road to the west. Greigs Road is shown to be upgraded to 2 lanes in each direction between Mount Cottell Road and Hopkins Road.
- Hopkins Road and the Western Freeway are shown to be upgraded to three lanes in each direction.
- The Mt Atkinson Train Station and the Outer Metropolitan Ring Road are **not** shown to be delivered.
- Grand Boulevard is configured with a 70km/hr speed limit. All other roads in the vicinity of the Town Centre are configured with a 50km/hr speed limit.

Land Use Assumptions

A review of the MITM land use assumptions indicated that compared to the proposed land use yields, the MITM included only modest land use assumptions for both zones 61 and 141 (i.e. the zones containing the of the Mt Atkinson MTC) – much less than contemplated as part of the PSP and this UDF.

Table 6.1: MITM Land Use Assumptions

Zone	Population	Retail Employment	Total Employment	Primary Enrolments	Secondary Enrolments	Tertiary Enrolments
Zone 61	1,797	45	295	48	0	0
Zone 141	56	7	74	0	0	0

Modelled Outputs

The MITM indicated the following performance metrics:

- The Western Freeway is operating at capacity in both the AM and PM peak periods (noting that MITM assumes it has been upgraded to three lanes in each direction).
- The distribution of vehicle trips to/from the of the Mt Atkinson MTC are heavily biased towards the east and north. There is also a significant distribution of trips to/from the west, with a minimal distribution of trips to/from the south.
- Public transport mode share within zone 61 and to/from zones 140 and 141 is 7% in the AM peak period and 6% in the PM peak period.

The model run also confirmed that the PM peak period is the critical period for assessment, as traffic volumes in the PM peak are significantly higher than in the AM peak. In addition, the of the Mt Atkinson MTC is expected to generate significantly more traffic in the PM peak compared to the AM peak. As such, this assessment focusses on the critical PM road network peak hour.

6.5.3 Land Use Assumptions

The Town Centre, Eastern Precinct and Western Precinct that make up the Mt Atkinson MTC are contained within MITM zones 61 and 141. Due to this zoning system, the indicative traffic expected to be generated by all three land parcels have been included within our analysis (the study area).

Noting the above, the indicative land use yields for each precinct that make up the Mt Atkinson MTC and expected to be delivered by 2041 are outlined at Table 5.1. The traffic associated with these yields has been adopted for assessment.

6.5.4 Intersection Modelling Approach

Stantec has assessed the impact of the development traffic on the road network during the weekday PM peak using the SIDRA INTERSECTION 9.0⁸ (SIDRA) modelling program for three 2041 design year scenarios, as follows:

- Scenario 1: Future Base
- Scenario 2: Post Development
- Scenario 3: Post Development with Mt Atkinson Train Station

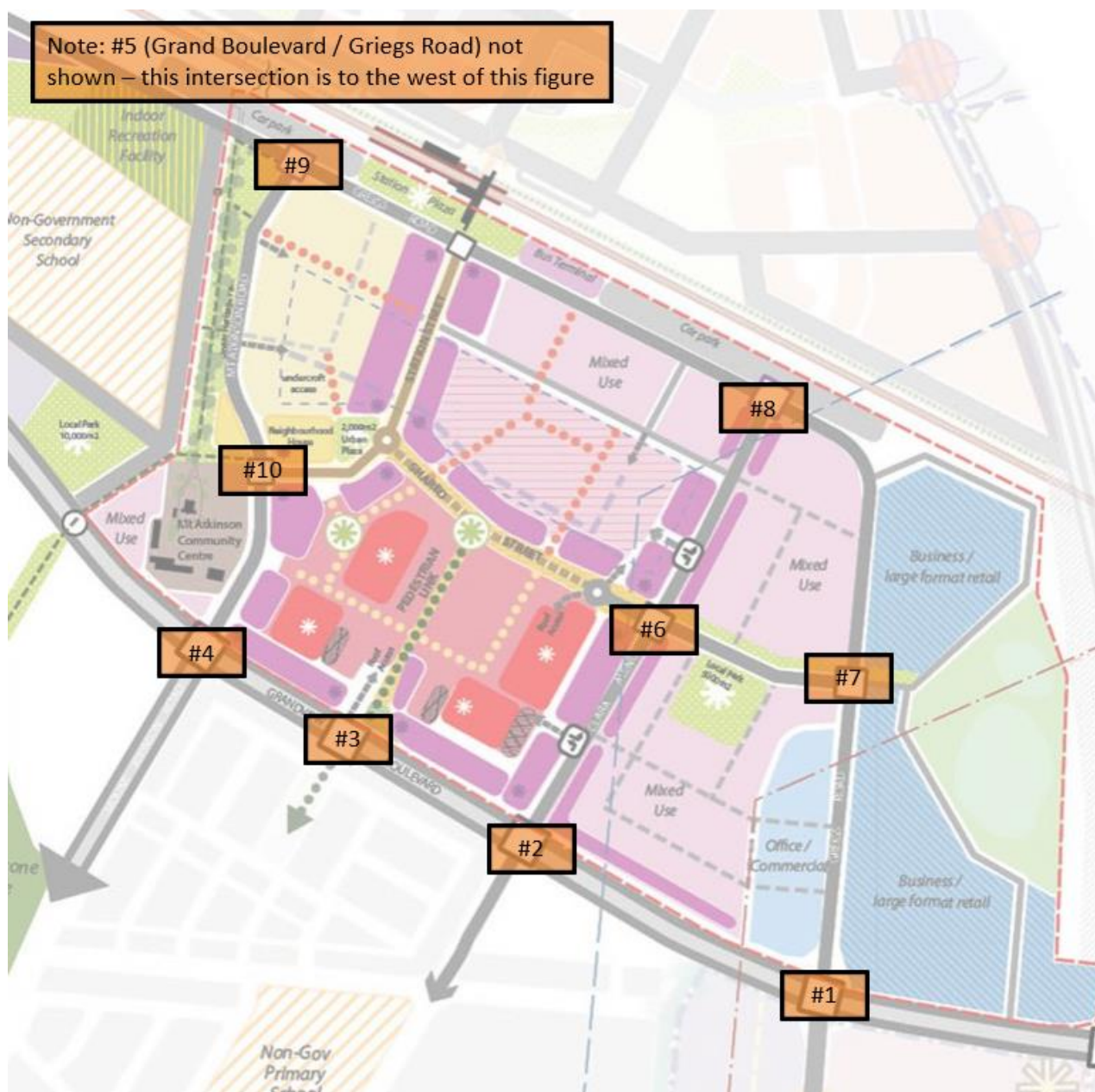
A summary of the intersections modelling within each scenario is provided at Table 6.2, while Figure 6.6 shows the location of each intersection. Further discussion regarding the rationale for the intersections included for each scenario is presented in the following sections.

Table 6.2: Summary of Intersections Modelled Within Each Scenario

Intersection	Scenario 1: Future Base	Scenario 2: Post Development	Scenario 3: Post Development with Train Station
Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)	✓	✓	✓
Grand Boulevard / Clara Avenue (intersection #2)	✓	✓	✓
Grand Boulevard / Shopping Centre Access (intersection #3)	x	✓	✓
Grand Boulevard / Mt Atkinson Road (intersection #4)	✓	✓	✓
Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5)	✓	✓	✓
Clara Avenue / East-West Road (intersection #6)	x	✓	x
Greigs Road / East-West Road (intersection #7)	x	✓	x
Clara Avenue / Greigs Road (intersection #8)	x	✓	x
Greigs Road / Mt Atkinson Road (intersection #9)	x	✓	x
Mt Atkinson Road / Shared Street (intersection #10)	x	✓	x
Total	4 intersections modelled	10 intersections modelled	5 intersections modelled

⁸ Program used under license from Akcelik & Associates Pty Ltd. SIDRA Intersection is a computer-based modelling package used to calculate intersection performance.

Figure 6.6: Intersections Modelled Using SIDRA



Commentary on the inputs, outputs and assumptions for each Scenario are provided within the following sub-sections.

6.5.5 2041 Future Base Traffic Volumes

The 2041 Future Base traffic volumes were determined as follows:

- Land use assumptions and associated traffic demand were removed from MITM zones 61 and 141 (i.e. the zones that included the Mt Atkinson MTC).
- MITM was run for the 2041 year PM peak hour.

The traffic volumes used for this scenario are shown at Figure 6.7 and Figure 6.8. It is noted that for this scenario only the Grand Boulevard corridor was modelled (i.e. intersections #1, #2, #4 and #5) as under this scenario there is negligible traffic at the Town Centre's internal intersections.

Figure 6.7: 2041 Future Base Traffic Volumes – Grand Boulevard Corridor (1 of 2)⁹

				Clara Avenue								Griegs Road (east)			
Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	4	11	Light
9	0	9	↑	0	0	0	Heavy	0	0	0	↑	0	0	0	Heavy
1090	0	1,090	→	0	0	0	Total	908	0	908	→	0	4	11	Total
13	0	13	↓	←	↓	↘		189	0	189	↓	←	↓	↘	Grand Boulevard
← ↑ →				↑	0	0	0	← ↑ →				↑	1	0	1
Light	15	0	3	←	306	0	306	Light	44	0	12	←	271	0	271
Heavy	0	0	0	↓	0	0	0	Heavy	0	0	0	↓	0	0	6
Total	15	0	3	Light Heavy Total				Total	44	0	12	Light Heavy Total			

Figure 6.8: 2041 Future Base Traffic Volumes – Grand Boulevard Corridor (2 of 2)

				Griegs Road (west)								Mt Atkinson Road			
Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	0	0	Light
4	0	4	↑	0	0	0	Heavy	1	0	1	↑	0	0	0	Heavy
1063	0	1,063	→	0	0	0	Total	1104	0	1,104	→	0	0	0	Total
30	0	30	↓	←	↓	↘		0	0	0	↓	←	↓	↘	
Grand Boulevard	← ↑ →			↑	0	0	0	← ↑ →				↑	0	0	0
Light	19	0	14	←	244	0	244	Light	0	1	9	←	300	0	300
Heavy	0	0	0	↓	22	0	22	Heavy	0	0	0	↓	21	0	21
Total	19	0	14	Light Heavy Total				Total	0	1	9	Light Heavy Total			

From the above diagram we can observe that the direction of traffic travelling on Grand Boulevard is biased towards the east (i.e. towards the Melbourne CBD). This is inconsistent with typical modelling outputs for a PM peak, where traffic is generally biased in a direction away from the CBD (i.e. westbound).

⁹ It is noted that these traffic volume figures show a split of 100% light vehicles and 0% heavy vehicles. However, in the SIDRA network modelling, a split of 98% light vehicles and 2% heavy vehicles was adopted.

A review of MITM indicates that the Hopkins Road interchange with the Western Freeway is operating with a Level of Service 'F' in the southbound direction. As such, a significant amount of traffic arriving from the Western Freeway to the west and heading to the north has redistributed to Grand Boulevard via the Leakes Road interchange, bypassing the Hopkins Road interchange.

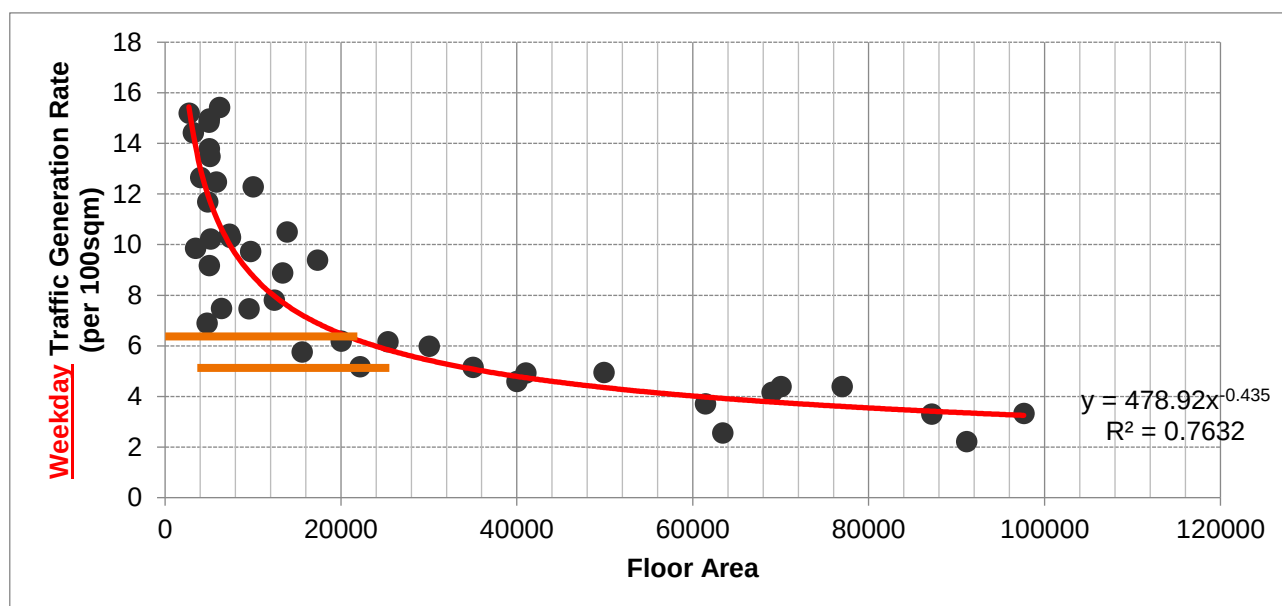
6.5.6 Traffic Generation

A summary of the anticipated peak hour and daily traffic generation for the Mt Atkinson MTC is presented in Table 6.3. The assessment includes consideration of the 'Town Centre', 'Western Precinct' and 'Eastern Precinct'. With the exception of the retail rate, the traffic generation rates have been generally adopted from the RMS Guide to Generating Developments document and from the background reports that inform the overarching Guide.

The retail traffic generation rates have been sourced from the Stantec traffic survey database which includes over 40 shopping centre traffic generation data points.

For this UDF application, it is proposed to increase the proposed level of retail floor area from the existing cap of 23,500sqm to 50,000sqm. It is commonly accepted that as a retail centre increase in size typically customers spend more time at the centre and as such, larger centres have a lower 'per 100sqm' or traffic generation rate compared to smaller centres. This relationship is identified in Figure 6.9, which plots the existing traffic generation rates of existing shopping centres based on their floor area (and clearly demonstrates reducing traffic generation rates as centres increase in size).

Figure 6.9: Shopping Centre Traffic Generation Rates



Based on the graph, a shopping centre with a floor area of 23,500sqm (current cap) would be expected to generate traffic at a rate of 6.14 movements per 100sqm (= 1,442vph) compared to a shopping centre of 50,000sqm (proposed) which would be expected to generate traffic at a rate of 4.19 movements per 100sqm (= 2,096vph).

Therefore, despite the proposed shopping centre or retail use being 113% larger than the cap it is expected to generate only 65% more traffic (or +654vph during the weekday PM peak hour). A comparison to the overall study area indicates that the additional retail traffic equates to a 16% increase (= 654 / 4,107).

Table 6.3: Forecast Development Traffic Generation – Weekday Peak Hour and Daily

Land Use	Size	Traffic Generation Rate		Traffic Generation	
		PM Peak Hour	Daily	PM Peak Hour	Daily
Town Centre					
Retail	50,000sqm	4.19 movements per 100sqm	41.9 movements per 100sqm	2,096	20,958
Office	15,000sqm	1.2 movements per 100sqm	12 movements per 100sqm	180	1,800
Community	2,500sqm	2.0 movements per 100sqm	20 movements per 100sqm	50	500
Residential (apartments)	320 dwellings	0.25 movements per dwelling	2.5 movements per dwelling	80	800
Sub Total				2,406	24,058
Western Precinct					
Residential (dwelling)	240 dwellings	0.5 movements per dwelling	5 movements per dwelling	120	1,200
Employment (Industrial)	36,000sqm (3.6ha)	0.56 movements per 100sqm	4.6 movements per 100sqm	202	1,656
School	750 students (6ha)	0.27 movements per student	1 movement per student	203	750
Indoor Recreation Facility	2,500sqm (0.67ha)	4.5 movements per 100sqm	30 movements per 100sqm	113	750
Sub Total				637	4,356
Eastern Precinct					
Large Format Retail	43,000sqm	1.31 movements per 100sqm	17 movements per 100sqm	563	7,310
Office	32,000sqm	1.2 movements per 100sqm	12 movements per 100sqm	384	3,840
Residential (apartment)	150 dwellings	0.25 movements per dwelling	2.5 movements per dwelling	38	375
Residential (townhouse)	200 dwellings	0.4 movements per dwelling	4.0 movements per dwelling	80	800
Sub Total				1,065	12,325
Sub Total (all three precincts)				4,107	40,739
Multi-Purpose Trip Discount (10%)				410	4,074
Total (including multi-purpose trip discount)				3,696	36,665

Table 6.3 indicates that having regard for a modest 10% multi-trip discount the study area could be expected to generate approximately 3,696 movements during the weekday PM peak hour and approximately 36,665 movements across a typical day.

6.5.7 Traffic Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development will be influenced by a number of factors, including the:

1. configuration of the future road network providing access to the study area
2. operation/performance of intersections used to access the study area
3. likely distribution of employee's residences in relation to the study area
4. configuration of access points to the study area.

Having consideration to the above, for the purposes of estimating vehicle movements, the overall directional distributions shown at Table 6.4 and Table 6.5 have been adopted. This is generally consistent with the directional distributions adopted in the MITM.

Table 6.4: Directional distributions - arrivals

Arrivals	Percentage Split
From the east via Hopkins Road	58%
From the west via Greigs Road	25%
From the south via Mt Atkinson Road	9.5%
From the south via Clara Avenue	2.5%
From the south via Strathbogie Road	5%

Table 6.5: Directional distributions - departures

Arrivals	Percentage Split
To the east via Hopkins Road	64%
To the west via Greigs Road	20%
To the south via Mt Atkinson Road	8.5%
To the south via Clara Avenue	2.5%
To the south via Strathbogie Road	5%

In addition to the directional distribution analysis presented above, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) for the various uses is summarised in Table 6.6. These directional splits are consistent with the 'traffic engineering rule of thumb' for each use and are considered appropriate for adoption.

Table 6.6: Directional split of traffic

Land Use	Inbound	Outbound
• Retail • Large Format Retail • Employment (Industrial) • Indoor Recreation Facility • Community	50%	50%
Office	10%	90%
Residential	60%	40%
School	45%	55%

Based on the traffic generation outlined in Section 6.5.6 and the traffic distribution outlined in Section 6.5.7, Figure 6.10 and Figure 6.11 have been prepared to show the site generated traffic along the Grand Boulevard corridor. A full network diagram which also includes the Town Centre's internal intersections is provided at Appendix D.

Figure 6.10: Site Generated Traffic Volumes – Grand Boulevard Corridor (1 of 2)

				Shopping Centre Access				Clara Avenue				Greigs Road (east)			
Light	Heavy	Total		Light	Heavy	Total		Light	Heavy	Total		Light	Heavy	Total	
141	0	141	↓	0	0	Heavy	139	0	139	↓	0	0	0	Heavy	
551	0	551	→	130	250	Total	639	0	639	→	174	19	403	Total	
0	0	0	↑	↓	↓		23	0	23	↑	↓	↓	↓		Grand Boulevard
				↑	301	0	301	↑	↑	↑	↑	↑	300	0	300
				←	312	0	312	←	420	0	420	←	666	0	666
				Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total	Light	Heavy	Total
				Light	19	17	3	Light	51	32	0	Light	0	0	0
				Heavy	0	0	0	Heavy	0	0	0	Heavy	0	0	0
				Total	19	17	3	Total	51	32	0	Total	0	0	0

Figure 6.11: Site Generated Traffic Volumes – Grand Boulevard Corridor (1 of 2)

				Greigs Road (west)				Mt Atkinson Road							
Light	Heavy	Total		68	0	0	Light	Light	Heavy	Total		57	46	191	Light
63	0	63	↓	0	0	0	Heavy	64	0	64	↓	0	0	0	Heavy
353	0	353	→	68	0	0	Total	410	0	410	→	57	46	191	Total
0	0	0	↱	↱	↓	↱		17	0	17	↱	↱	↓	↱	
Grand Boulevard	↱	↑	↱	↱	0	0	0	↱	↑	↱	↱	↱	52	0	52
Light	0	0	0	↱	338	0	338	Light	0	66	92	↱	281	0	281
Heavy	0	0	0	↱	0	0	0	Heavy	0	0	0	↱	110	0	110
Total	0	0	0		Light	Heavy	Total	Total	0	66	92		Light	Heavy	Total

6.5.8 Other Considerations (Network Capacity Limitations)

The land use traffic generation rates relied upon have been documented at Section 6.5.6. These rates have generally been based on land use survey data for locations that reflect “free-flow” traffic and transport conditions.

The adoption of specific land use traffic generation rates is one of two primary component considerations in likely traffic outcomes in and around the subject land. The second relates to background traffic volumes as documented at Section 6.5.5.

In this regard, traffic networks, not unlike all movement-based networks, are subject to a finite transport capacity which is regulated by the number of trafficable lanes and metering of those lanes as competing demands arrive from all compass directions. On this occasion the main limitation on capacity in the area was observed to be the Hopkins Road interchange with the Western Freeway.

Noting the above, in practice, intersections which are at or near capacity experience subdued levels of land use traffic generation or have the resultant effect of re-distributing background traffic demands to alternate routes which offer a higher level of service. This was observed at Figure 6.7, where it was observed that a significant amount of traffic arriving from the Western Freeway to the west and heading to the north has redistributed to Grand Boulevard via the Leakes Road interchange, as Grand Boulevard offered a greater Level of Service (and improved travel times).

Having consideration to the above, once land use development is realised within the study area, Grand Boulevard will operate with a reduced Level of Service. As such, it is expected that there will be a re-distribution of some eastbound traffic movements on Grand Boulevard to alternate east-west routes, such as Riding Boundary Road.

Based on the above, it is considered reasonable to redistribute 276 vehicles eastbound Grand Boulevard traffic volumes (approximately equal to 25% of the Grand Boulevard Future Base eastbound demand) to alternate east-west routes that are outside of the intersections modelled.

6.5.9 2041 Post Development Traffic Volumes

Noting the commentary in the previous sub-section, Figure 6.12 and Figure 6.13 have been prepared to show the post development traffic along the Grand Boulevard corridor. A full network diagram which also includes the Mt Atkinson MTC's internal intersections is provided at Appendix D.

Figure 6.12: 2041 Post Development Traffic Volumes – Grand Boulevard Corridor (1 of 2)

				Shopping Centre Access								Clara Avenue								Greigs Road (east)							
Light	Heavy	Total		130	250	Light		Light	Heavy	Total		174	19	403	Light		Light	Heavy	Total		94	33	320	Light			
141	0	141	↑	0	0	Heavy		148	0	148	↑	0	0	0	Heavy		39	0	39	↑	0	0	0	Heavy			
1388	0	1,388	→	130	250	Total		1453	0	1,453	→	174	19	403	Total		1610	0	1,610	→	94	33	320	Total			
0	0	0	↓	↑	↓			36	0	36	↓	↑	↓	↓			262	0	262	↓	↑	↓	↓	Grand Boulevard			
				↑	301	0	301		↑	↑	↑	↑	383	0	383		↑	↑	↑	↑	↑	301	0	301			
				↑	633	0	633	Light	34	17	6	↑	726	0	726	Light	95	32	12	↑	937	0	937				
				Light Heavy Total				Heavy	0	0	0	↓	8	0	8	Heavy	0	0	0	↓	0	0	6				
								Total	34	17	6	Light Heavy Total				Total	95	32	12	Light Heavy Total							

Figure 6.13: 2041 Post Development Traffic Volumes – Grand Boulevard Corridor (2 of 2)

				Greigs Road (west)				Mt Atkinson Road							
Light	Heavy	Total		68	0	0	Light	Light	Heavy	Total		57	46	191	Light
67	0	67	↓	0	0	0	Heavy	65	0	65	↓	0	0	0	Heavy
1140	0	1,140	→	68	0	0	Total	1238	0	1,238	→	57	46	191	Total
30	0	30	↓	↓	↓	↓		17	0	17	↓	↓	↓	↓	
Grand Boulevard				↓	0	0	0	↓	↓	↓	↓	↓	52	0	52
Light	19	0	14	←	582	0	582	Light	0	67	101	←	581	0	581
Heavy	0	0	0	↓	22	0	22	Heavy	0	0	0	↓	131	0	131
Total	19	0	14	Light Heavy Total				Total	0	67	101	Light Heavy Total			

6.5.10 2041 Post Development Traffic Volumes – With Mt Atkinson Train Station

Following the delivery of the Mt Atkinson Train Station, there is expected to be a mode shift away from private car towards alternate forms of transport. As shown at Figure 6.4, the delivery of the train station is likely to change private car mode share from approximately 94% to approximately 70% based on the 2041 land use scenario for the Mt Atkinson MTC. That is, a reduction in traffic generated by the site by approximately 25% (calculated as 70%/94%) for the same levels of development on the basis of improved accessibility by non-car modes is achieved with the implementation of the station.

Noting the above, this 2041 Post Development 'with Train Station' scenario has been prepared to demonstrate the road network performance following the delivery of the train station (i.e. any improvements compared to the without station option and the latent capacity in the network).

Figure 6.14 and Figure 6.15 have been prepared to show the 2041 post development traffic along the Grand Boulevard corridor following the delivery of the train station.

Figure 6.14: 2041 Post Development 'with Train Station' Traffic Volumes – Grand Boulevard Corridor (1 of 2)

				Shopping Centre Access				Clara Avenue								Griegs Road (east)									
Light	Heavy	Total		97	188	Light	Light	Heavy	Total	131	14	302	Light	Light	Heavy	Total	71	26	243	Light					
106	0	106	↗	0	0	Heavy		113	0	113	↗	0	0	0	Heavy	29	0	29	↗	0	0	0	Heavy		
1250	0	1,250	→	97	188	Total		1293	0	1,293	→	131	14	302	Total	1366	0	1,366	→	71	26	243	Total		
0	0	0	↘	↖				30	0	30	↘	↖	↓	↖		244	0	244	↘	↖	↓	↖	Grand Boulevard		
				↖	226	0	226			↖	↑	↖	↖	212	0	212			↖	↑	↖	↖	301	0	301
				←	555	0	555	Light	29	13	5	←	621	0	621	Light	82	24	12	←	695	0	695		
				Light Heavy Total				Heavy	0	0	0	↘	6	0	6	Heavy	0	0	0	↘	0	0	0	6	
				Total				29	13	5	Light Heavy Total				Total	82	24	12	Light Heavy Total						

Figure 6.15: 2041 Post Development 'with Train Station' – Grand Boulevard Corridor (2 of 2)

				Griegs Road (west)								Mt Atkinson Road			
Light	Heavy	Total		51	0	0	Light	Light	Heavy	Total		43	35	143	Light
51	0	51	↗	0	0	0	Heavy	49	0	49	↗	0	0	0	Heavy
1052	0	1,052	→	51	0	0	Total	1135	0	1,135	→	43	35	143	Total
30	0	30	↘	↖	↓	↖		13	0	13	↘	↖	↓	↖	
Grand Boulevard	↖	↑	↖	↖	0	0	0	↖	↑	↖		↖	39	0	39
Light	19	0	14	←	498	0	498	Light	0	51	78	←	511	0	511
Heavy	0	0	0	↖	22	0	22	Heavy	0	0	0	↖	103	0	103
Total	19	0	14	Light Heavy Total				Total	0	51	78	Light Heavy Total			

6.5.11 Traffic Impact Assessment

An assessment of the study area traffic on the performance of the road network has been carried out using SIDRA INTERSECTION 9.0¹⁰ (SIDRA) for the three scenarios, as follows:

- Scenario 1: Future Base
- Scenario 2: Post Development
- Scenario 3: Post Development with Mt Atkinson Train Station

Commentary on the modelling inputs and assumptions (including the specific intersection layouts that have been tested) adopted for the assessment are provided at Appendix B.

The performance of intersections assessed within the three modelled scenarios is presented at Table 6.7, with detailed analysis results presented at Appendix E.

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The *DOS* represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DOS of around 0.95 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately¹¹.

¹⁰ Program used under license from Akcelik & Associates Pty Ltd.

¹¹ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Table 6.7: Modelled Intersection Performance Results

Intersection	Weekday PM Peak Intersection Performance					
	2041 Future base		Post Development		Post Development – with Mt Atkinson Train Station	
	DOS	Average Queue	DOS	Average Queue	DOS	Average Queue
Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)	0.63	81m	0.89	177m	0.85	91m
Grand Boulevard / Clara Avenue (intersection #2)	0.82	100m	0.88	138m	0.75	57m
Grand Boulevard / Shopping Centre Access (intersection #3)	-	-	0.83	94m	0.73	48m
Grand Boulevard / Mt Atkinson Road (intersection #4)	0.82	101m	0.72	132m	0.86	124m
Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5)	0.74	85m	0.80	98m	0.74	83m
Clara Avenue / East-West Road (intersection #6)	-	-	0.71	45m	-	-
Greigs Road / East-West Road (intersection #7)	-	-	0.45	26m	-	-
Clara Avenue / Greigs Road (intersection #8)	-	-	0.13	4m	-	-
Greigs Road / Mt Atkinson Road (intersection #9)	-	-	0.10	2m	-	-
Mt Atkinson Road / Shared Street (intersection #10)	-	-	0.63	28m	-	-

Table 6.7 indicates that each of the assessed intersections are forecast to operate with a 'good' level of service or better, with manageable queues and delays on all approaches.

It is also noted that under Scenario 3 (i.e. 2041 Post Development with Mt Atkinson Train Station) there is additional capacity created at key intersections along the Grand Boulevard corridor. This outcome would suggest that additional land use intensification could be contemplated at the Mt Atkinson MTC following the delivery of the Mt Atkinson Train Station and the associated changes in travel behaviour. This is consistent with the three stages of urban development presented earlier at Section 6.2.

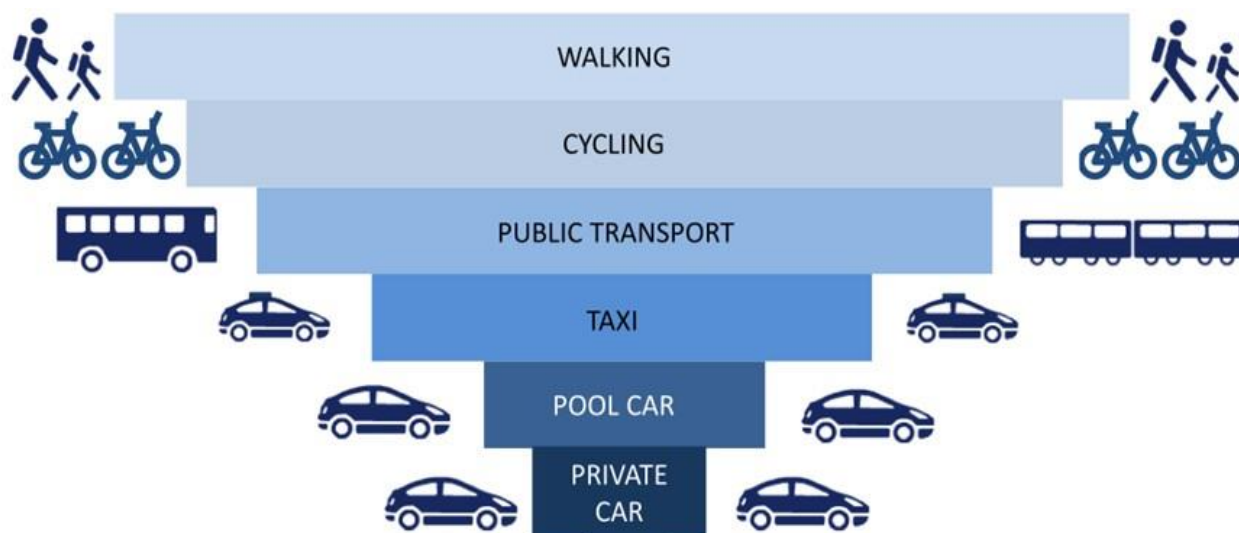
Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

7. Precinct Design & Cross-Sections

7.1 Planning Approach

The planning and design of the Mt Atkinson MTC has been based on a modal hierarchy that prioritises walking, cycling and public transport, with the lowest priority given to the private car. This modal hierarchy is shown at Figure 7.1. The adoption of this modal hierarchy is expected to assist in achieving a high amenity environment that supports the vibrancy and safety aspired for the Mt Atkinson MTC.

Figure 7.1: Mt Atkinson Major Town Centre Modal Hierarchy



As outlined earlier within this report, there is a large body of evidence which indicates that population and employment densities drive lower car mode shares and associated road space allocation. As densities increase, there is a need for more space efficient transport modes to be prioritised, as car only travel is not able to be provided within the available road corridor widths. As such, road links within a close proximity to the Mt Atkinson MTC, and especially within it, should have a higher level of space allocated to walking, cycling and public transport.

It is noted that the design of the Mt Atkinson MTC has been designed to consolidate access to car parking and minimise uncontrolled conflict points between motorists and users of active transport. This approach is considered consistent with the longer desired operation and function of a centre of this scale and density. Undermining this intent and allowing vehicle intrusion within the core area of the Mt Atkinson MTC would be expected to have safety, amenity and accessibility impacts.

7.2 Active Travel

7.2.1 Pedestrian Infrastructure

Principal Pedestrian Network

A Principal Pedestrian Network generally following the arterial road network is set out in the Moving Melton – Integrated Transport Strategy. It is expected that high quality pedestrian paths will be provided on the connector level roads and within the Mt Atkinson MTC, including those shown in the Public Transport and Path Network Plan in the Mt Atkinson and Tarneit Plains PSP.

Collectively these pedestrian facilities should be sufficient to service the Mt Atkinson & Tarneit Plains PSP. However, the delivery of high-quality pedestrian paths within a 2km local catchment of the Mt Atkinson MTC should also be prioritised in order to encourage walking as a mode of transport.

Mt Atkinson Major Town Centre

Within the Mt Atkinson MTC and along the pedestrian connections to key points of access (train station, bus stops, car parks, etc.), the road environment and pedestrian crossing arrangements are expected to prioritise pedestrian movements. This is expected to be delivered through the following design elements:

- Providing opportunities to deliver pedestrianised areas.
- Providing a low-speed environment through suitable surfacing and traffic calming measures, and/or shared spaces.
- Having clear footpath widths that support the likely high demand levels.
- Crossing facilities on each intersecting road that prioritises pedestrians, such as zebra or wombat crossings.
- Traffic signals that prioritise pedestrian crossing movements through short cycle times and all crossing phases.

7.2.2 Cycling Infrastructure

Principal Bicycle Network

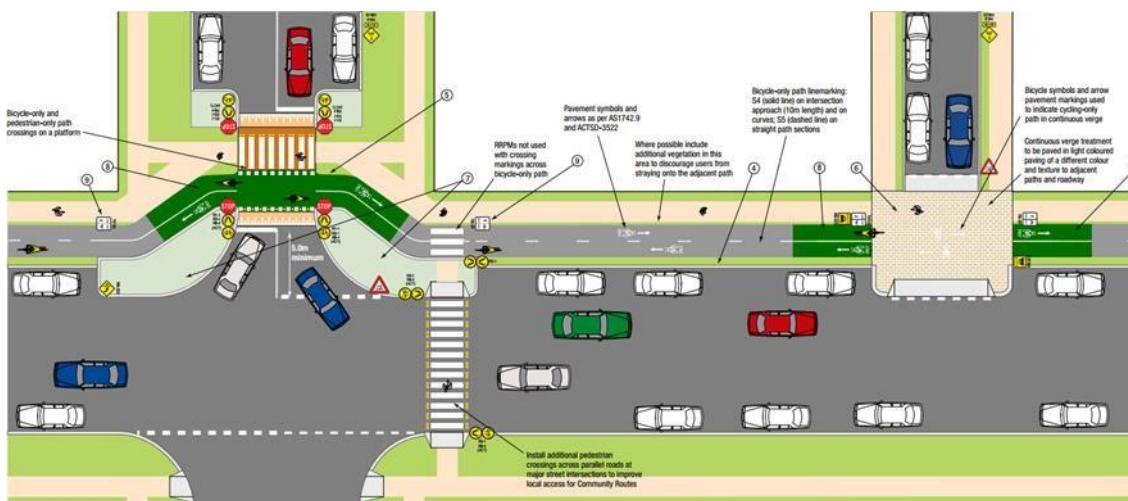
There is a Principal Bicycle Network that essentially follows the arterial road network set out in the Moving Melton – Integrated Transport Strategy. It is expected that high quality facilities will be provided on the connector level roads and within the key Mt Atkinson MTC, including those shown in the Public Transport and Path Network Plan in the Mt Atkinson and Tarneit Plains PSP.

Collectively these facilities, along with on-road facilities on lower order roads, will service the Mt Atkinson and Tarneit Plains PSP. However, the delivery of cycling infrastructure within a 5km local catchment of the Mt Atkinson MTC should also be prioritised in order to encourage cycling as a mode of transport.

Mt Atkinson Major Town Centre

Within the Mt Atkinson MTC, the road environment is expected to be low speed, enabling cyclists to mix with motorists. Alternatively, and at least on the connecting arterial and connector roads (within 5km of the Town Centre), the bicycle facilities should be provided through separated facilities, with crossing facilities that could be consistent with those shown at Figure 7.2 or as per other relevant local cycling design guidelines.

Figure 7.2: Separated Bicycle Crossing Facility for Access Lanes and Access Streets¹²



End-of-trip facilities will be required at key gateway and destination places to the Mt Atkinson MTC. These are recommended to be provided at least in part as public facilities and not solely relied on to be provided as part of private development.

7.3 Public Transport

7.3.1 Train Services

As mentioned above the delivery of the Mt Atkinson Train Station is key in unlocking the Mt Atkinson and Tarneit Plains PSP. The train station will significantly improve the transport accessibility of the Mt Atkinson MTC and accordingly facilitate increasing land use development.

¹² Source: <http://activeinfrastructure.net.au/practitioner-tool/docs/id-b5tdhzn19ukmaemi/ACTSD-0505-DRAFT-170607.pdf>

It will also unlock opportunities for further transport network improvements within the vicinity of the train station. These include the integration of bus routes, providing pick-up/drop-off areas, providing end of trip cycling and micro-mobility facilities and providing a high-quality pedestrian path network connecting with the station.

7.3.2 Bus Services

The area between Melton and Caroline Springs is currently serviced by only one bus route along the Western Freeway. Internal connections and coverage to the areas beyond the Western Freeway are currently non-existent. The delivery of the Mt Atkinson and Tarneit Plains PSP represents a major opportunity to deliver an improved public transport network to service the subject PSP and other surrounding PSP areas.

When the Mt Atkinson Train Station is delivered, part of its success will be based on the integration with bus services via a well-located transport hub. A bus interchange could be provided to provide a high level of service to users, help prioritise interchanges between bus and train and minimise vehicle conflicts.

Opportunities to integrate with the train station are expected to be considered further when the bus network is planned for the area by the Department of Transport and Planning. In this regard, the bus network prior to the delivery of the train station should provide a high level of coverage and frequent services, targeting (say) 95% of residents and jobs within 400m of a bus route. Providing such coverage should be achievable for the Mt Atkinson and Tarneit Plains PSP area, given the previous planning completed on public transport coverage and the principles adopted by the VPA in the development of the PSP.

7.3.3 Road Network

There is a broader arterial and connector road network being developed for the Western Growth Corridor, including the Mt Atkinson and Tarneit Plains PSP and adjacent PSP areas. Various transport modelling activities have and continue to be completed to ensure that a sufficient level of road capacity is available to support the anticipated level of private vehicle and freight movement.

One of the major future road projects is the Outer Metropolitan Ring (OMR) / E6 Transport Corridor, which will be located at the western end of the Mt Atkinson & Tarneit PSP. Moreover, there is a potential opportunity, through Greigs Road, to connect with it via active transport paths, bus services and private car traffic.

Relating specifically to the Mt Atkinson MTC, the Mt Atkinson and Tarneit Plains PSP road network modelling completed by Jacobs in 2016 indicated that sufficient capacity exists to cater for forecast population and employment on the planned internal road network.

More broadly, the Jacobs assessment indicated that the surrounding arterial network is expected to approach capacity by 2046 (the model year), particularly along Hopkins Road around the Western Ring Road and Boundary Road. To cope with the build out of the area, it would be beneficial for Hopkins Road and Greigs Road to be upgraded to four lane arterial roads by 2026.

To ensure that the Mt Atkinson MTC is predominantly focused around active and public transport, with as little conflict with motor vehicles as possible it is recommended that the design:

- Limits property and car park access through the core of the Mt Atkinson MTC (i.e. primary car access be directed around the centre via the surrounding arterial and connector roads).
- Integrates behaviour change initiatives with infrastructure projects to achieve an increased shift away from private car use (i.e. bicycle lanes where appropriate, proportionate walking infrastructure).
- On roads planned to be used as future bus routes, that these roads be designed such that they can accommodate bus movements.

7.4 Daily Traffic Demand

An assessment of the future midblock capacities of each of the key roads servicing the Town Centre is presented in Table 7.1. The road capacities have been determined from the Austroads Guide, the VPA Our Roads Connecting People document and 'traffic engineering rule of thumb'.

Table 7.1: Comparison of Post Development Daily Volumes to Daily Capacity

Location	No. of Lanes (capacity)	Daily Traffic Volumes (vpd)		
		Base	Additional	Post development
Grand Boulevard (between Hopkins Road and Greigs Road/Strathbogie Road)	4 Lanes (up to 40,000vpd)	9,330	22,350	31,680
Grand Boulevard (between Greigs Road/Strathbogie Road and Clara Avenue)	4 Lanes (up to 40,000vpd)	11,360	19,220	30,580
Grand Boulevard (between Clara Avenue and Shopping Centre Access)	4 Lanes (up to 40,000vpd)	11,580	13,990	25,570
Grand Boulevard (between Shopping Centre Access and Mt Atkinson Road)	4 Lanes (up to 40,000vpd)	11,580	11,200	22,780
Greigs Road (between Grand Boulevard and East-West Road)	2 Lanes (up to 14,000vpd)	160	8,020	8,180
Greigs Road (between Clara Avenue and Mt Atkinson Road)	2 Lanes (up to 14,000vpd)	-	4,610	4,610
East-West Road (between Greigs Road and Clara Avenue)	2 Lanes (up to 14,000vpd)	170	1,900	2,070
Clara Avenue (between Grand Boulevard and East-West Road)	2 Lanes (up to 14,000vpd)	-	12,040	12,040
Clara Avenue (between East-West Road and Greigs Road)	2 Lanes (up to 14,000vpd)	-	4,780	4,780
Mt Atkinson Road (between Grand Boulevard and Station Street)	2 Lanes (up to 14,000vpd)	70	4,510	4,580
Mt Atkinson Road (between Station Street and Greigs Road)	2 Lanes (up to 14,000vpd)	60	540	600

The above table provides a comparison of the post development daily volumes against the theoretical capacity of each road based on the road classification (i.e., connector and arterial roads). Based on the analysis, it can be concluded that post development daily volumes all are within the theoretical capacity of each road.

The above assessment indicates that Clara Avenue between Grand Boulevard and the East-West Road will operate satisfactorily with a 2-lane cross-section (single traffic lane in each direction). Notwithstanding, the UDF has been designed with increased building setbacks to Clara Avenue to cater for a potential duplication of the road link, should this be required beyond the 2041 planning horizon.

7.5 Adopted Town Centre Cross-Sections

Cross-sections of the Town Centre's road network have been designed to be in accordance with the requirements and objectives set out in Clause 56 of the Planning Scheme and the Mt Atkinson and Tarneit Plains PSP. This is considered appropriate.

Based on the traffic modelling presented at Section 6.5, the intersection layouts adopted within the modelling (refer Appendix B) were demonstrated to adequately cater for the expected demand for the Town Centre, Eastern Precinct and Western Precinct.

It is expected that detailed engineering plans for the Mt Atkinson MTC's road network cross-sections and intersection layouts will be prepared as part of future planning permit applications.



8. Conclusions

Based on the analysis and discussions presented within this report, the following conclusions are made:

- Melbourne's western corridor has been subject to rapid and sustained growth in the past few decades and is expected to continue well into the future. In support, new transport infrastructure investment and emerging transport network reform will contribute to significant improvements in accessibility across Melbourne's western region.
- The future Mt Atkinson Train Station will provide improved accessibility for the population and new jobs created by the uses within and around the Mt Atkinson MTC.
- Mt Atkinson currently sits within Stage 1 of the three stages of urban development. Mt Atkinson is expected to move to Stage 2 in 2041 and even Stage 3 ultimately.
- To facilitate a mode shift from private car use to other modes of transport, the UDF has been developed to harness the benefits of a range of PSP locational attributes by ensuring that the UDF design responds cohesively with the five "D's" including ensuring that the urban form delivers a pedestrian orientated design.
- Traffic modelling was completed to assess the impact of the indicative development traffic on the performance of intersections within the vicinity of the Town Centre. This assessment indicated that these intersections are forecast to operate with a 'good' level of service or better, with manageable queues and delays on all approaches.
- Following the delivery of the Mt Atkinson Train Station there will be additional capacity created at key intersections along the Grand Boulevard corridor. This outcome would suggest that additional land use intensification could be contemplated at the Town Centre following the delivery of the Mt Atkinson Train Station and the associated changes in travel behaviour.
- The planning and design of the Mt Atkinson MTC has been based on a modal hierarchy that prioritises walking, cycling and public transport, with the lowest priority given to the private car. The adoption of this modal hierarchy is expected to assist in achieving a high amenity environment that supports the vibrancy and safety of the Mt Atkinson MTC.
- An assessment of the daily midblock capacities of each of the key roads servicing the Mt Atkinson MTC has been completed for the 2041 design year. This assessment indicated that the forecast daily volumes all are within the theoretical capacity of each road, even before the delivery of the Mt Atkinson MTC.
- The daily midblock capacity assessment indicated that Clara Avenue between Grand Boulevard and the East-West Road will operate satisfactorily with a 2-lane cross-section (single traffic lane in each direction). Notwithstanding, the UDF has been designed with increased building setbacks to Clara Avenue to cater for a potential duplication of the road link, should this be required beyond the 2041 planning horizon.
- The cross-sections of the Mt Atkinson MTC's road network have been designed to be in accordance with the requirements and objectives set out in Clause 56 of the Planning Scheme and the Mt Atkinson and Tarneit Plains PSP, which is considered appropriate.

Appendix A. Stantec Review of Melton Integrated Transport Model (MITM)





Melton Integrated Transport Model (MITM) – Model Review

Model Details

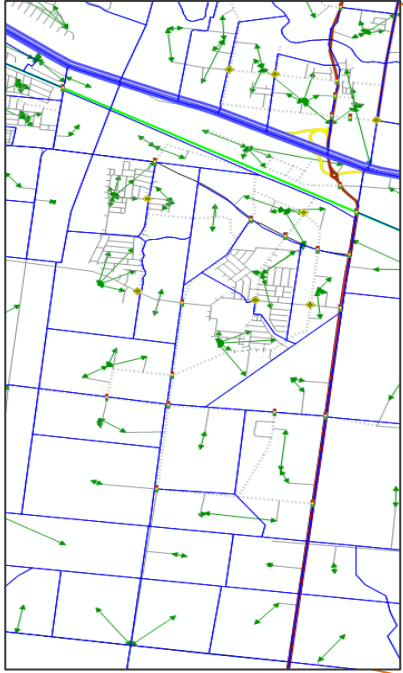
Software: PTV VISUM 21.01-10

Model Application:

- Simulation Based Assignment (SBA) Modelling
- Mesoscopic Dynamic Model – 15min profile
- Models signal control
- AM Peak: 6:30 to 9:00 (2hr +30 min warm up time)
- PM Peak Period 14:30 to 18:00 (3hr+ 30 min warm up time)



Zones & Connectors

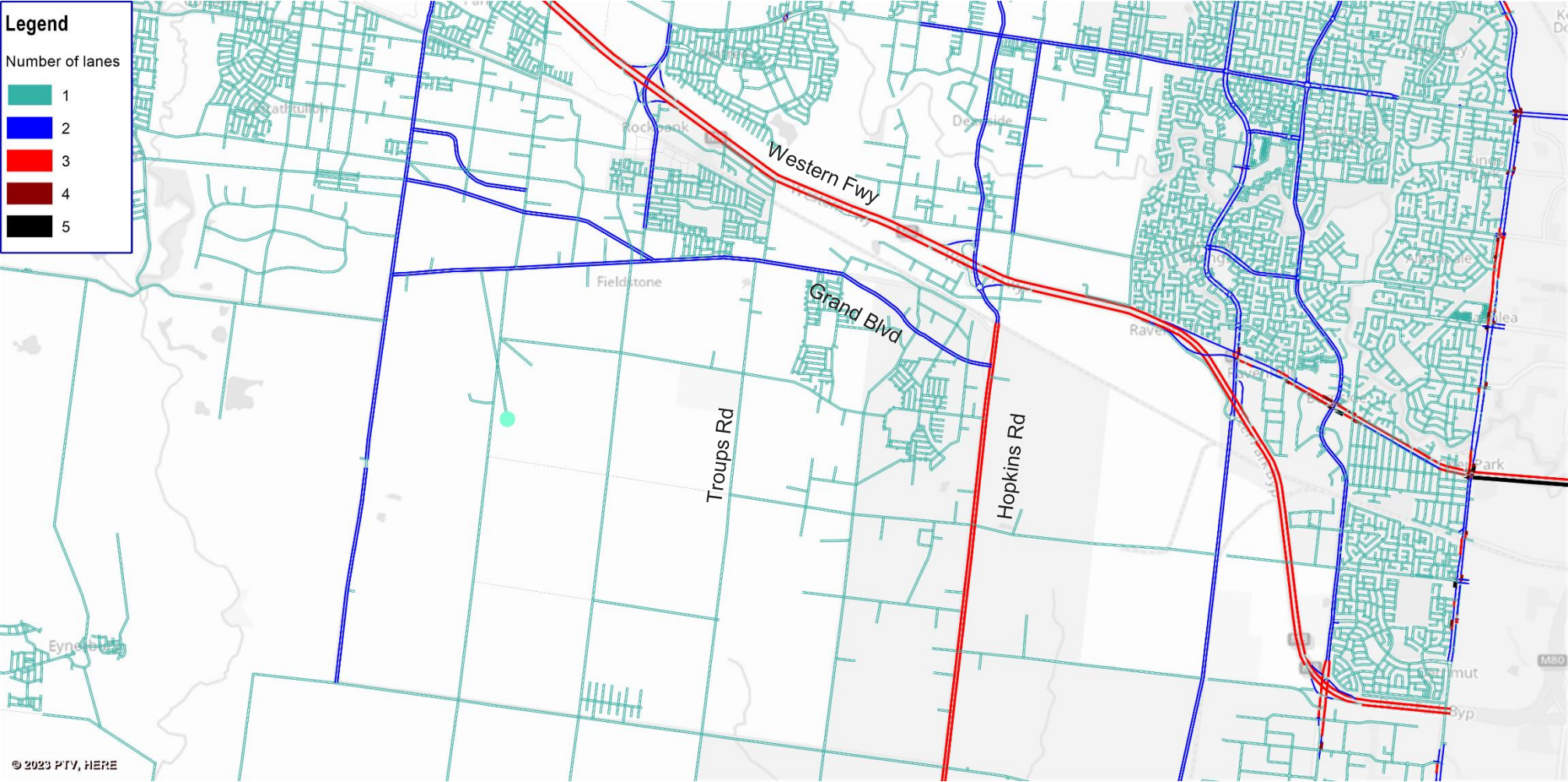


Zones are very detailed. Individual residential blocks are represented.



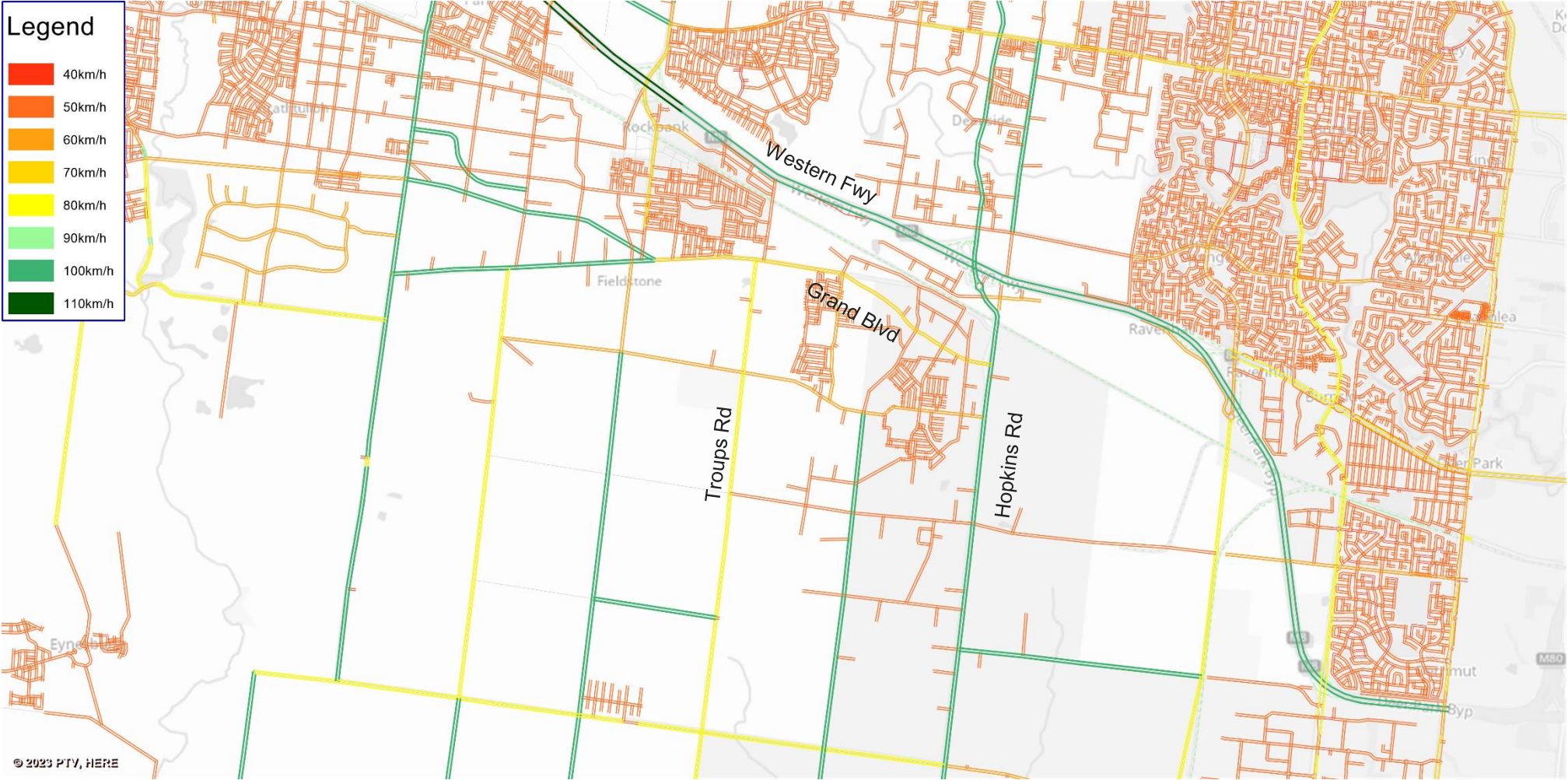
Network Inputs

Mt. Atkinson PSP: Overall



Number of Lanes

Mt. Atkinson PSP: Overall



Posted Speed

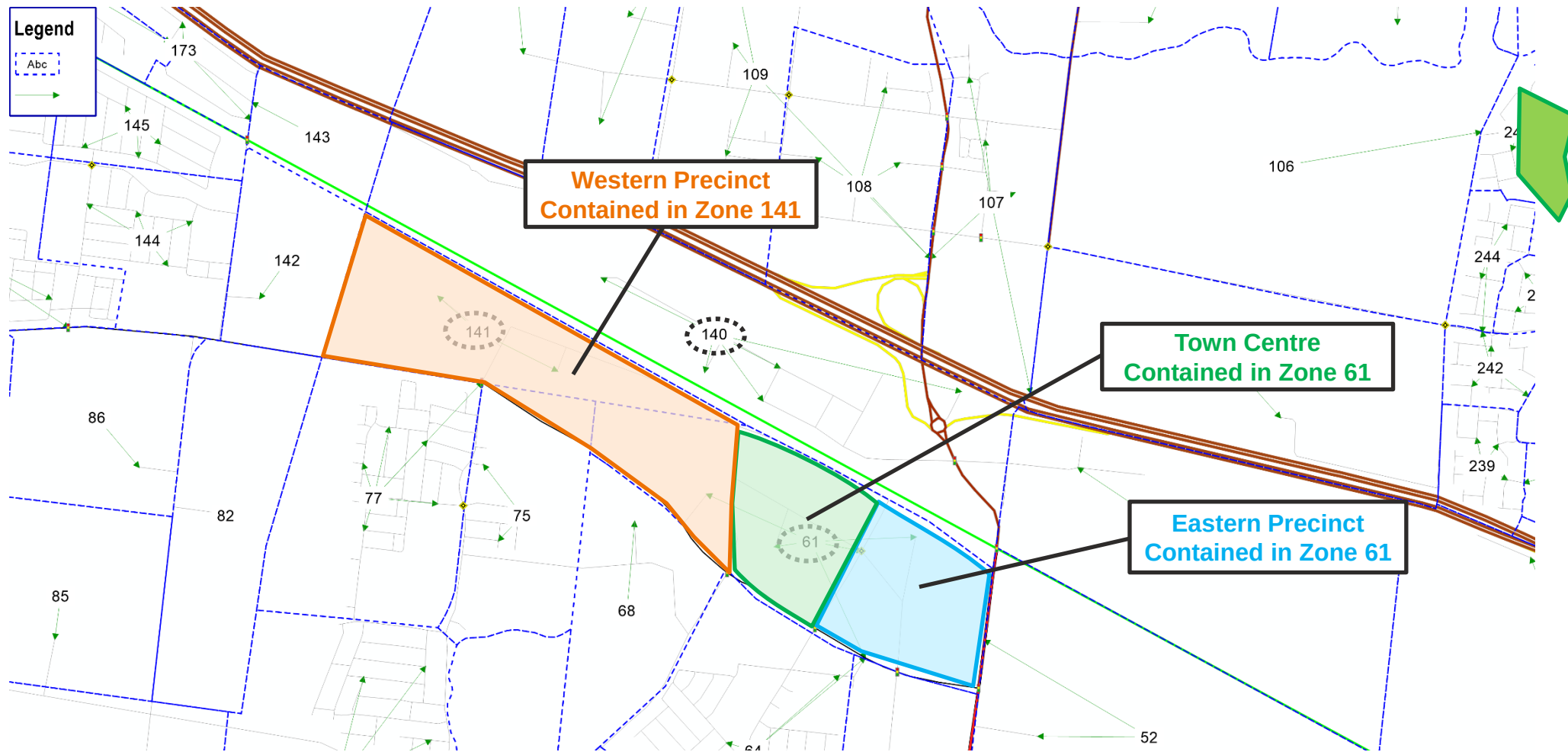
Number of Lanes: Zoomed in



Posted Speed: Zoomed In



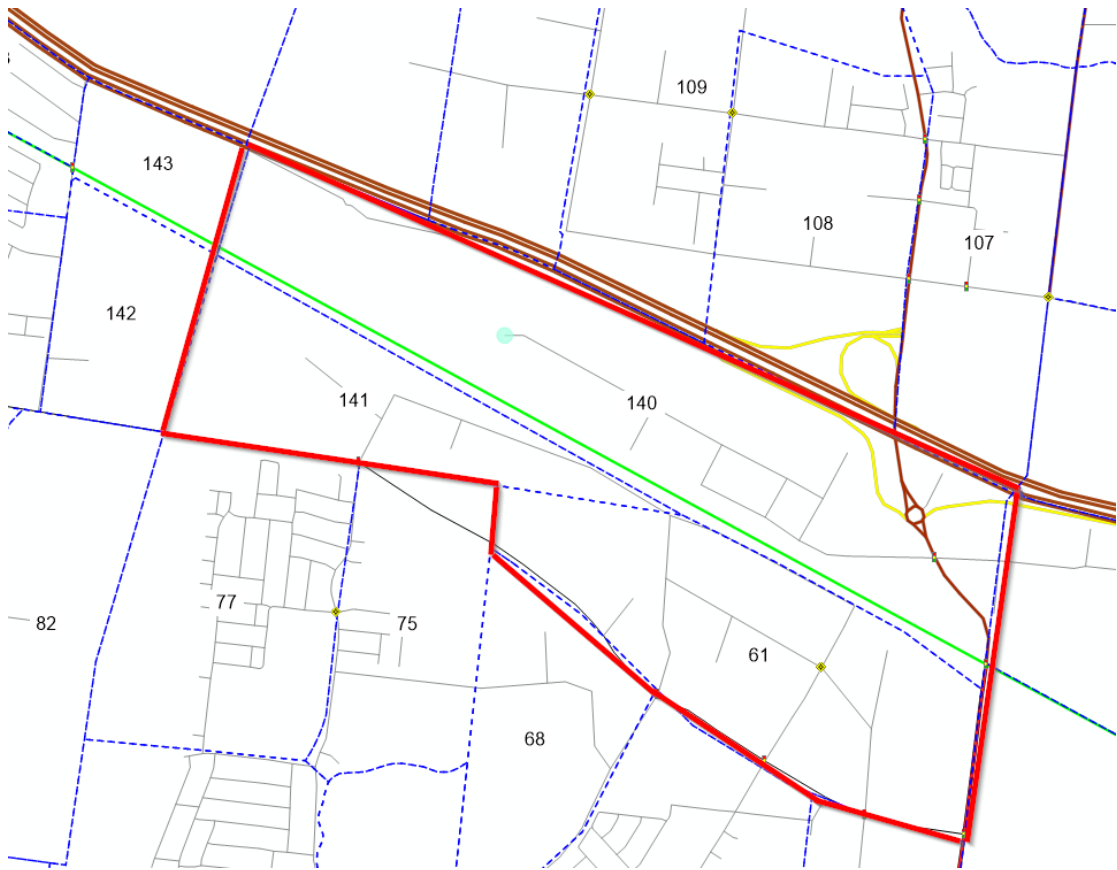
Zone Structure



Zones 140, 141 and 61 are of the interest

Land Use Inputs

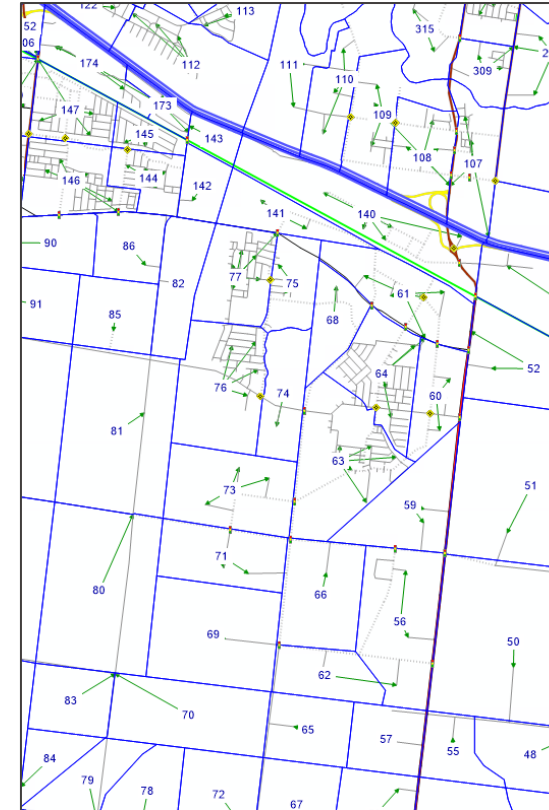
Demographics



TAZ	Population	Retail Employment	Total Employment	Primary Enrolments	Secondary Enrolments	Tertiary Enrolments
140	436	50	324	0	0	0
141	56	7	74	0	0	0
61	1,797	45	295	48	0	0
Total	2,289	102	692	48	0	0

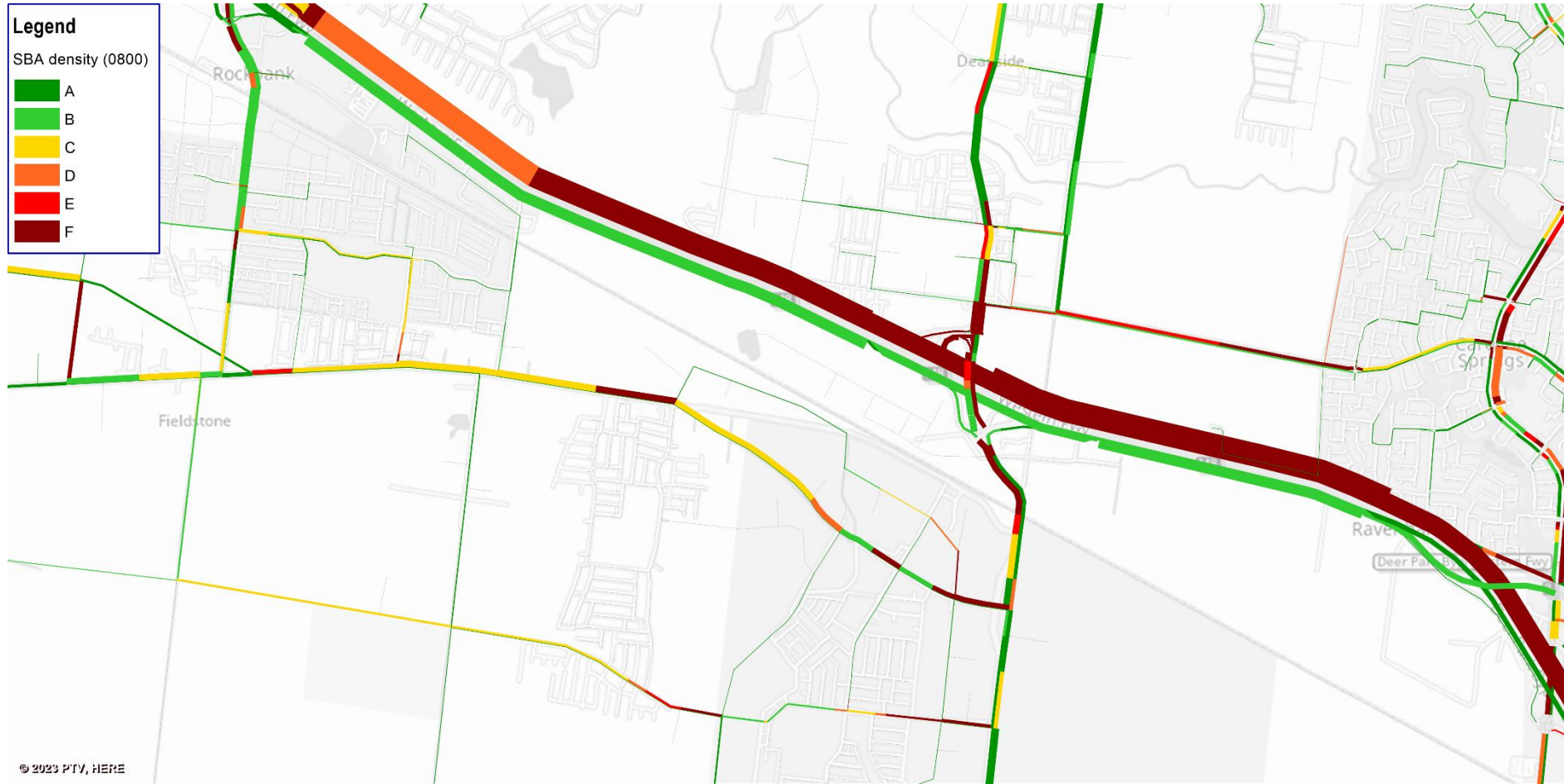
Demographics: Mt Atkinson and Tarneit Plains PSP

TAZ	Population	Retail Employment	Total Employment	Primary Enrolments	Secondary Enrolments	Tertiary Enrolments
Mt Atkinson						
61	1,797	45	295	48	0	0
59	0	4	73	0	0	0
60	1	36	269	0	0	0
63	1,647	1	39	187	0	0
64	1,211	3	71	0	125	0
68	327	0	4	0	0	0
73	0	4	81	0	0	0
74	223	0	3	0	0	0
75	648	4	27	0	0	0
76	1,172	1	14	0	0	0
77	772	0	55	330	0	0
140	436	50	324	0	0	0
141	56	7	74	0	0	0
Total	8,290	154	1,329	565	125	0
Tarneit Plains						
56	0	12	235	0	0	0
62	0	5	101	0	0	0
66	0	0	1	0	0	0
69	0	3	38	0	0	0
71	0	7	137	0	0	0
Total	0	26	512	0	0	0



Model Outputs

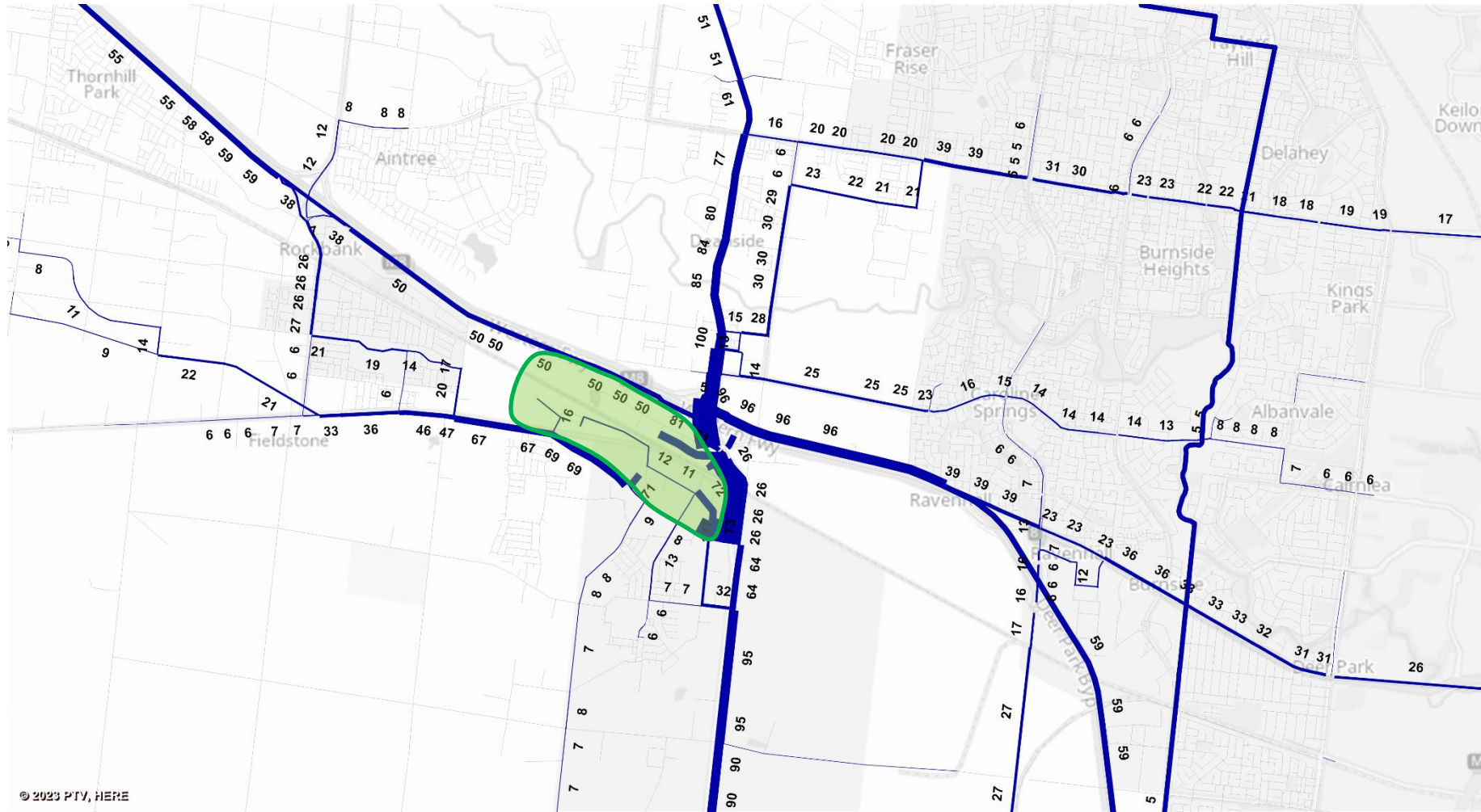
AM Peak Density (7:00 to 08:00 AM)



- Shows critical AM peak hour (7:00am-8:00am)
- In the 2041 AM, Western Highway is congested in the eastbound direction

Density is a measure of the number of vehicles per kilometer of a link. It is a good tool to measure the level of congestion on the network, and varies between LOS A to LOS F.

AM Peak (2.5 hr) Flow Bundle : Outbound Overall



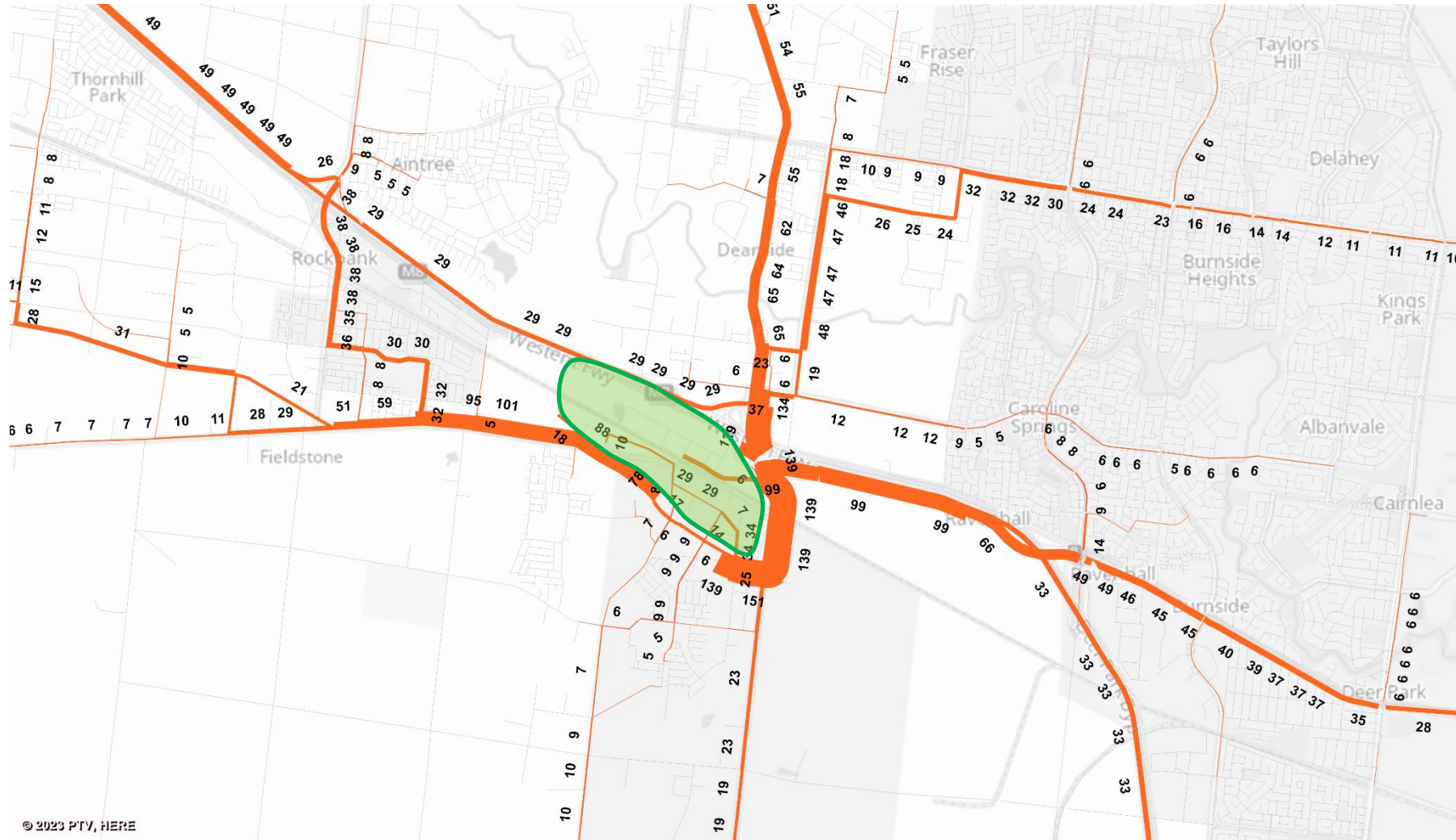
Zones 140, 141 and 61 are of the interest

AM Peak (2.5 hr) Flow Bundle- Outbound



3% Internal Trips (within 3 zones)

AM Peak (2.5 hr) Flow Bundle - Inbound



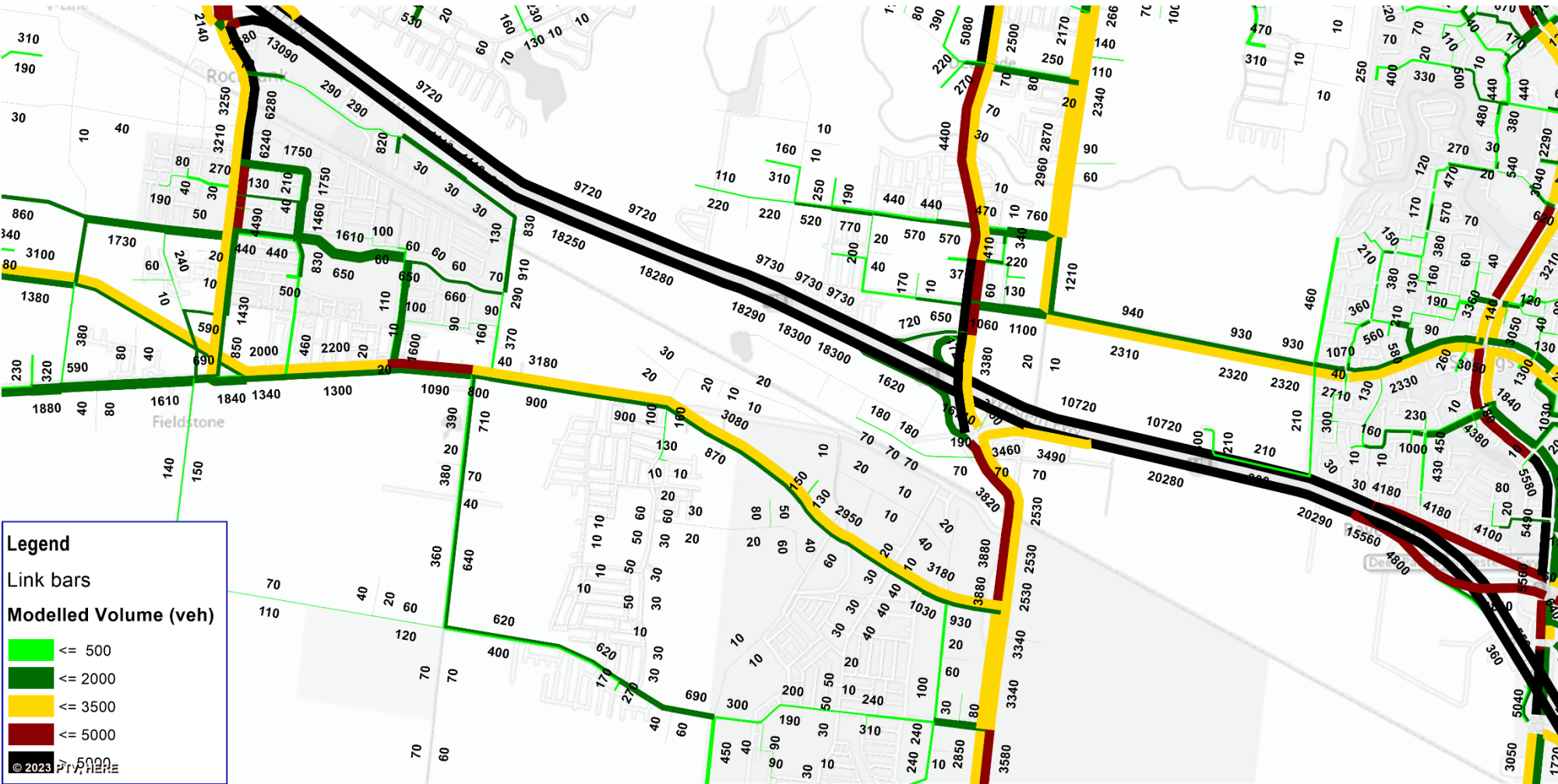
Zones 140, 141 and 61 are of the interest

AM Peak (2.5 hr) Flow Bundle – Inbound

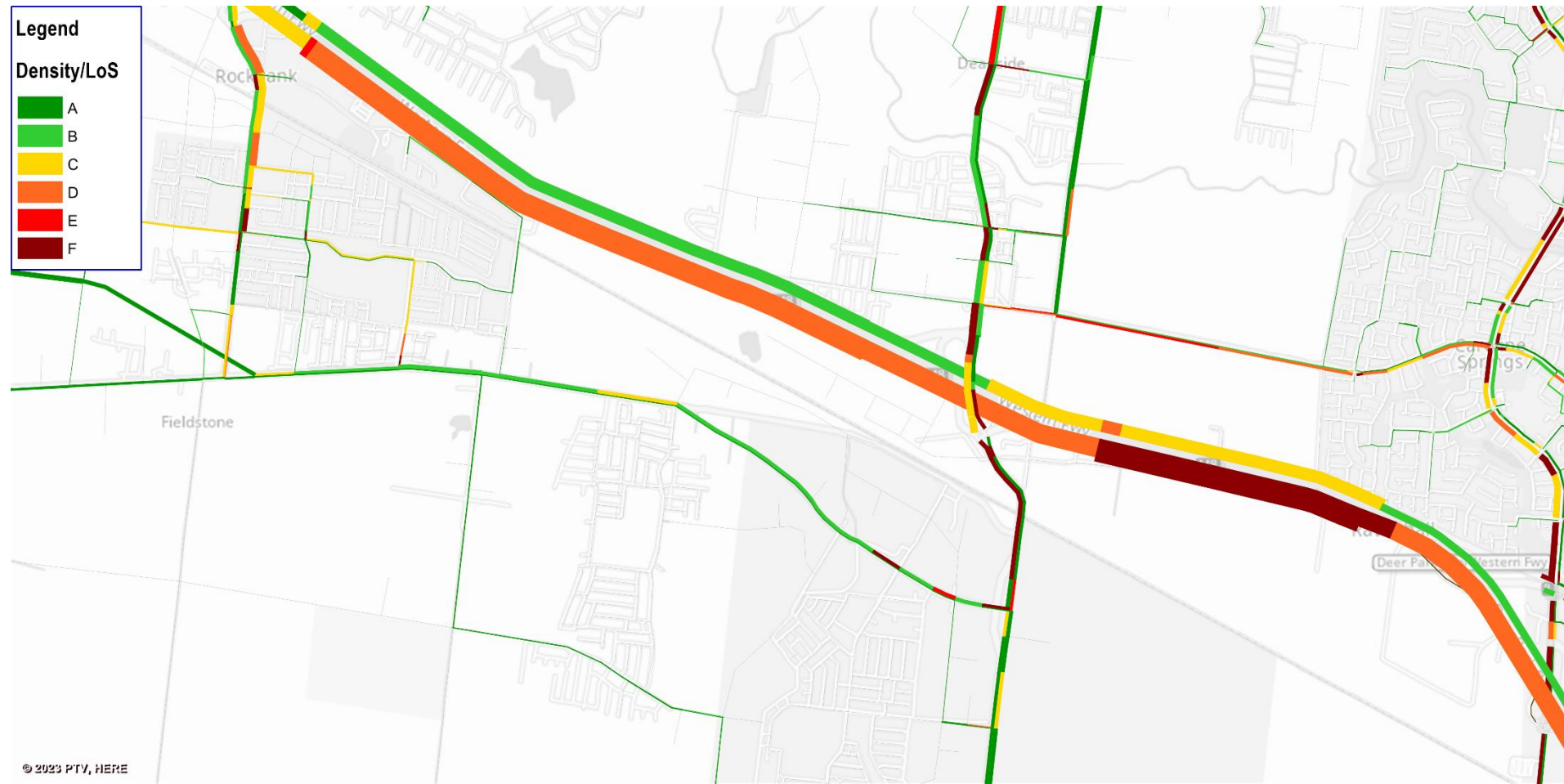


5% Internal Trips (within 3 zones)

PM Peak Volume (14:30 to 18:00 PM)



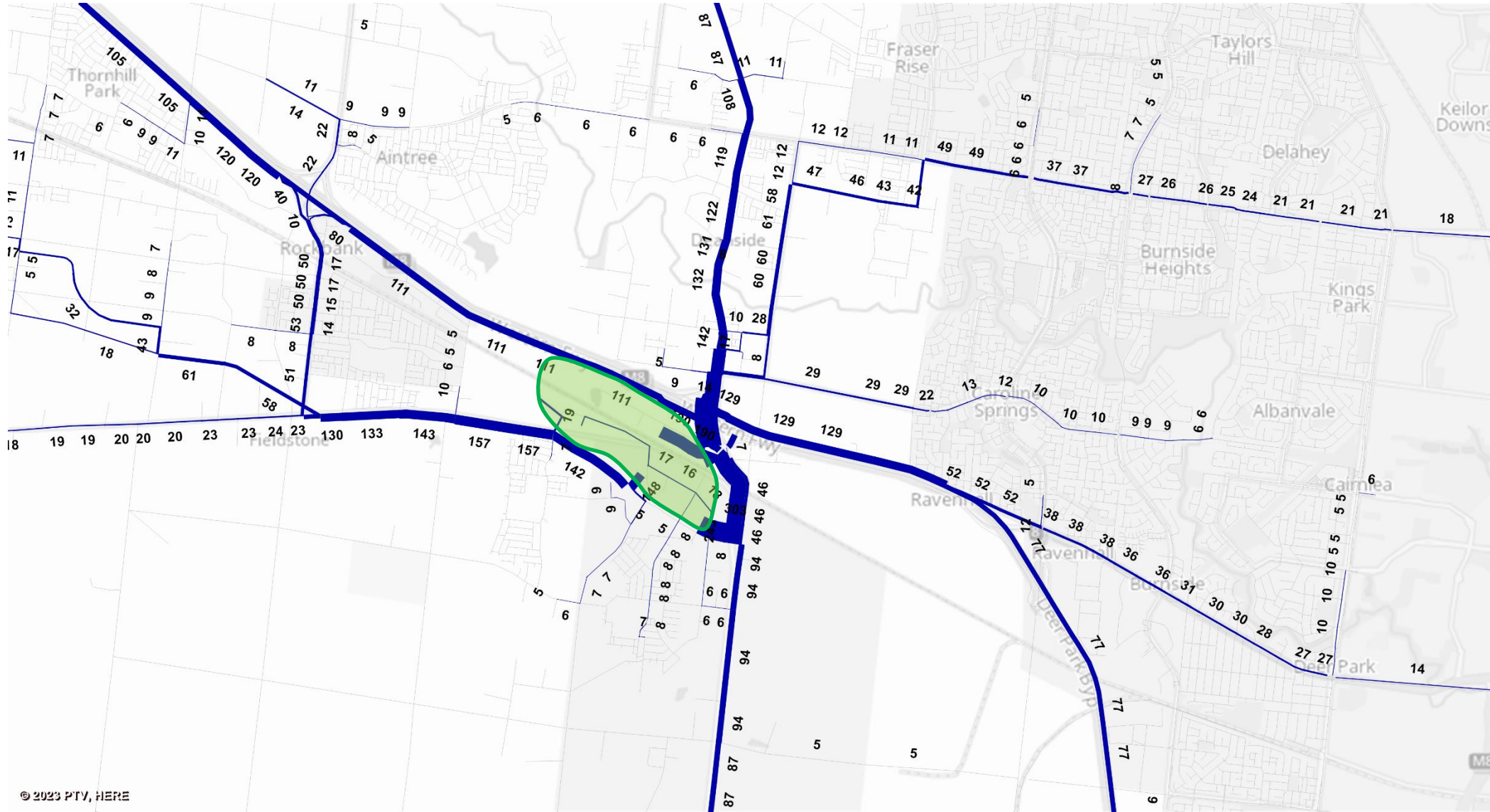
PM Peak Density (16:00-17:00PM)



- Shows critical PM peak hour (16:00-17:00PM)
- In the 2041 AM, Western Highway is congested in the westbound direction
- Also, Hopkins Road is congested in Northbound direction

Density is a measure of the number of vehicles per kilometer of a link. It is a good tool to measure the level of congestion on the network, and varies between LOS A to LOS F.

PM Peak (3.5 hr) Flow Bundle- Outbound: Overall



Zones 140, 141 and 61 are of the interest

PM Peak (3.5 hr) Flow Bundle: Outbound



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5% Internal Trips (within 3 zones)

PM Peak (3.5 hr) Flow Bundle : Inbound Overall



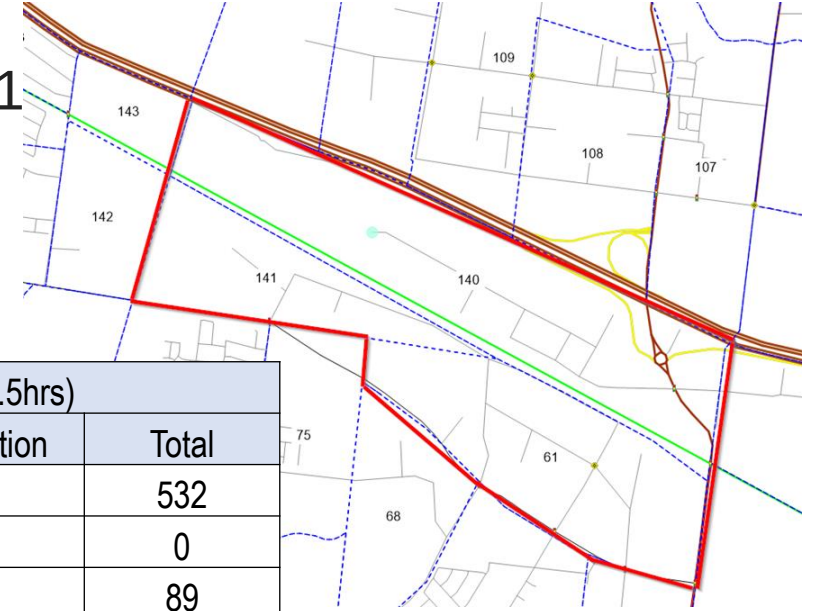
Zones 140, 141 and 61 are of the interest

Map of the Western Freeway interchange area showing traffic volume and delay data. The map highlights the interchange and surrounding roads with orange lines. Traffic volumes are shown as numbers along the roads. Delay percentages are shown in orange boxes with arrows pointing to specific locations. The delay percentages are: 24% on the approach from the west, 3% on the approach from the north, 27% on the approach from the north, 20% on the approach from the east, 2% on the approach from the south, 2% on the approach from the south, and 17% on the approach from the south.

5% Internal Trips (within 3 zones)

PT Outputs for Town Centre Zones

- Mt Atkinson Station is not active in the MITM for year 2041
- There are few PT Bus routes passing through the PSP.



Desc.	Zone	AM Peak (2.5hrs)			PM Peak (3.5hrs)		
		Origin	Destination	Total	Origin	Destination	Total
PrT [veh]	140	145	158	303	287	245	532
PuT [Pass]		0	0	0	0	0	0
PrT [veh]	141	28	28	57	52	37	89
PuT [Pass]		0	0	0	0	0	0
PrT [veh]	61	327	241	568	474	591	1065
PuT [Pass]		57	13	70	30	72	103
Total		558	440	998	842	946	1788
PT Share				7%			6%

The PT Share for combined zones is around 7% and 6% for AM and PM peaks when compared with PuT passenger's trips and PrT vehicular trips.



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Appendix B. Traffic Impact Assessment

B.1 Modelling Approach

Stantec has assessed the impact of the development traffic on the performance of the road network during the weekday PM peak using the SIDRA INTERSECTION 9.0¹³ (SIDRA) modelling program for following three 2041 design year scenarios:

- Scenario 1: Future Base
- Scenario 2: Post Development
- Scenario 3: Post Development with Mt Atkinson Train Station

SIDRA Intersection is a computer-based modelling package used to calculate intersection performance. The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DOS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, DOS of around 0.95 are typically considered the 'ideal' limit of performance, whilst for unsignalized intersections, a DOS of 0.90 typically considered the 'ideal' limit of performance.¹⁴

A summary of the intersections modelled within each scenario is provided at Table B.1, while Figure B.1 shows the location of each intersection.

Table B.1: Summary of Intersections Modelled Within Each Scenario

Intersection	Scenario 1: Future Base	Scenario 2: Post Development	Scenario 3: Post Development with Mt Atkinson Train Station
Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)	✓	✓	✓
Grand Boulevard / Clara Avenue (intersection #2)	✓	✓	✓
Grand Boulevard / Shopping Centre Access (intersection #3)	✓	✓	✓
Grand Boulevard / Mt Atkinson Road (intersection #4)	✓	✓	✓
Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5),	✓	✓	✓
Clara Avenue / East-West Road (intersection #6)	✗	✓	✗
Greigs Road / East-West Road (intersection #7)	✗	✓	✗

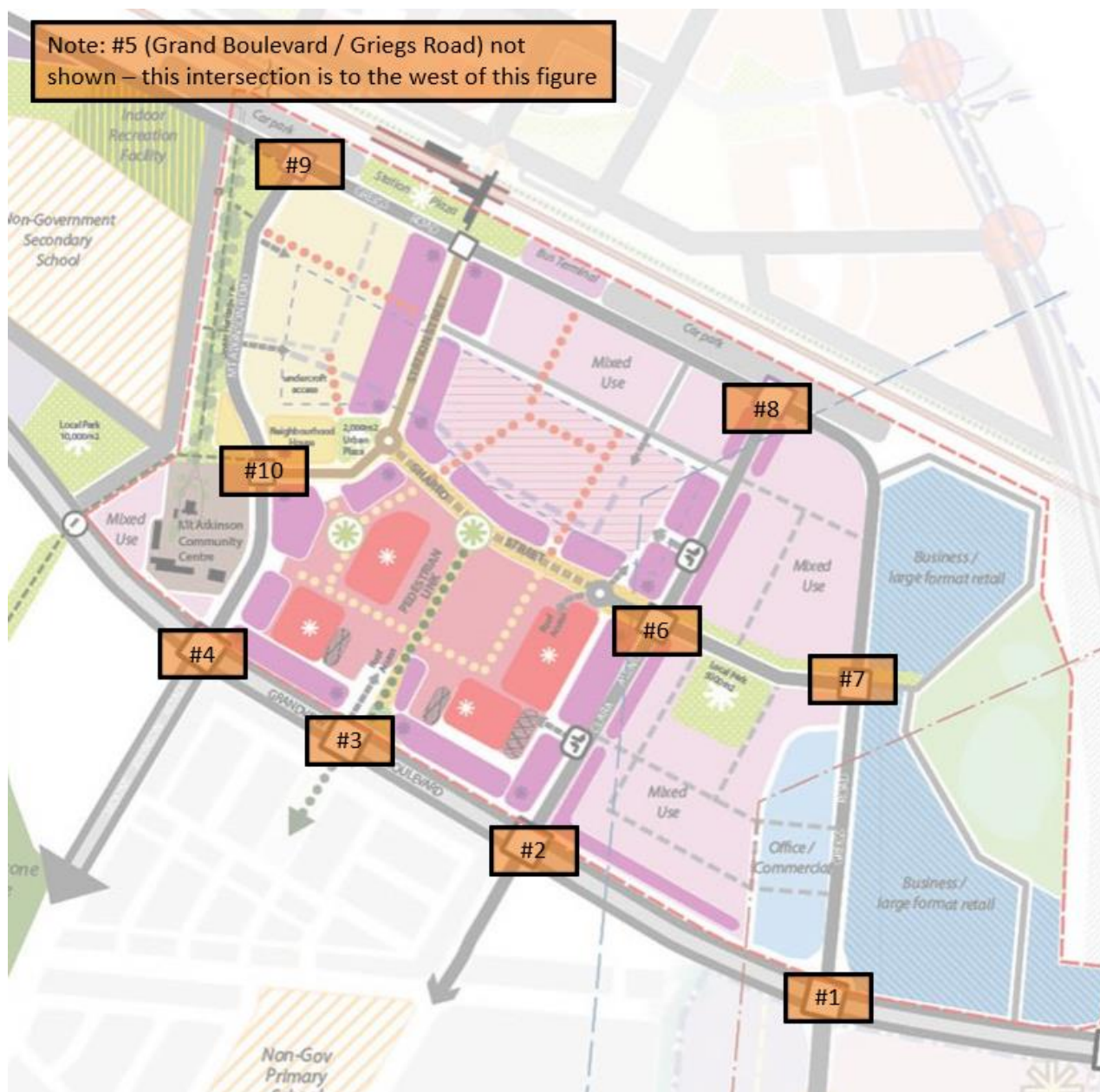
¹³ Program used under license from Akcelik & Associates Pty Ltd. SIDRA Intersection is a computer-based modelling package used to calculate intersection performance.

¹⁴ SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)	
		Unsignalized intersection	Signalised intersection
A	Excellent	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90
D	Acceptable	0.80-0.90	0.90-0.95
E	Poor	0.90-1.00	0.95-1.00
F	Very Poor	>= 1.0	>=1.0

Clara Avenue / Greigs Road (intersection #8)	x	✓	x
Greigs Road / Mt Atkinson Road (intersection #9)	x	✓	x
Mt Atkinson Road / Shared Street (intersection #10)	x	✓	x
Total	5 intersections modelled	10 intersections modelled	5 intersections modelled

Figure B.1: Intersections modelled using SIDRA



It is noted that the following intersections have been modelled as a 'Network' using SIDRA:

- Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)
- Grand Boulevard / Clara Avenue (intersection #2)
- Grand Boulevard / Shopping Centre Access (intersection #3)
- Grand Boulevard / Mt Atkinson Road (intersection #4)

Given its distance from the other intersections in the Grand Boulevard corridor, the Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5), located to the west of Grand Boulevard / Mt Atkinson Road intersection, has been assessed as an isolated intersection.

The following Town Centre internal intersections have also been modelled as isolated intersections:

- Clara Avenue / East-West Road (intersection #6)
- Greigs Road / East-West Road (intersection #7)
- Clara Avenue / Greigs Road (intersection #8)
- Greigs Road / Mt Atkinson Road (intersection #9)
- Mt Atkinson Road / Shared Street (intersection #10)

With the exception of intersections #8 and #9 (which are modelled as unsignalised intersections), all of the Town Centre's internal intersections have been modelled as signalised intersections.

B.2 Intersection Layout Assumptions

B.2.1 Scenario 1: 2041 Future Base

The intersections along the Grand Boulevard corridor (i.e. intersections #1, #2 and #4) have been modelled based on the approved Traffic Signal Plans prepared by Ratio Consultants. These plans are provided at Appendix C.

It is noted that these plans show Grand Boulevard configured with one lane in each direction at the Grand Boulevard / Mt Atkinson Road intersection. However, the entire Grand Boulevard corridor has been modelled with two through lanes in each direction, consistent with the MITM assumptions for this corridor. This is the case for all three scenarios.

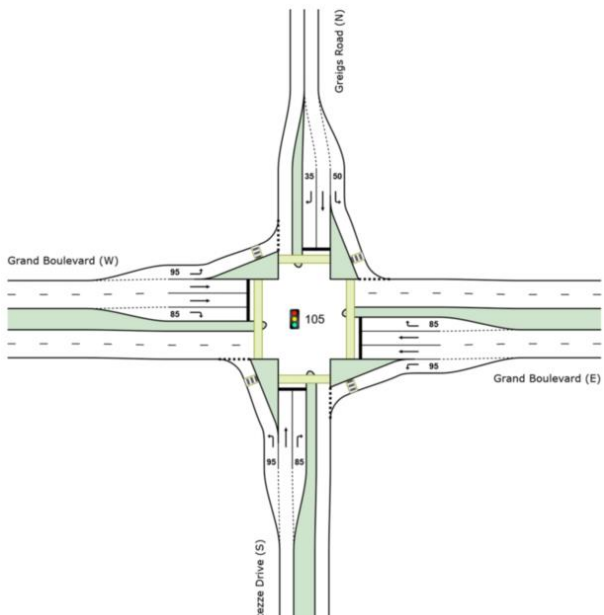
Approved plans were not available for the Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5). As such, the geometric configuration of intersection #5 is based on intersection #4.

For this scenario, the geometric configurations adopted for the modelled intersections are outlined at Table B.2.

Table B.2: Changes Between Scenario 1 and Scenario 2 for Grand Boulevard Corridor Intersections

Intersection	Intersection Control	Intersection Layout
Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)	Signalised	

Grand Boulevard / Clara Avenue (intersection #2)	Signalised	
Grand Boulevard / Shopping Centre Access (intersection #3)	Signalised	
Grand Boulevard / Mt Atkinson Road (intersection #4)	Signalised	

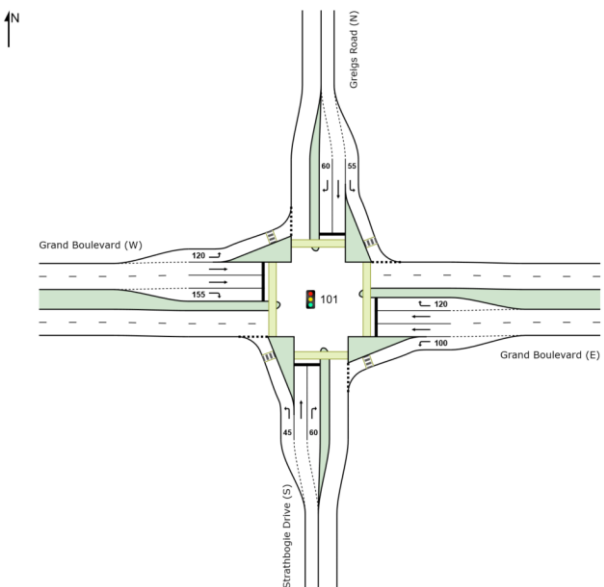
Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5),	Signalised	
---	-------------------	--

B.2.2 Scenario 2: 2041 Post Development

Grand Boulevard Corridor

For this scenario, the geometric configurations of intersections along the Grand Boulevard corridor were changed compared to Scenario 1. The changes made for each intersection and the resultant intersection layouts are summarised at Table B.3.

Table B.3: Changes Between Scenario 1 and Scenario 2 for Grand Boulevard Corridor Intersections

Intersection	Changes Made	Intersection Layout
Grand Boulevard / Greigs Road / Strathbogie Drive (intersection #1)	The length of short and slip lanes on both east and west approaches were extended as follows: • West approach left turn slip lane: from 85m to 120m. • West approach right turn short lane: from 85m to 155m. • East approach left turn slip lane: from 85m to 100m. • East approach right turn short lane: from 85m to 120m.	

Grand Boulevard / Clara Avenue (intersection #2)	• Addition of double right turns on the east approach instead of the single right turn. • North approach left turn lane changed to a slip lane with a length of 80m. • Addition of a short departure lane on the north approach. • The length of short and slip lanes on both east and west approaches were extended as follows: • West approach left turn short lane: from 70m to 100m. • West approach right turn short lane: from 85m to 100m. • East approach double right turn short lanes: from 85m to 95m and 100m.	
Grand Boulevard / Shopping Centre Access (intersection #3)	In this scenario the intersection of Grand Boulevard and the Shopping Centre Access was introduced to the Grand Boulevard corridor Network model.	
Grand Boulevard / Mt Atkinson Road (intersection #4)	• The addition of double right turns (shared with the through lane) on the south approach instead of a single right turn. • South approach left turn lane changed to a slip lane with the same length (i.e. 85m) • East approach left turn lane changed to a slip lane with the same length (i.e. 85m) • North approach left turn slip lane length extended from 50m to 80m. • The length of short and slip lanes on both east and west approaches were extended as follows: • West approach left turn slip lane: from 95m to 120m.	

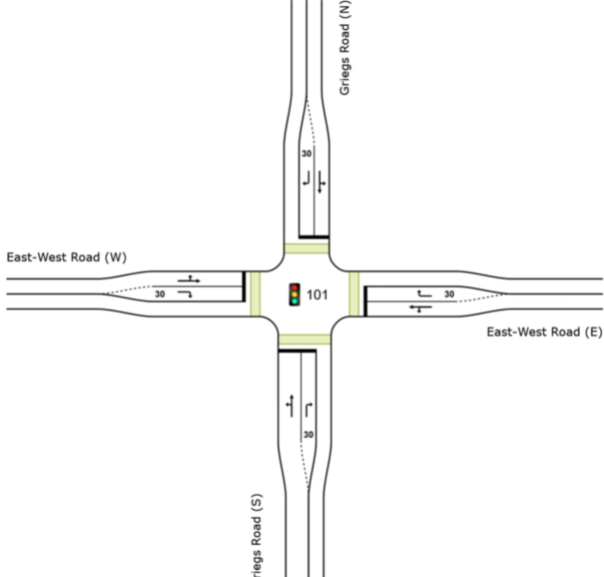
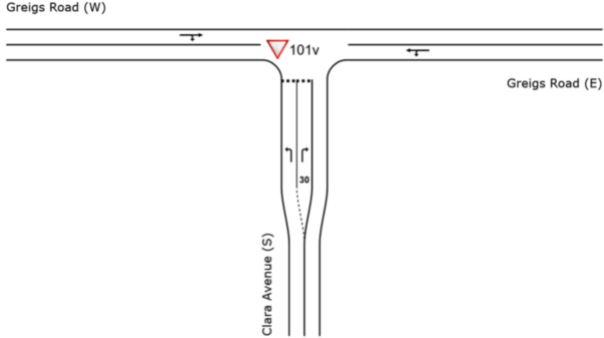
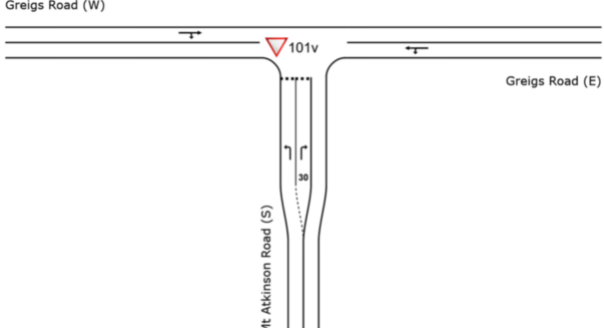
	- West approach right turn short lane: from 85m to 120m. - East approach right turn short lane: from 85m to 120m.	
Grand Boulevard / Greigs Road / Altezze Drive intersection (intersection #5),	No changes were made to the layout of this intersection between Scenarios 1 and 2.	

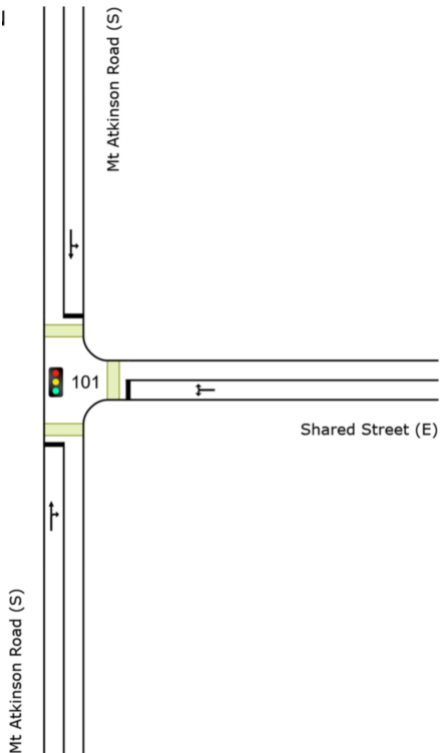
Town Centre Internal Intersections

The geometric configurations adopted for the Town Centre's internal intersections are outlined at Table B.4 below.

Table B.4: Intersection Layouts Adopted for Town Centre Internal Intersections

Intersection	Intersection Control	Intersection Layout
Clara Avenue / East-West Road (intersection #6)	Signalised	

Greigs Road / East-West Road (intersection #7)	Signalised	
Clara Avenue / Greigs Road (intersection #8)	Priority controlled	
Greigs Road / Mt Atkinson Road (intersection #9)	Priority controlled	

Mt Atkinson Road / Shared Street (intersection #10)	Signalised	
---	-------------------	--

B.2.3 Scenario 3: 2041 Post Development – With Mt Atkinson Train Station

The intersection layouts used for this scenario were identical to the layouts used for Scenario 2.

Appendix C. Traffic Signal Layout Plans prepared by Ratio Consultants



INSTALLATION NOTES

A. SIGNAL CONTRACTOR

1. SUPPLY AND INSTALL NEW HARDWARE AS SHOWN USING LED LANTERNS.
2. SUPPLY AND INSTALL TRAFFIC SIGNAL MAINS SUPPLY/METER CABINET AND CONNECT TO THE POINT OF SUPPLY.
3. SUPPLY AND INSTALL ADDITIONAL DETECTOR PIT AND 1/20 CONDUIT FOR FUTURE TELSTRA CONNECTION.
4. SUPPLY AND INSTALL 1 NO. 750 DIAMETER, CONDUIT PIT NEXT TO PEDESTAL 8.
5. SUPPLY AND INSTALL AUDIO TACTILE PEDESTRIAN DETECTORS (VARIABLE OUTPUT).
6. ARRANGE FOR INSTALLATION OF NEW CONTROLLER.

B. CIVIL CONTRACTOR

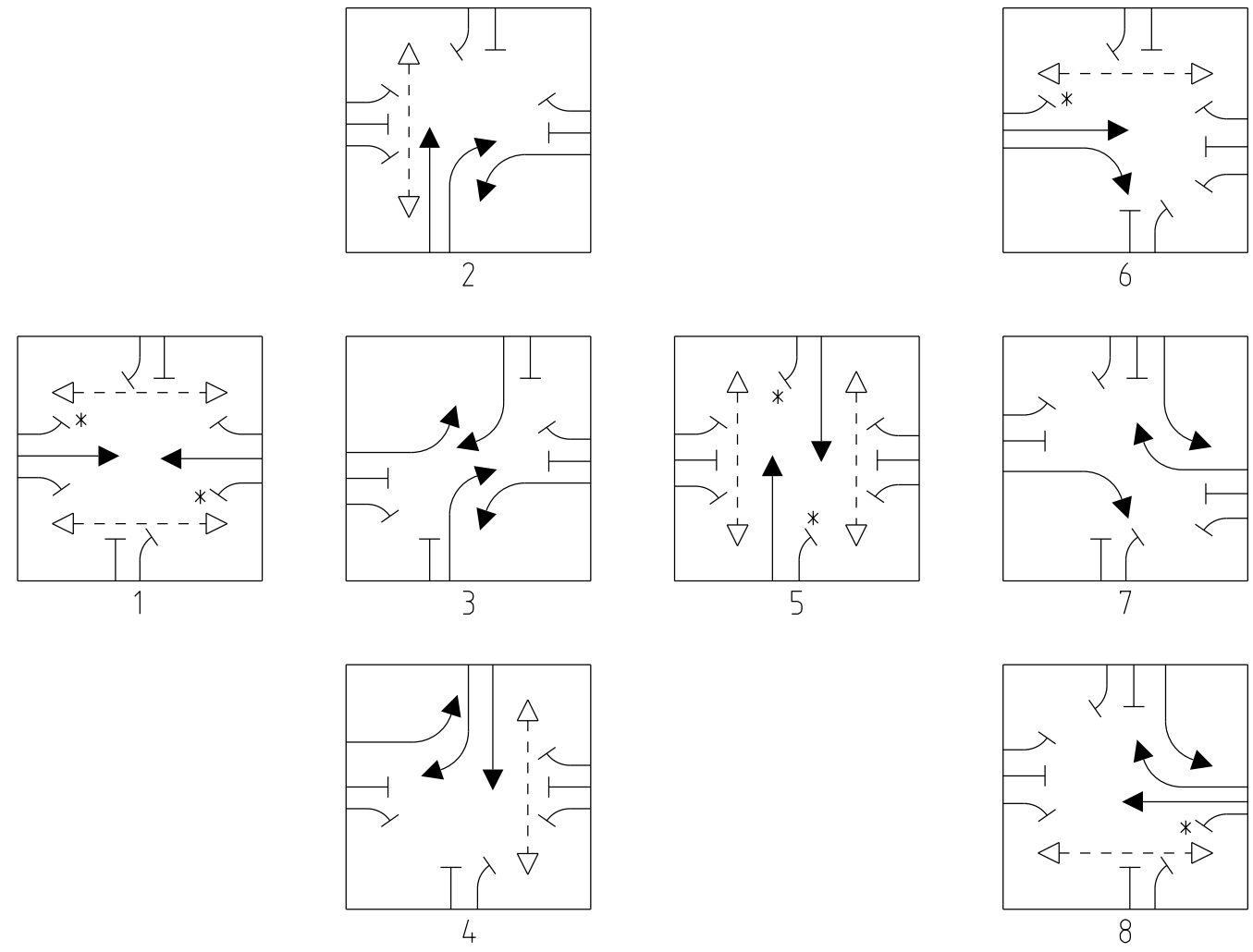
1. CONSTRUCT ROAD WORKS AS SHOWN.
2. LINEMARK AS SHOWN AND REMOVE ANY REDUNDANT MARKINGS.
3. SUPPLY AND INSTALL ROAD SIGNS WHERE SHOWN AND REMOVE REDUNDANT SIGNS.
4. SUPPLY AND INSTALLATION OF PUBLIC LIGHTING AND THE REMOVAL/RELOCATION OF ANY REDUNDANT POLES OR EQUIPMENT. SEE GENERAL NOTES.
5. SUPPLY AND INSTALL R.R.P.M.'s AS SHOWN AND REMOVE ANY REDUNDANT MARKERS.
6. VESIPIT AND ASSOCIATED CONDUITS TO BE INSTALLED BY POWER COMPANY APPROVED PRE-QUALIFIED ELECTRICAL CONTRACTORS.
7. CONSTRUCT 8 DDA COMPLIANT PRAM CROSSINGS IN ACCORDANCE WITH AS1428.
8. CONSTRUCT 4 CUT-THROUGH WALKWAYS AS SHOWN IN ACCORDANCE WITH AS1428.

C. VICROADS

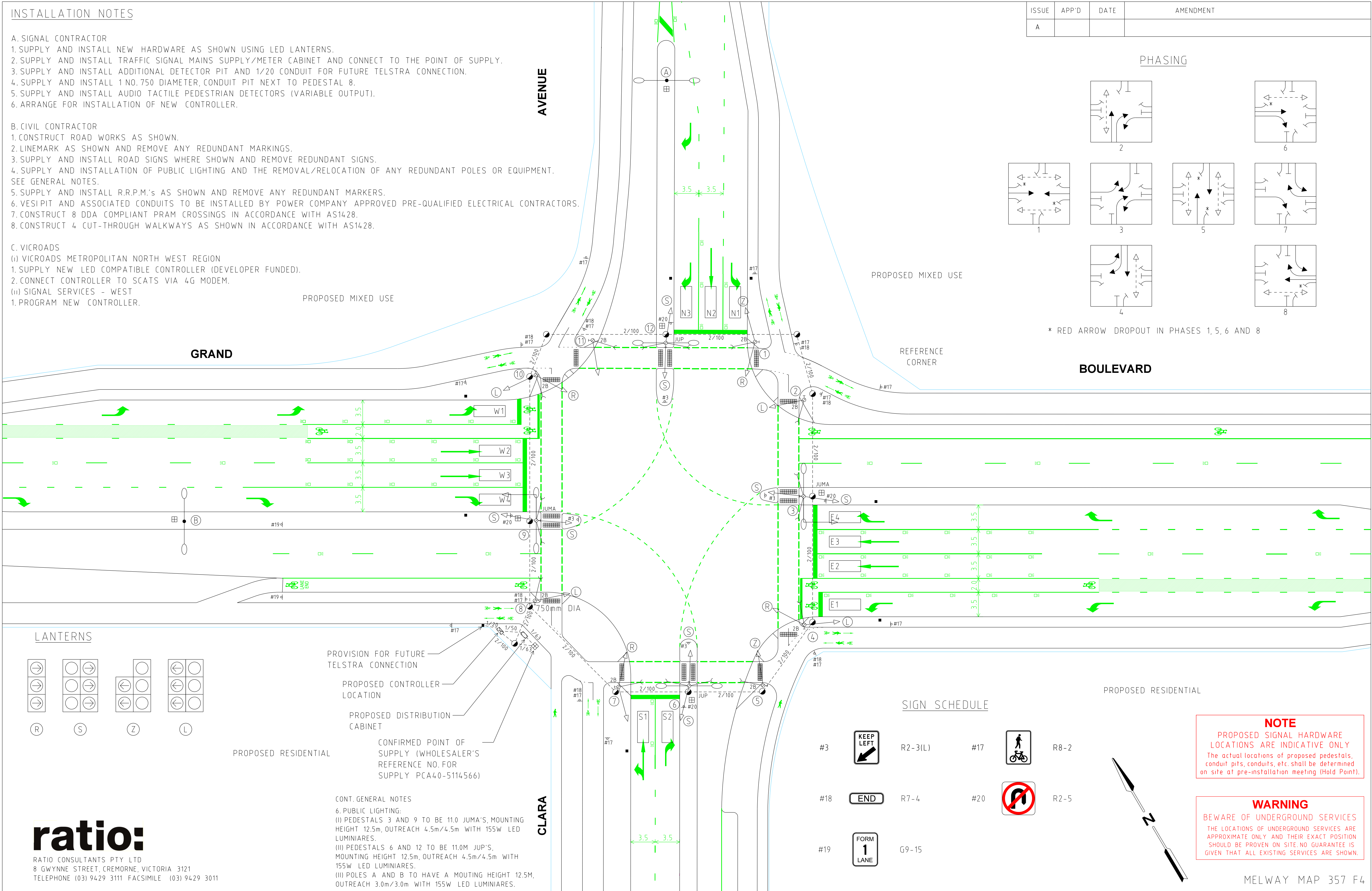
- (i) VICROADS METROPOLITAN NORTH WEST REGION
1. SUPPLY NEW LED COMPATIBLE CONTROLLER (DEVELOPER FUNDED).
 2. CONNECT CONTROLLER TO SCATS VIA 4G MODEM.
- (iii) SIGNAL SERVICES - WEST
1. PROGRAM NEW CONTROLLER.

ISSUE	APP'D	DATE	AMENDMENT
A			

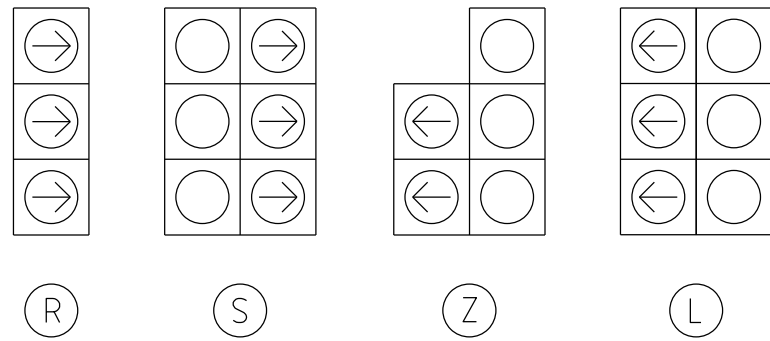
PHASING



* RED ARROW DROPOUT IN PHASES 1, 5, 6 AND 8



LANTERNS



PROVISION FOR FUTURE
TELSTRA CONNECTION

PROPOSED CONTROLLER
LOCATION

PROPOSED DISTRIBUTION
CABINET

CONFIRMED POINT OF
SUPPLY (WHOLESALE'S
REFERENCE NO. FOR
SUPPLY PCA40-5114566)

CONT. GENERAL NOTES

6. PUBLIC LIGHTING:
- (i) PEDESTALS 3 AND 9 TO BE 11.0 JUMA'S, MOUNTING HEIGHT 12.5m, OUTREACH 4.5m/4.5m WITH 155W LED LUMINAIRES.
- (ii) PEDESTALS 6 AND 12 TO BE 11.0M JUP'S, MOUNTING HEIGHT 12.5m, OUTREACH 4.5m/4.5m WITH 155W LED LUMINAIRES.
- (iii) POLES A AND B TO HAVE A MOUNTING HEIGHT 12.5M, OUTREACH 3.0m/3.0m WITH 155W LED LUMINAIRES.

SIGN SCHEDULE

#3	KEEP LEFT	R2-3(L)	#17	R8-2
#18	END	R7-4	#20	R2-5
#19	FORM 1 LANE	G9-15		

PROPOSED RESIDENTIAL

NOTE

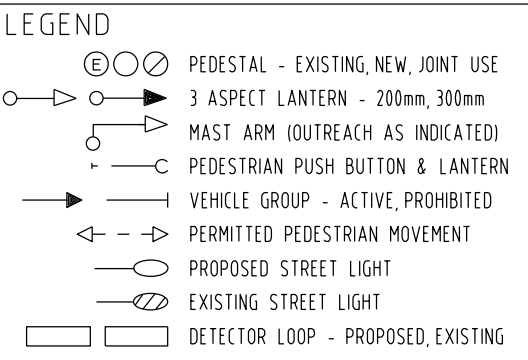
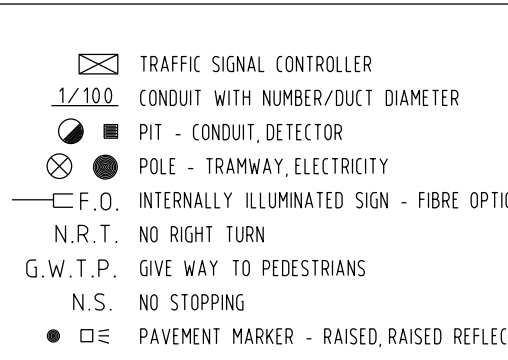
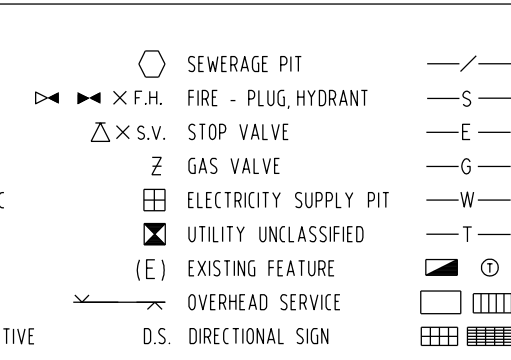
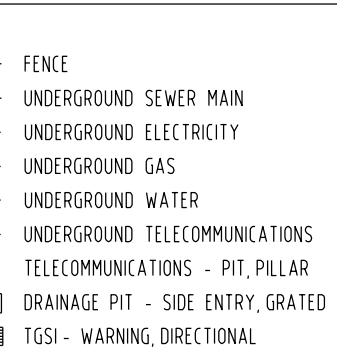
PROPOSED SIGNAL HARDWARE
LOCATIONS ARE INDICATIVE ONLY
The actual locations of proposed pedestals,
conduit pits, conduits, etc. shall be determined
on site at pre-installation meeting (Hold Point).

WARNING

BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE
APPROXIMATE ONLY AND THEIR EXACT POSITION
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

ratio:

RATIO CONSULTANTS PTY LTD
8 GWYNNE STREET, CREMORNE, VICTORIA 3121
TELEPHONE (03) 9429 3111 FACSIMILE (03) 9429 3011

			
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GENERAL NOTES

1. SURVEY BASE INFORMATION OBTAINED FROM 02691-D6_COMPILED_V3.dwg
2. ALL DIMENSIONS ARE TO FACE OF KERB UNLESS OTHERWISE SHOWN
3. LOCAL ROAD - GRAND BOULEVARD (SPEED ZONE 60KM/H)
4. FOR FUNCTIONAL LAYOUT PLAN REFER TO 14156 CP05-C

Notes continued above.

DESIGNED
RATIO CONSULTANTS
SEPTEMBER 2018

APPROVED

CAT: METRO_NORTH_WEST
PROJ: 41XA0839



SCALE OF METRES
HOR 0 5 10
VER

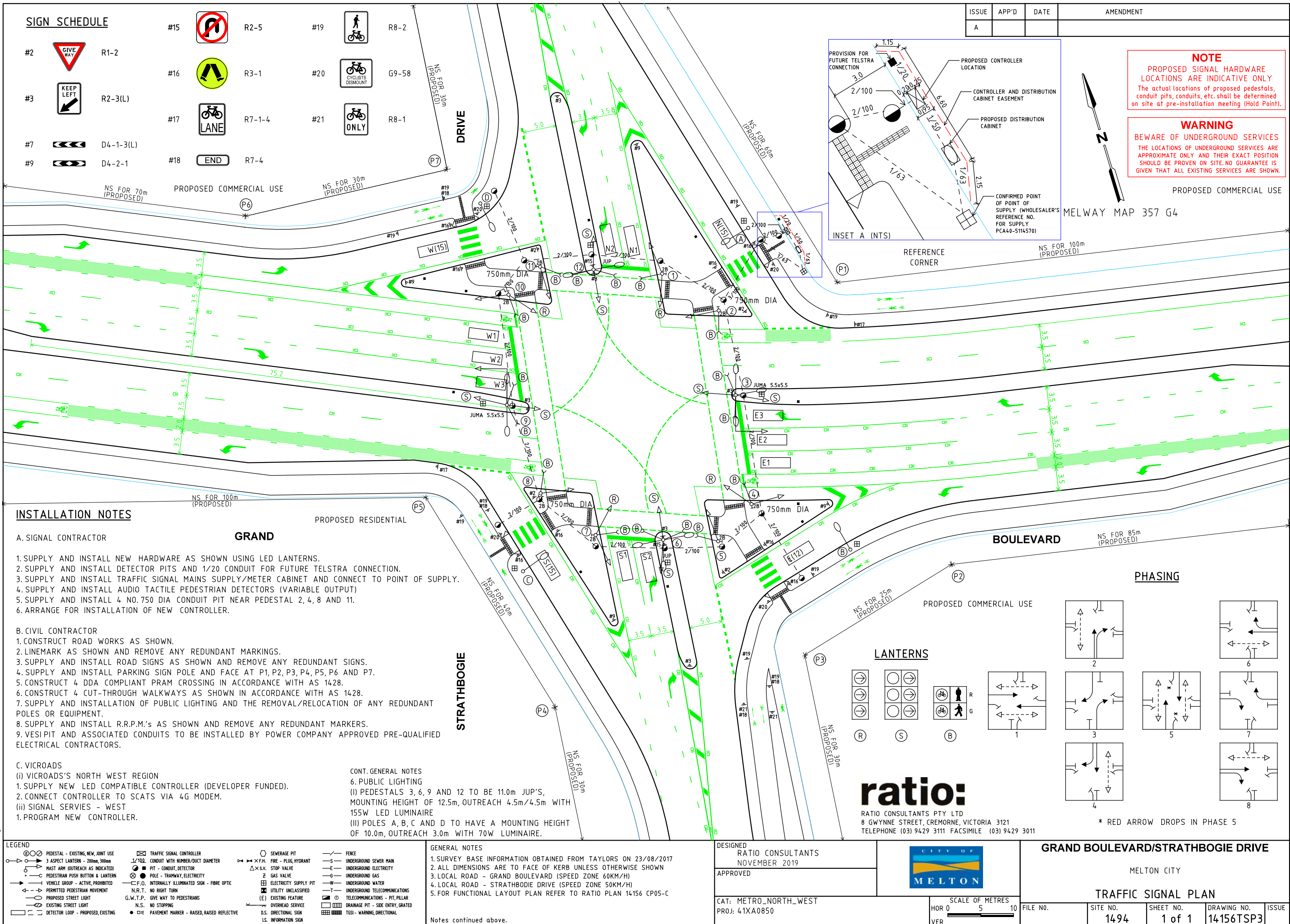
GRAND BOULEVARD/CLARA AVENUE

MELTON CITY

TRAFFIC SIGNAL PLAN

FILE NO.	SITE NO.	SHEET NO.	DRAWING NO.	ISSUE
	1492	1 of 1	14156TSP2	

18/02/2019 14:56 TSP03
8:29:31 AM 14:56 TSP03.dgn



NOTE

PROPOSED SIGNAL HARDWARE LOCATIONS ARE INDICATIVE ONLY
The actual locations of proposed pedestals, conduit pits, conduits, etc. shall be determined on site at pre-installation meeting (Hold Point).

WARNING

BEWARE OF UNDERGROUND SERVICES
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PROPOSED COMMERCIAL USE

MELWAY MAP 357 G4

REFERENCE CORNER

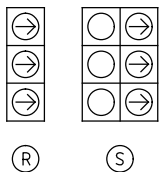
NS FOR 100m (PROPOSED)

BOULEVARD

NS FOR 85m (PROPOSED)

PROPOSED COMMERCIAL USE

LANTERNS



ratio:

RATIO CONSULTANTS PTY LTD
8 GWYNNE STREET, CREMORNE, VICTORIA 3121
TELEPHONE (03) 9429 3111 FACSIMILE (03) 9429 3011

* RED ARROW DROPS IN PHASE 5

Appendix D. Traffic Movement Diagrams



2041 Future Base (Grand Boulevard corridor)

				Griegs Road (west)								Mt Atkinson Road				Clara Avenue				Griegs Road (east)			
Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	4	11	Light
4	0	4	↑	0	0	0	Heavy	1	0	1	↑	0	0	0	Heavy	9	0	9	↑	0	0	0	Heavy
1063	0	1,063	→	0	0	0	Total	1104	0	1,104	→	0	0	0	Total	1090	0	1,090	→	0	4	11	Total
30	0	30	↓	←	↓	↘		0	0	0	↓	←	↓	↘		13	0	13	↓	←	↓	↘	Grand Boulevard
Grand Boulevard	←	↑	→	↑	0	0	0	←	↑	→		↑	0	0	0	←	↑	→		↑	1	0	1
Light	19	0	14	←	244	0	244	Light	0	1	9	←	300	0	300	Light	15	0	3	←	271	0	271
Heavy	0	0	0	↓	22	0	22	Heavy	0	0	0	↓	21	0	21	Heavy	0	0	0	↓	0	0	6
Total	19	0	14		Light	Heavy	Total	Total	0	1	9		Light	Heavy	Total	Total	15	0	3		Light	Heavy	Total

2041 Post Development (Grand Boulevard corridor)

				Greigs Road (west)								Mt Atkinson Road				Shopping Centre Access								Clara Avenue								Greigs Road (east)						
Light	Heavy	Total		68	0	0	Light	Light	Heavy	Total		57	46	191	Light	Light	Heavy	Total		130	250	Light	Light	Heavy	Total		174	19	403	Light	Light	Heavy	Total		94	33	320	Light
67	0	67	↱	0	0	0	Heavy	65	0	65	↱	0	0	0	Heavy	141	0	141	↱	0	0	Heavy	148	0	148	↱	0	0	0	Heavy	39	0	39	↱	0	0	0	Heavy
1140	0	1,140	→	68	0	0	Total	1238	0	1,238	→	57	46	191	Total	1388	0	1,388	→	130	250	Total	1453	0	1,453	→	174	19	403	Total	1610	0	1,610	→	94	33	320	Total
30	0	30	↲	↲	↲	↲		17	0	17	↲	↲	↲	↲		0	0	0	↲	↲	↲		36	0	36	↲	↲	↲	↲		262	0	262	↲	↲	↲	↲	Grand Boulevard
Grand Boulevard	↲	↑	↲	↲	0	0	0	↲	↑	↲		↲	52	0	52	↲	301	0	301	↲	↑	↲	↲	↲	383	0	383	↲	↑	↲	↲	↲	301	0	301			
Light	19	0	14	↲	582	0	582	Light	0	67	101	↲	581	0	581	↲	633	0	633	Light	34	17	6	↲	726	0	726	Light	95	32	12	↲	937	0	937			
Heavy	0	0	0	↲	22	0	22	Heavy	0	0	0	↲	131	0	131	Light Heavy Total				Heavy	0	0	0	↲	8	0	8	Heavy	0	0	0	↲	0	0	6			
Total	19	0	14	Light Heavy Total				Total	0	67	101	Light Heavy Total				Total				34	17	6	Light Heavy Total				Total	95	32	12	Light Heavy Total							

2041 Post Development (Internal Intersections)

[illegible]

2041 Post Development – site generation only (Grand Boulevard corridor)

				Greigs Road (west)								Mt Atkinson Road								Shopping Centre Access								Clara Avenue								Greigs Road (east)													
Light Heavy Total				68	0	0	Light	Light Heavy Total				57	46	191	Light	Light Heavy Total				130	250				Light	Light Heavy Total				174	19	403	Light	Light Heavy Total				94	29	309	Light								
63				0	63	↓	0	0	0	Heavy	64	0	64	↓	0	0	0	Heavy	141	0	141	↓	0	0				Heavy	139	0	139	↓	0	0	0	Heavy	39	0	39	↓	0	0	0	Heavy					
353				0	353	→	68	0	0	Total	410	0	410	→	57	46	191	Total	551	0	551	→	130	250				Total	639	0	639	→	174	19	403	Total	978	0	978	→	94	29	309	Total					
0				0	0	↓	↓	↓	↓	17	0	17	↓	↓	↓	↓	↓	↓	0	0	0	↓	↓	↓				23	0	23	↓	↓	↓	↓	73	0	73	↓	↓	↓	↓	↓	↓	↓	Grand Boulevard				
Grand Boulevard				↔	↑	↔	↓	0	0	0	↔				↑	↔	↓	52	0	52	↔	301	0	301	↔				↑	↔	↓	383	0	383	↔				↑	↔	↓	300	0	300					
Light				0	0	0	←	338	0	338	Light				0	66	92	←	281	0	281	←	312	0	312	Light				19	17	3	←	420	0	420	Light				51	32	0	←	666	0	666		
Heavy				0	0	0	↓	0	0	0	Heavy				0	0	0	↓	110	0	110	↓	Light Heavy Total				Heavy	0	0	0	↓	8	0	8	Heavy				0	0	0	↓	0	0	0	↓	0	0	0
Total				0	0	0	Light Heavy Total				Total	0	66	92	Light Heavy Total				Total				19	17	3	Light Heavy Total				Total	51	32	0	Light Heavy Total															

[illegible]

2041 Post Development – With Mt Atkinson Train Station (Grand Boulevard corridor)

				Griggs Road (west)								Mt Atkinson Road								Shopping Centre Access								Clara Avenue								Griggs Road (east)							
Light	Heavy	Total		51	0	0	Light	Light	Heavy	Total		43	35	143	Light	Light	Heavy	Total		97	188	Light	Light	Heavy	Total		131	14	302	Light	Light	Heavy	Total		71	26	243	Light					
51	0	51	↗	0	0	0	Heavy	49	0	49	↗	0	0	0	Heavy	106	0	106	↗	0	0	Heavy	113	0	113	↗	0	0	0	Heavy	29	0	29	↗	0	0	0	Heavy					
1052	0	1,052	→	51	0	0	Total	1135	0	1,135	→	43	35	143	Total	1250	0	1,250	→	97	188	Total	1293	0	1,293	→	131	14	302	Total	1366	0	1,366	→	71	26	243	Total					
30	0	30	↘	↖	↓	↗		13	0	13	↘	↖	↓	↗		0	0	0	↘	↖	↓	↗		30	0	30	↘	↖	↓	↗		244	0	244	↘	↖	↓	↗	Grand Boulevard				
Grand Boulevard	↖	↑	↗	↖	0	0	0	↖	↑	↗		↖	39	0	39		↖	226	0	226	↖	↑	↗		↖	212	0	212	↖	↑	↗		↖	301	0	301							
Light	19	0	14	↖	498	0	498	Light	0	51	78	↖	511	0	511		↖	555	0	555	Light	29	13	5	↖	621	0	621	Light	82	24	12	↖	695	0	695							
Heavy	0	0	0	↘	22	0	22	Heavy	0	0	0	↘	103	0	103		Light Heavy Total				Heavy	0	0	0	↘	6	0	6	Heavy	0	0	0	↘	0	0	6							
Total	19	0	14		Light Heavy Total	Total	0	51	78		Light Heavy Total					Total	29	13	5		Light Heavy Total				Total	82	24	12		Light Heavy Total													

2041 Future Base – daily volumes (Grand Boulevard corridor)

				Griegs Road (west)								Mt Atkinson Road								Clara								Griegs Road (east)				
Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	0	0	Light	Light	Heavy	Total		0	0	0	Light	0	40	110	Light					
40	0	40	↑	0	0	0	Heavy	10	0	10	↑	0	0	0	Heavy	90	0	90	↑	0	0	0	Heavy	0	0	0	Heavy					
7870	0	7,870	→	0	0	0	Total	8280	0	8,280	→	0	0	0	Total	8140	0	8,140	→	0	0	0	Total	6320	0	6,320	→	0	40	110	Total	
300	0	300	↓	↖	↓	↗		0	0	0	↓	↖	↓	↗		130	0	130	↓	↖	↓	↗		1890	0	1,890	↓	↖	↓	↗		Grand Boulevard
Grand Boulevard	↖	↑	↗	↖	0	0	0	↖	↑	↗		↖	0	0	0	↖	↑	↗		↖	0	0	0	↖	↑	↗	↖	10	0	10		
Light	190	0	140	↖	2440	0	2,440	Light	0	10	90	↖	3000	0	3,000	Light	150	0	30	↖	3060	0	3,060	Light	440	0	120	↖	2710	0	2,710	
Heavy	0	0	0	↘	220	0	220	Heavy	0	0	0	↘	210	0	210	Heavy	0	0	0	↘	0	0	0	Heavy	0	0	0	↘	0	0	60	
Total	190	0	140		Light	Heavy	Total	Total	0	10	90		Light	Heavy	Total	Total	150	0	30		Light	Heavy	Total	Total	440	0	120		Light	Heavy	Total	

2041 Post Development – daily volumes (Grand Boulevard corridor)

				Griegs Road (west)																Shopping Centre Access																Clara Avenue																Griegs Road (east)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
Grand Boulevard	Light	Heavy	Total		491	0	0	Light		Light	Heavy	Total		570	436	1804	Light		Light	Heavy	Total		1300		2503	Light		Light	Heavy	Total		1850	199	4238	Light		Light	Heavy	Total		1058	344	3279	Light																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	524	0	524	↓	0	0	0	Heavy		651	0	651	↓	0	0	0	Heavy		1414	0	1,414	↓	0		0	Heavy		1569	0	1,569	↓	0	0	0	Heavy		474	0	474	↓	0	0	0	Heavy																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	11524	0	#####	→	491	0	0	Total		12085	0	12,085	→	570	436	1,804	Total		13555	0	13,555	→	1300		2503	Total		14137	0	14,137	→	1850	199	4,238	Total		15901	0	15,901	→	1058	344	3,279	Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
	300	0	300	↓	↔	↓	↔			112	0	112	↓	↔	↓	↔			0	0	0	↓	↔	↔	↔			341	0	341	↓	↔	↓	↔		2591	0	2,591	↓	↔	↓	↔																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
	↔	↑	↔	↔	↔	0	0	0		↔	↑	↔	↔	↔	474	0	474		↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔

2041 Post Development – daily volumes (internal intersections)

Light Heavy Total				Light Heavy Total				Light Heavy Total				Light Heavy Total			
330 0 330 →				202 0 202 →				785 0 785 →				Griegs Road			
300 0 300 ↴				128 0 128 ↴				1113 0 1,113 ↴							
Griegs Road															
↵ ↶				↵ ↶				↵ ↶				↵ ↶			
Light 303 0				Light 114 1696				Light 1233 0 1,233				Light 1312 0			
Heavy 0 0				Heavy 0 0				Heavy 0 0				Heavy 0 0			
Total 303 0				Total 114 1,696				Total 1,312 0				Total 1,395 0 1,395			
↵ ↶				↵ ↶				↵ ↶				↵ ↶			
1347 0 1,347				1473 0 1,473				1395 0 1,395				0 0 0			
0 0 0				Light Heavy Total				Light Heavy Total				Light Heavy Total			
Light Heavy Total				Total 114 1,696				Total 1,312 0				Into Eastern Precinct			
												386 1040			
293 250								Into Eastern Precinct				Out of Eastern Precinct			
↑ ↓								1012 1348							
250 0 Light								0 2454 0 Light				0 1826 0 Light			
0 0 Heavy								0 0 0 Heavy				0 0 0 Heavy			
300 0 Total Station								1025 0 1,025 →				0 2454 0 Total			
↓ ↵								2275 0 2,275 ↴				1357 0 1,357 ↴			
↑ ↶								↵ ↶				↵ ↶			
10 0 10								0 0 0				0 0 0			
↵ ↶								↵ ↶				↵ ↶			
2560 0 2,560								701 0 701				701 1781 365			
Light Heavy Total								212 0 212				570 0 570			
Total 293 1,424								Light Heavy Total				Light Heavy Total			

Appendix E. Detailed SIDRA Modelling Results



USER REPORT FOR NETWORK

All Movement Classes

Project: 230918_mt_atkinson_final

Template: Network Report

Network: N101 [FB PM - Int#1,2,4 Network (Network Folder: Future base 2041)]

New Network

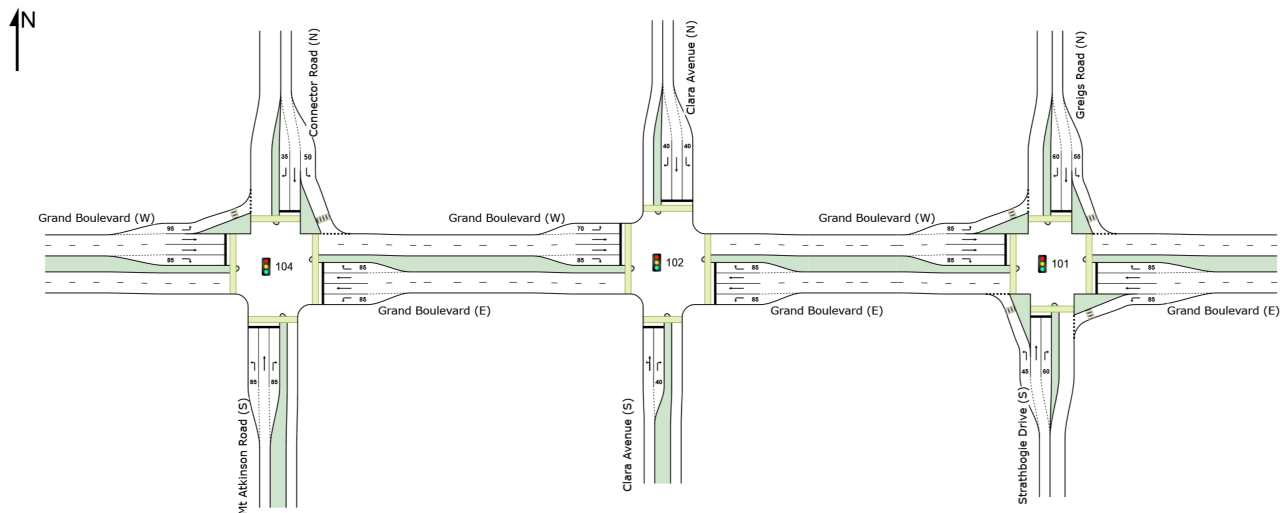
Network Category: (None)

Network Cycle Time = 80 seconds (Network Practical Cycle Time)

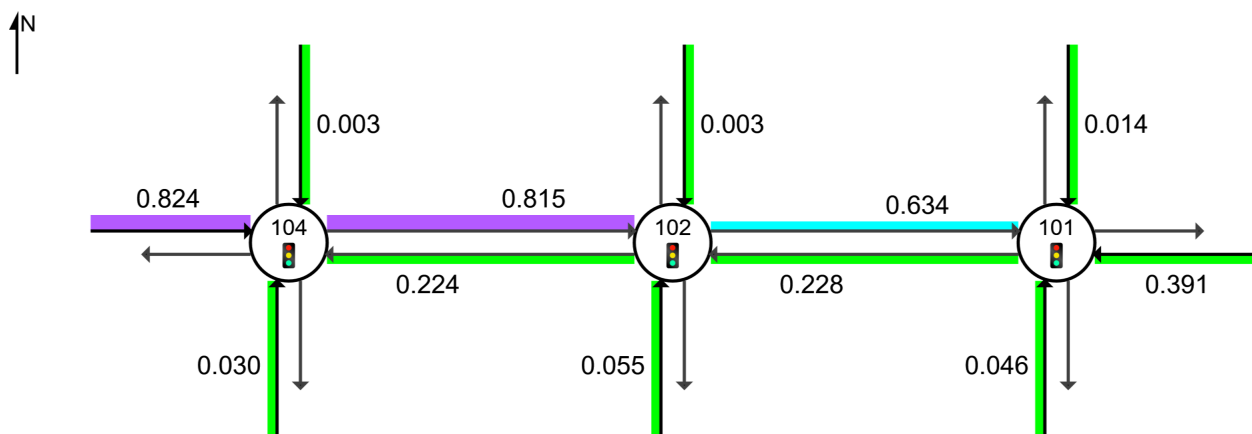
Critical Site / Common Control Group that determines the Network Cycle Time (for Coordinated Sites): 102 [02 FB PM - Grand Blvd / Clara Ave (Int#2)]

Network Layout

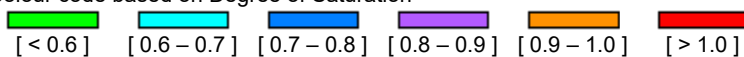
Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Degree of Saturation



Colour code based on Degree of Saturation



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Organisation: GTA CONSULTANTS | Licence: NETWORK / Enterprise | Created: Wednesday, 27 September 2023 12:41:58 PM

Project: U:\300304089\technical\modelling\sidra\230918_mt_atkinson_final.sip9

USER REPORT FOR NETWORK SITE

All Movement Classes



Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary



**Site: 101 [01 FB PM - Grand Blvd / Greigs Rd
(east) / Strathbogie Drive (Int #1) (Site Folder:
Future base 2041)]**



**Network: 1 [FB PM - Int#1,2,4 Network
(Network Folder: Future base 2041)]**

Grand Boulevard / Greigs Road (east)

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 80 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - Import - Import

Reference Phase: Phase A

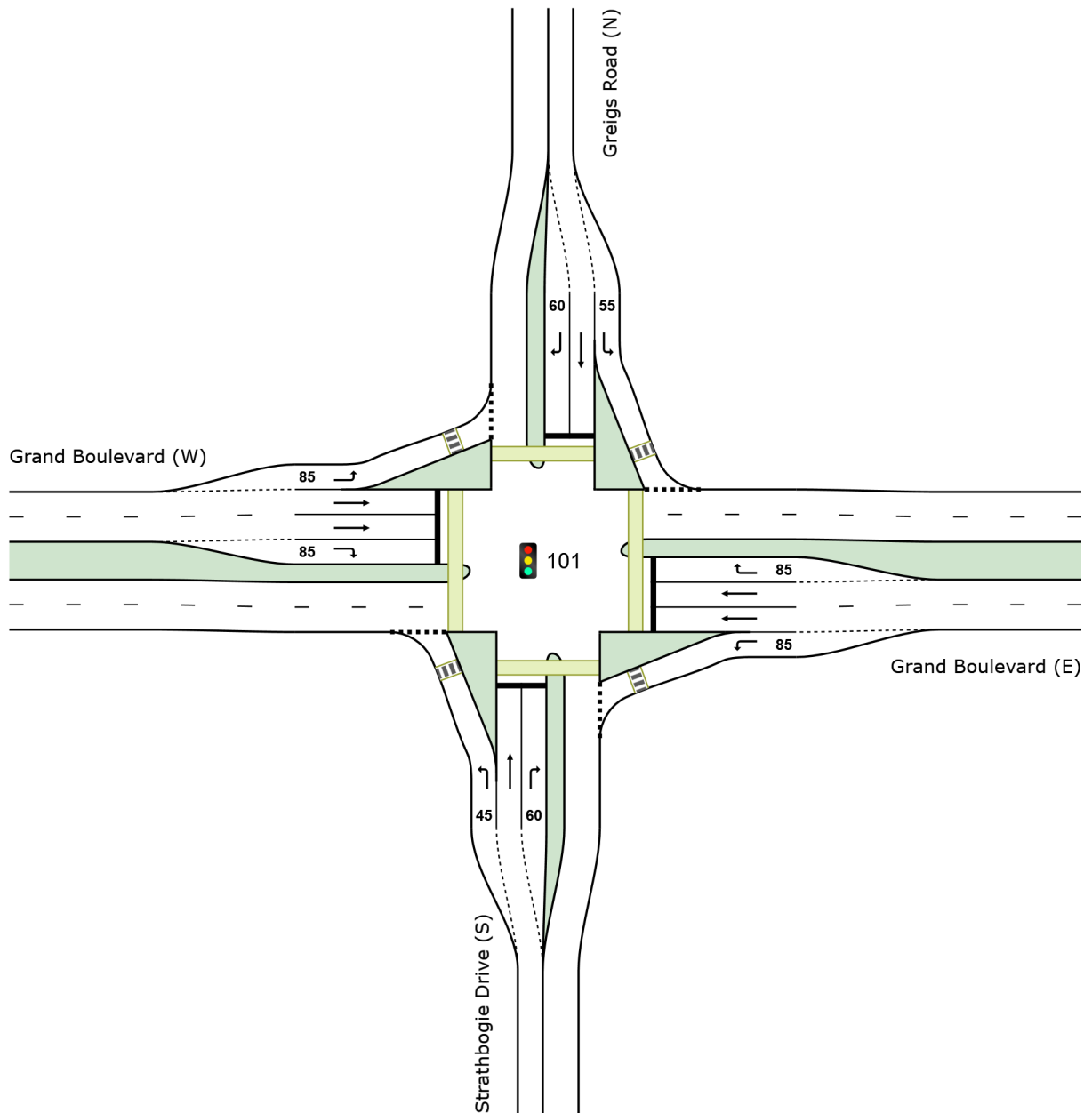
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D, D1*

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: Strathbogie Drive (S)															
Lane 1	46	2.0	46	2.0	1315	0.035	100	5.7	LOS A	0.2	1.1	Short	45	0.0	NA
Lane 2	1	2.0	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	13	2.0	13	2.0	277	0.046	100	27.4	LOS C	0.2	1.6	Short	60	0.0	NA
Approach	60	2.0	60	2.0		0.046		10.7	LOS B	0.2	1.6				
East: Grand Boulevard (E)															
Lane 1	6	2.0	6	2.0	1314	0.005	100	8.2	LOS A	0.0	0.2	Short	85	0.0	NA
Lane 2	143	2.0	143	2.0	365	0.391	100	31.6	LOS C	3.1	21.9	Full	500	0.0	0.0
Lane 3	143	2.0	143	2.0	365	0.391	100	31.6	LOS C	3.1	21.9	Full	500	0.0	0.0
Lane 4	1	2.0	1	2.0	139	0.008	100	44.5	LOS D	0.0	0.2	Short	85	0.0	NA
Approach	293	2.0	293	2.0		0.391		31.1	LOS C	3.1	21.9				

North: Greigs Road (N)															
Lane 1	12	2.0	12	2.0	808	0.014	100	11.6	LOS B	0.1	0.8	Short	55	0.0	NA
Lane 2	4	2.0	4	2.0	316	0.013	100	30.4	LOS C	0.1	0.6	Full	500	0.0	0.0
Lane 3	1	2.0	1	2.0	277	0.004	100	26.7	LOS C	0.0	0.1	Short	60	0.0	NA
Approach	17	2.0	17	2.0		0.014		17.2	LOS B	0.1	0.8				
West: Grand Boulevard (W)															
Lane 1	1	2.0	1	2.0	1397	0.001	100	7.2	LOS A	0.0	0.0	Short	85	0.0	NA
Lane 2	478	2.0	478	2.0	754	0.634	100	34.5	LOS C	11.4	81.4	Full	350	0.0	0.0
Lane 3	478	2.0	478	2.0	754	0.634	100	34.5	LOS C	11.4	81.4	Full	350	0.0	0.0
Lane 4	199	2.0	199	2.0	509	0.391	100	41.4	LOS D	4.8	34.1	Short	85	0.0	NA
Approach	1156	2.0	1156	2.0		0.634		35.7	LOS D	11.4	81.4				
Intersection	1525	2.0	1525	2.0		0.634		33.6	LOS C	11.4	81.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

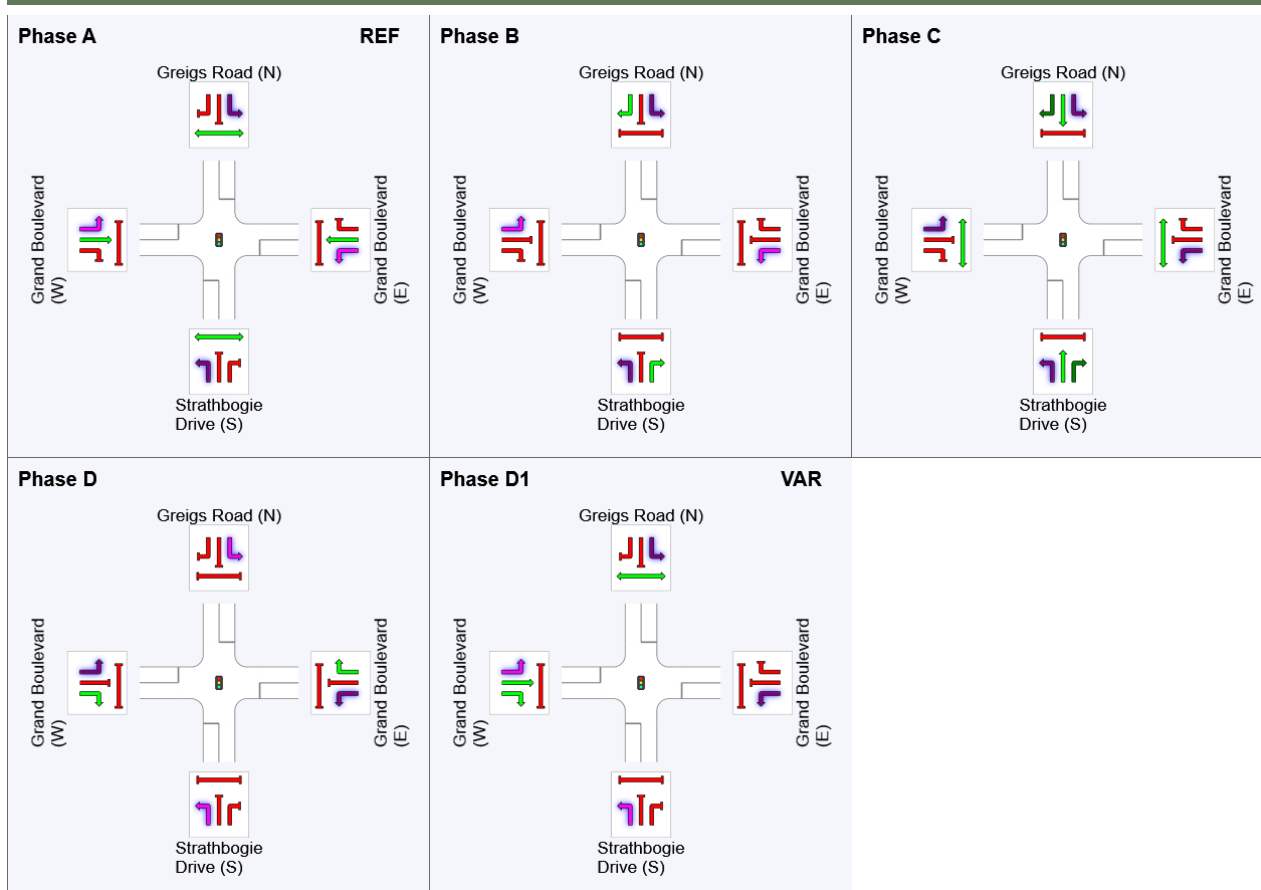
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D	D1
Phase Change Time (sec)	0	21	33	52	64
Green Time (sec)	15	6	13	6	10
Phase Time (sec)	21	12	19	12	16
Phase Split	26%	15%	24%	15%	20%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 102 [02 FB PM - Grand Blvd / Clara Ave
(Int#2) (Site Folder: Future base 2041)]

Network: 1 [FB PM - Int#1,2,4 Network
(Network Folder: Future base 2041)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 80 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing

Reference Phase: Phase A

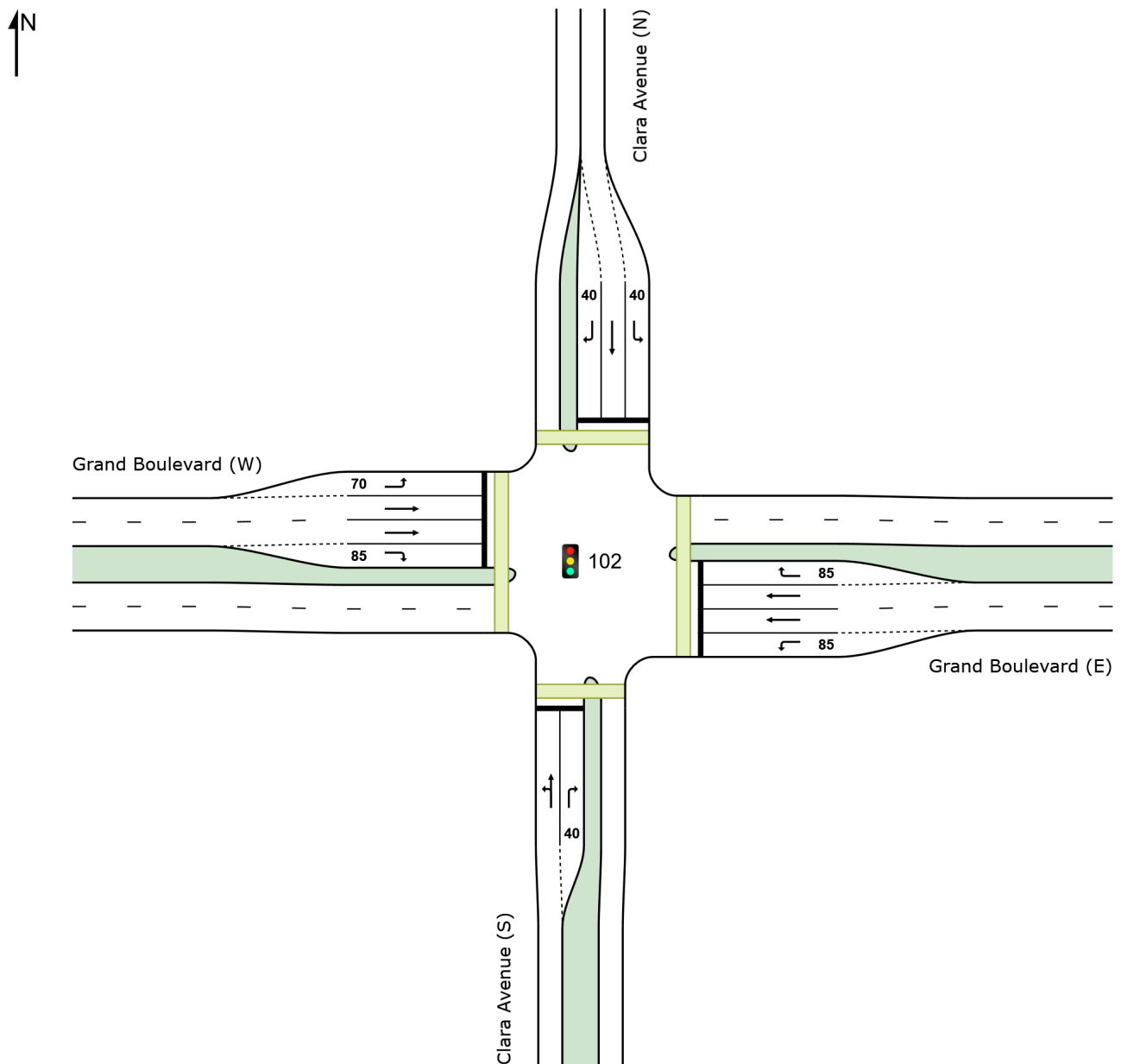
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Clara Avenue (S)															
Lane 1	17	2.0	17	2.0	304	0.055	100	34.4	LOS C	0.3	2.4	Full	500	0.0	0.0
Lane 2	3	2.0	3	2.0	313	0.010	100	25.4	LOS C	0.1	0.4	Short	40	0.0	NA
Approach	20	2.0	20	2.0		0.055		33.0	LOS C	0.3	2.4				
East: Grand Boulevard (E)															
Lane 1	1	2.0	1	2.0	902	0.001	100	9.1	LOS A	0.0	0.0	Short	85	0.0	NA
Lane 2	161	2.0	161	2.0	705	0.228	100	6.7	LOS A	1.0	7.4	Full	350	0.0	0.0
Lane 3	161	2.0	161	2.0	705	0.228	100	3.0	LOS A	0.5	3.5	Full	350	0.0	0.0
Lane 4	1	2.0	1	2.0	139	0.008	100	46.7	LOS D	0.0	0.2	Short	85	0.0	NA
Approach	324	2.0	324	2.0		0.228		5.0	LOS A	1.0	7.4				
North: Clara Avenue (N)															
Lane 1	1	2.0	1	2.0	578	0.002	100	24.5	LOS C	0.0	0.1	Short	40	0.0	NA
Lane 2	1	2.0	1	2.0	365	0.003	100	28.2	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	1	2.0	1	2.0	312	0.003	100	25.2	LOS C	0.0	0.1	Short	40	0.0	NA
Approach	3	2.0	3	2.0		0.003		25.9	LOS C	0.0	0.1				
West: Grand Boulevard (W)															
Lane 1	9	2.0	9	2.0	902	0.011	100	13.6	LOS B	0.1	0.5	Short	70	0.0	NA
Lane 2	573	2.0	573	2.0	703 ¹	0.815	100	29.6	LOS C	14.0	99.9	Full	400	0.0	0.0
Lane 3	575	2.0	575	2.0	705	0.815	100	29.8	LOS C	14.1	100.4	Full	400	0.0	0.0
Lane 4	14	2.0	14	2.0	139	0.099	100	48.0	LOS D	0.3	2.4	Short	85	0.0	NA
Approach	1171	2.0	1171	2.0		0.815		29.8	LOS C	14.1	100.4				
Intersection	1518	2.0	1518	2.0		0.815		24.5	LOS C	14.1	100.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

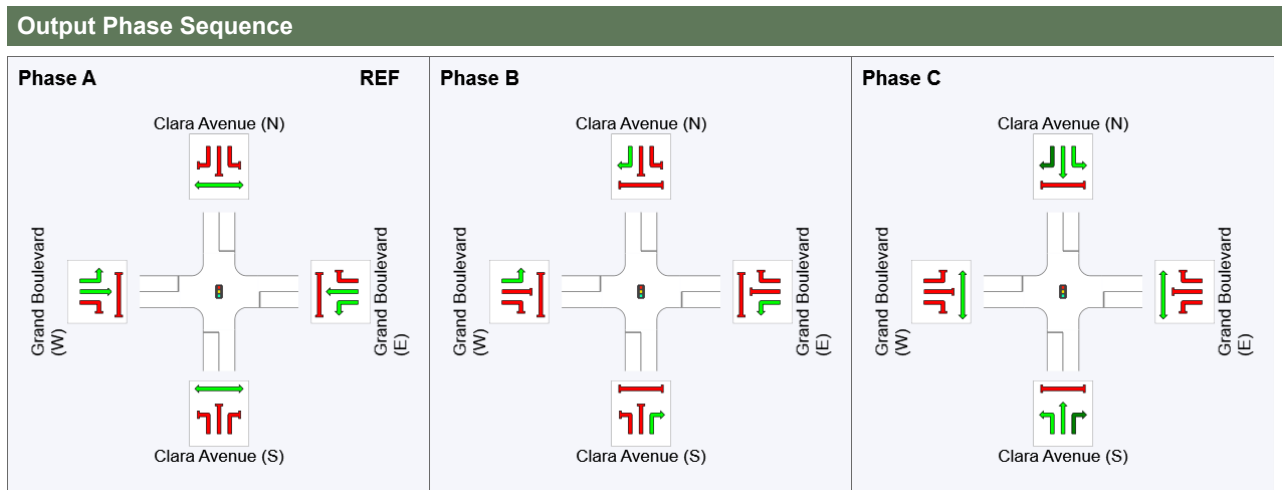
Intersection and Approach LOS values are based on average delay for all lanes.

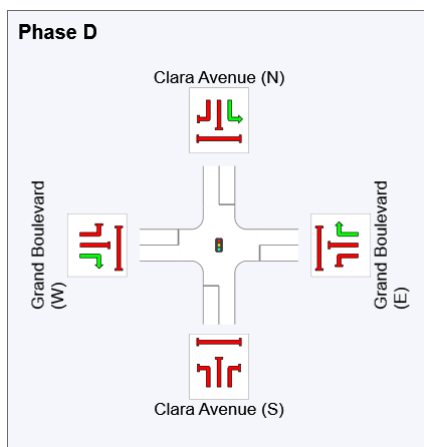
Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.





REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	35	47	68
Green Time (sec)	29	6	15	6
Phase Time (sec)	35	12	21	12
Phase Split	44%	15%	26%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 104 [04 FB PM - Grand Blvd / Mt Atkinson Rd (Int#4) (Site Folder: Future base 2041)]

Network: 1 [FB PM - Int#1,2,4 Network (Network Folder: Future base 2041)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 80 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - Import

Reference Phase: Phase A

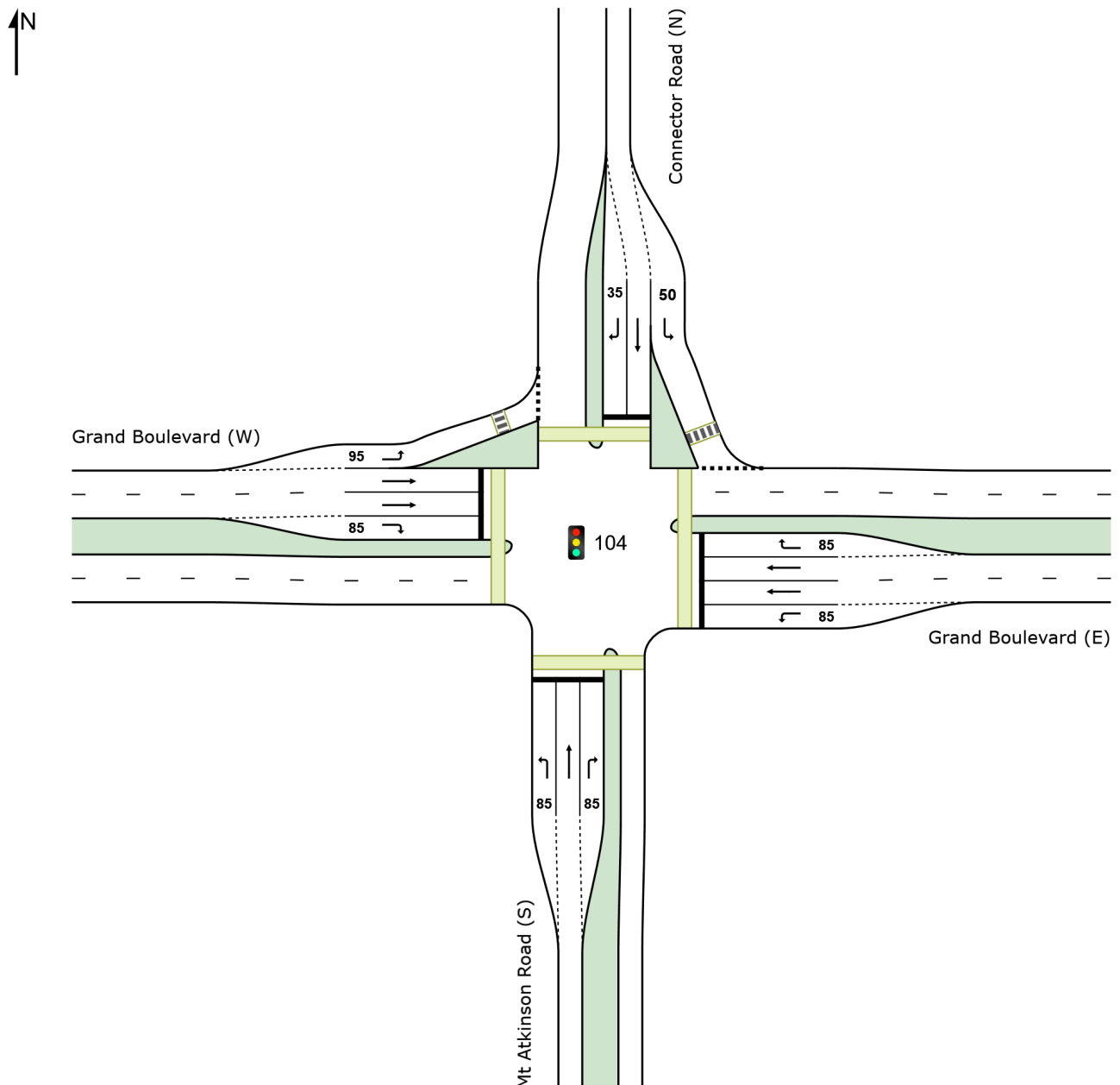
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Mt Atkinson Road (S)															
Lane 1	1	2.0	1	2.0	439	0.002	100	25.1	LOS C	0.0	0.1	Short	85	0.0	NA
Lane 2	1	2.0	1	2.0	365	0.003	100	28.2	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	9	2.0	9	2.0	313	0.030	100	25.8	LOS C	0.2	1.1	Short	85	0.0	NA
Approach	12	2.0	12	2.0		0.030		25.9	LOS C	0.2	1.1				
East: Grand Boulevard (E)															
Lane 1	22	2.0	22	2.0	763	0.029	100	20.5	LOS C	0.4	2.5	Short	85	0.0	NA
Lane 2	158	2.0	158	2.0	705	0.224	100	21.6	LOS C	3.1	22.0	Full	400	0.0	0.0
Lane 3	158	2.0	158	2.0	705	0.224	100	26.7	LOS C	3.5	24.6	Full	400	0.0	0.0
Lane 4	1	2.0	1	2.0	254	0.004	100	25.2	LOS C	0.0	0.1	Short	85	0.0	NA
Approach	339	2.0	339	2.0		0.224		23.9	LOS C	3.5	24.6				
North: Connector Road (N)															
Lane 1	1	2.0	1	2.0	953	0.001	100	9.8	LOS A	0.0	0.1	Short	50	0.0	NA
Lane 2	1	2.0	1	2.0	365	0.003	100	28.2	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	1	2.0	1	2.0	313	0.003	100	25.1	LOS C	0.0	0.1	Short	35	0.0	NA
Approach	3	2.0	3	2.0		0.003		21.0	LOS C	0.0	0.1				
West: Grand Boulevard (W)															
Lane 1	1	2.0	1	2.0	1488	0.001	100	7.2	LOS A	0.0	0.0	Short	95	0.0	NA
Lane 2	581	2.0	581	2.0	705	0.824	100	30.0	LOS C	14.2	101.0	Full	500	0.0	0.0
Lane 3	581	2.0	581	2.0	705	0.824	100	30.0	LOS C	14.2	101.0	Full	500	0.0	0.0
Lane 4	1	2.0	1	2.0	466	0.002	100	18.2	LOS B	0.0	0.1	Short	85	0.0	NA
Approach	1164	2.0	1164	2.0		0.824		30.0	LOS C	14.2	101.0				
Intersection	1518	2.0	1518	2.0		0.824		28.6	LOS C	14.2	101.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

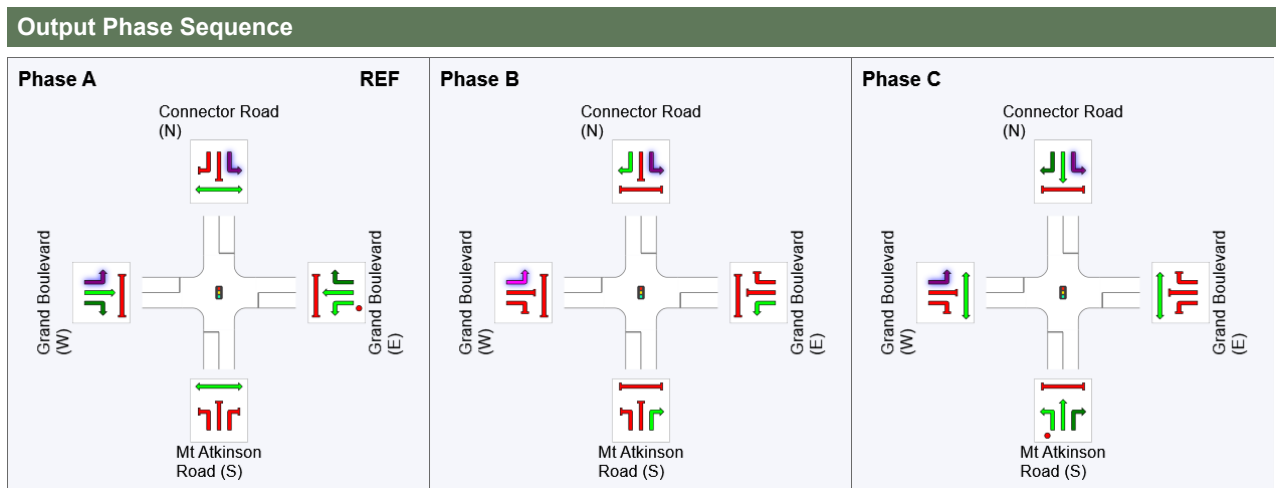
Lane LOS values are based on average delay per lane.

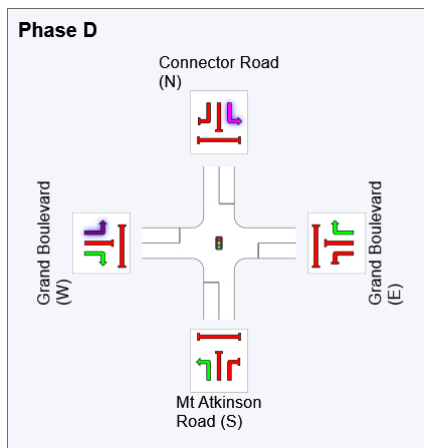
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

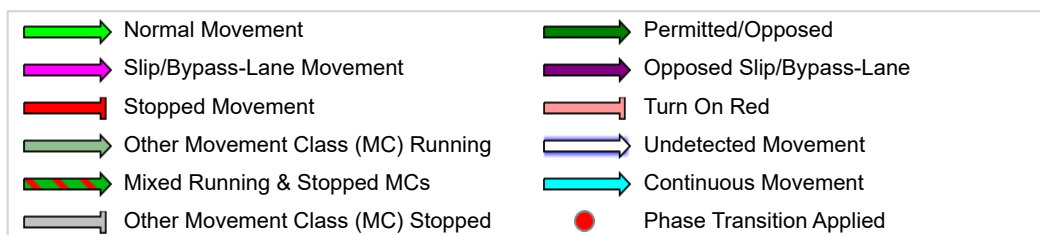
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.





REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	35	47	68
Green Time (sec)	29	6	15	6
Phase Time (sec)	35	12	21	12
Phase Split	44%	15%	26%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

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Project: U:\300304089\technical\modelling\sidra\230918_mt_atkinson_final.sip9

USER REPORT FOR SITE

All Movement Classes



Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary

 Site: 105 [05 FB PM - Grand Blvd / Greigs Road (west) / Attezze Drive (Int#5) (Site Folder: Future base 2041)]

Note that the design for this intersection is not available and has been based on Int#4

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

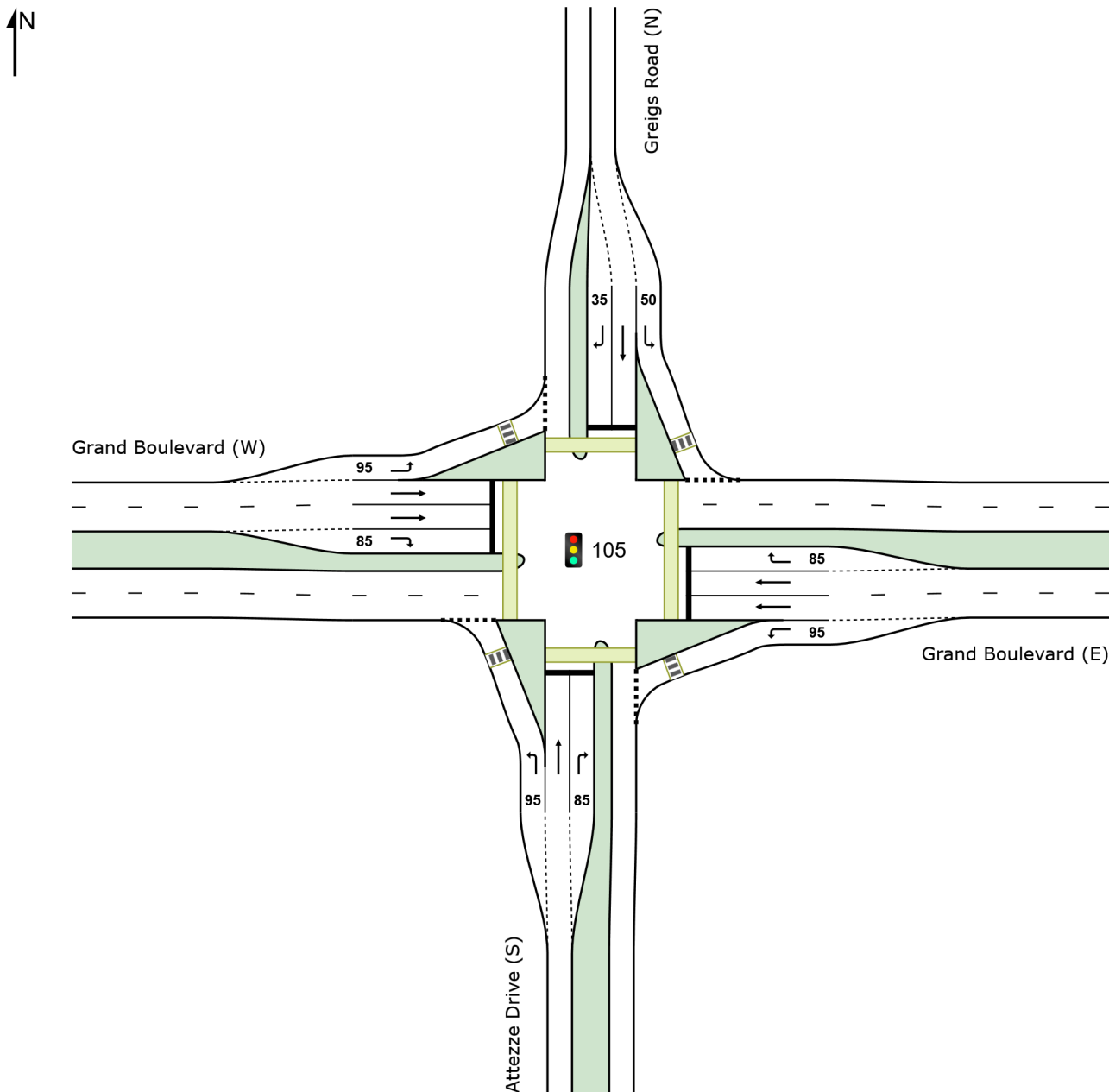
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance													
	DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist] m		m	%	%
South: Attezze Drive (S)													
Lane 1	20	2.0	1316	0.015	100	5.4	LOS A	0.1	0.4	Short	95	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	15	2.0	277	0.053	100	27.5	LOS C	0.3	1.8	Short	85	0.0	NA
Approach	36	2.0		0.053		15.2	LOS B	0.3	1.8				
East: Grand Boulevard (E)													
Lane 1	23	2.0	1398	0.017	100	7.2	LOS A	0.0	0.3	Short	95	0.0	NA
Lane 2	128	2.0	754	0.170	100	17.3	LOS B	2.0	14.3	Full	500	0.0	0.0
Lane 3	128	2.0	754	0.170	100	17.3	LOS B	2.0	14.3	Full	500	0.0	0.0
Lane 4	1	2.0	272	0.004	100	20.4	LOS C	0.0	0.1	Short	85	0.0	NA
Approach	281	2.0		0.170		16.4	LOS B	2.0	14.3				

North: Greigs Road (N)													
Lane 1	1	2.0	920	0.001	100	9.4	LOS A	0.0	0.1	Short	50	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	1	2.0	277	0.004	100	26.7	LOS C	0.0	0.1	Short	35	0.0	NA
Approach	3	2.0		0.004		22.0	LOS C	0.0	0.1				
West: Grand Boulevard (W)													
Lane 1	4	2.0	1479	0.003	100	7.2	LOS A	0.0	0.1	Short	95	0.0	NA
Lane 2	559	2.0	754	0.742	100	23.8	LOS C	11.9	84.8	Full	500	0.0	0.0
Lane 3	559	2.0	754	0.742	100	23.8	LOS C	11.9	84.8	Full	500	0.0	0.0
Lane 4	32	2.0	513	0.062	100	17.7	LOS B	0.4	2.7	Short	85	0.0	NA
Approach	1155	2.0		0.742		23.6	LOS C	11.9	84.8				
Intersection	1475	2.0		0.742		22.0	LOS C	11.9	84.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

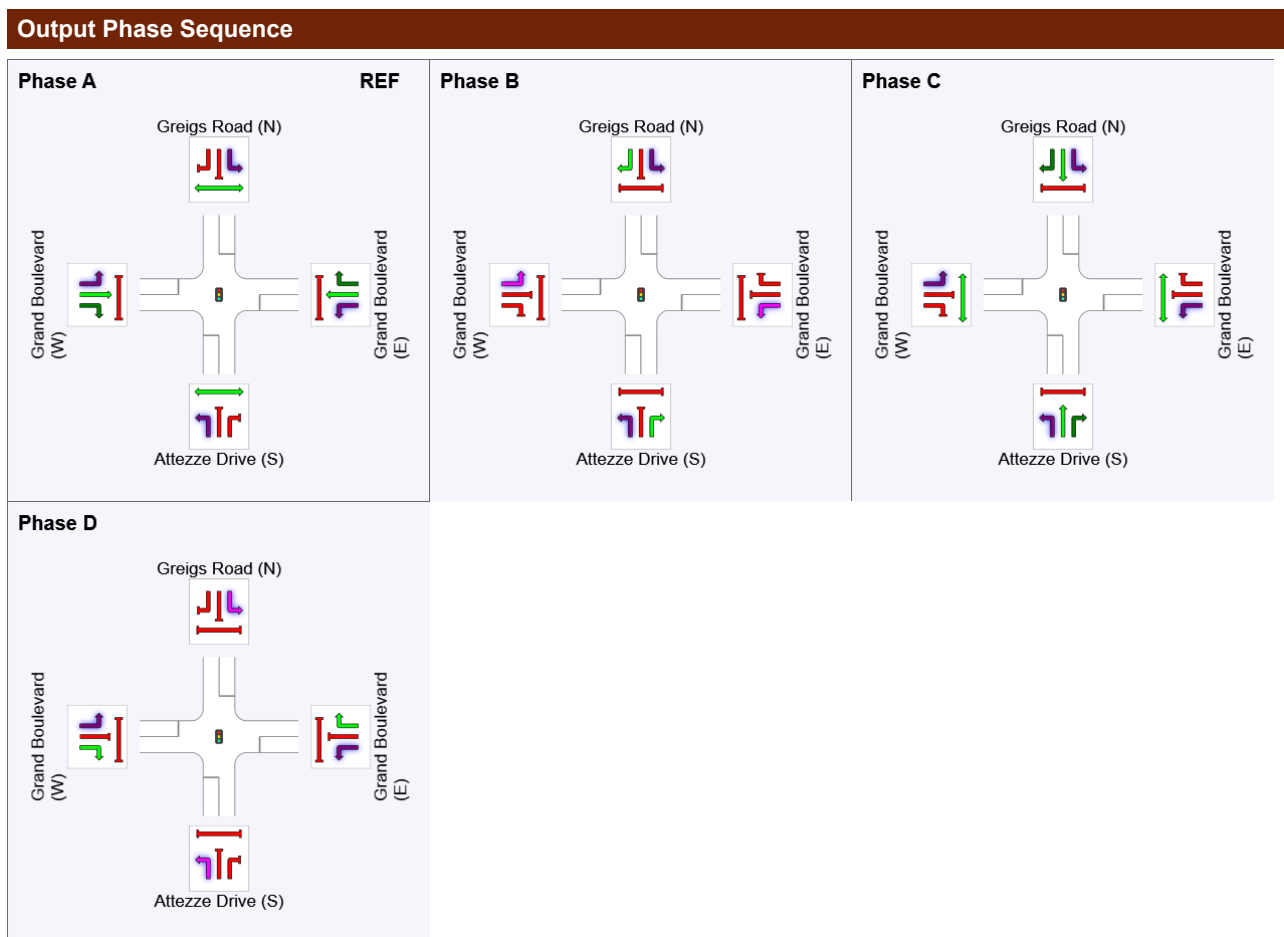
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	37	49	68
Green Time (sec)	31	6	13	6
Phase Time (sec)	37	12	19	12
Phase Split	46%	15%	24%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

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Organisation: GTA CONSULTANTS | Licence: NETWORK / Enterprise | Created: Wednesday, 27 September 2023 12:42:11 PM
Project: U:\300304089\technical\modelling\sidra\230918_mt_atkinson_final.sip9

USER REPORT FOR NETWORK

All Movement Classes

Project: 230918_mt_atkinson_final

Template: Network Report

Network: N101 [FPD PM - Int#1,2,3,4 Network - eastbound re-route (Network Folder: Future Post Development - 25% discount to eastbound flow)]

New Network

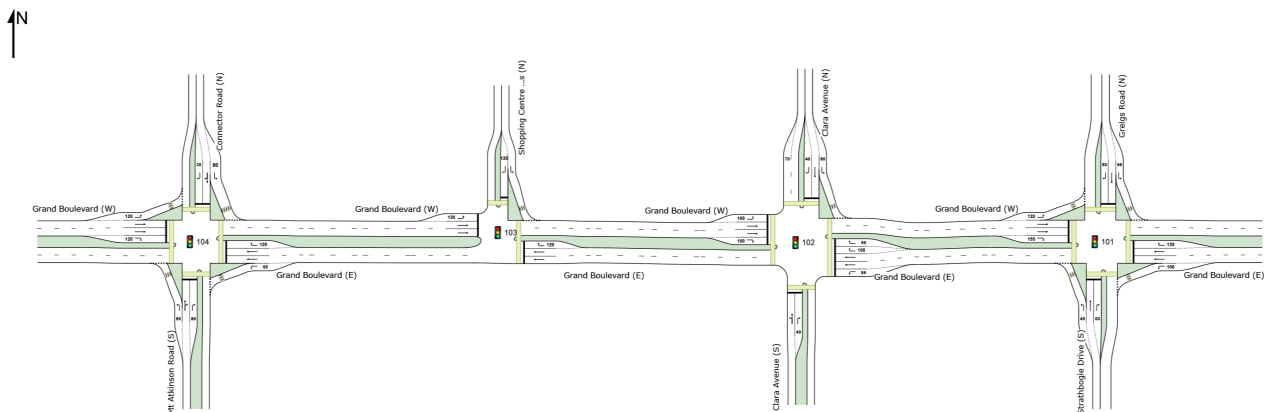
Network Category: (None)

Network Cycle Time = 120 seconds (Network Practical Cycle Time)

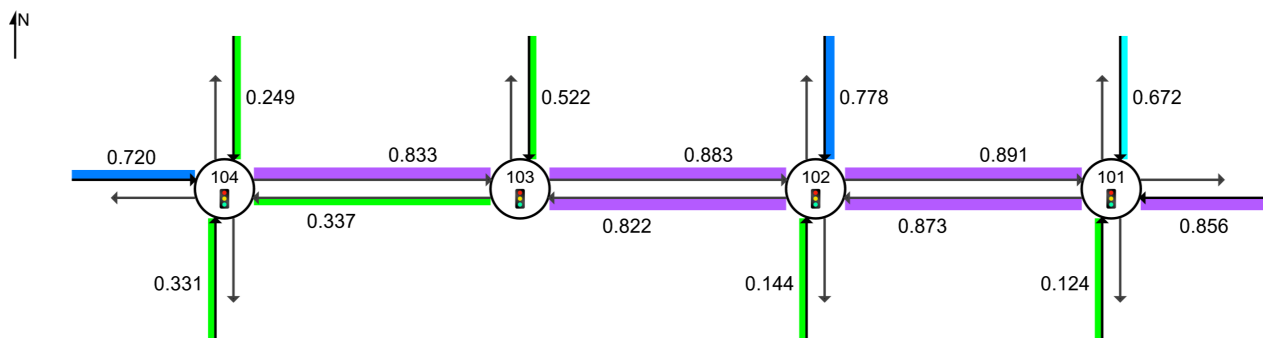
Critical Site / Common Control Group that determines the Network Cycle Time (for Coordinated Sites): 101 [01 FPD PM - Grand Blvd / Greigs Rd (east) / Strathbogie Drive (Int #1) - eastbound re-route]

Network Layout

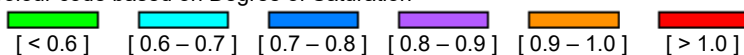
Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Degree of Saturation



Colour code based on Degree of Saturation



USER REPORT FOR NETWORK SITE

All Movement Classes

 Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary

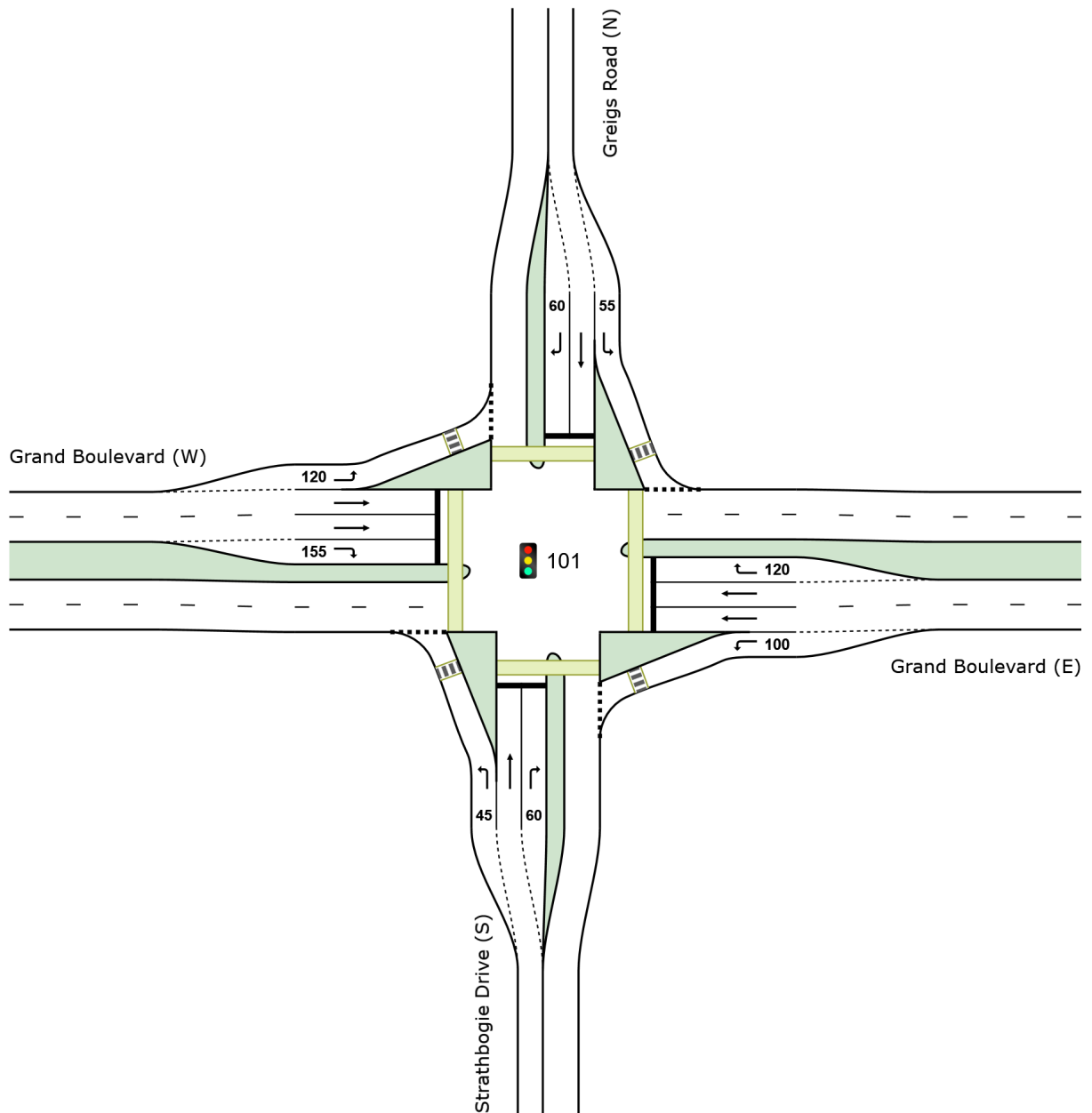
 Site: 101 [01 FPD PM - Grand Blvd / Greigs Rd (east) / Strathbogie Drive (Int #1) - eastbound re-route (Site Folder: Future Post Development - 25% discount to eastbound flow)]
 Network: 2 [FPD PM - Int#1,2,3,4 Network - eastbound re-route (Network Folder: Future Post Development - 25% discount to eastbound flow)]

Grand Boulevard / Greigs Road (east)
Site Category: Base Year
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Variable Phasing - No B
Reference Phase: Phase A
Input Phase Sequence: A, C, D, D1*, D2*
Output Phase Sequence: A, C, D
(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: Strathbogie Drive (S)															
Lane 1	100	2.0	100	2.0	806	0.124	100	9.1	LOS A	0.9	6.7	Short	45	0.0	NA
Lane 2	34	2.0	34	2.0	308	0.109	100	46.9	LOS D	1.0	7.4	Full	500	0.0	0.0
Lane 3	13	2.0	13	2.0	147	0.086	100	60.0	LOS E	0.4	3.1	Short	60	0.0	NA
Approach	146	2.0	146	2.0		0.124		22.2	LOS C	1.0	7.4				
East: Grand Boulevard (E)															
Lane 1	6	2.0	6	2.0	1341	0.005	100	9.6	LOS A	0.0	0.3	Short	100	0.0	NA
Lane 2	493	2.0	493	2.0	956	0.516	100	22.1	LOS C	11.9	84.6	Full	500	0.0	0.0
Lane 3	493	2.0	493	2.0	956	0.516	100	22.1	LOS C	11.9	84.6	Full	500	0.0	0.0
Lane 4	317	2.0	317	2.0	370	0.856	100	65.0	LOS E	12.3	87.6	Short	120	0.0	NA
Approach	1309	2.0	1309	2.0		0.856		32.4	LOS C	12.3	87.6				

North: Greigs Road (N)																
Lane 1	337	2.0	337	2.0	752	0.448	100	25.9	LOS C	7.4	52.4	Short	55	0.0	NA	
Lane 2	35	2.0	35	2.0	308	0.113	100	46.9	LOS D	1.1	7.7	Full	300	0.0	0.0	
Lane 3	99	2.0	99	2.0	147	0.672	100	65.5	LOS E	3.7	26.2	Short	60	0.0	NA	
Approach	471	2.0	471	2.0		0.672		35.7	LOS D	7.4	52.4					
West: Grand Boulevard (W)																
Lane 1	41	2.0	41	2.0	1320	0.031	100	9.4	LOS A	0.2	1.6	Short	120	0.0	NA	
Lane 2	843	2.0	843	2.0	946 ¹	0.891	100	23.0	LOS C	24.9	177.0	Full	350	0.0	0.0	
Lane 3	852	2.0	852	2.0	956	0.891	100	10.4	LOS B	17.1	121.5	Full	350	0.0	0.0	
Lane 4	276	2.0	276	2.0	370	0.745	100	67.5	LOS E	10.1	72.0	Short	155	0.0	NA	
Approach	2012	2.0	2012	2.0		0.891		23.5	LOS C	24.9	177.0					
Intersection	3938	2.0	3938	2.0		0.891		27.9	LOS C	24.9	177.0					

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

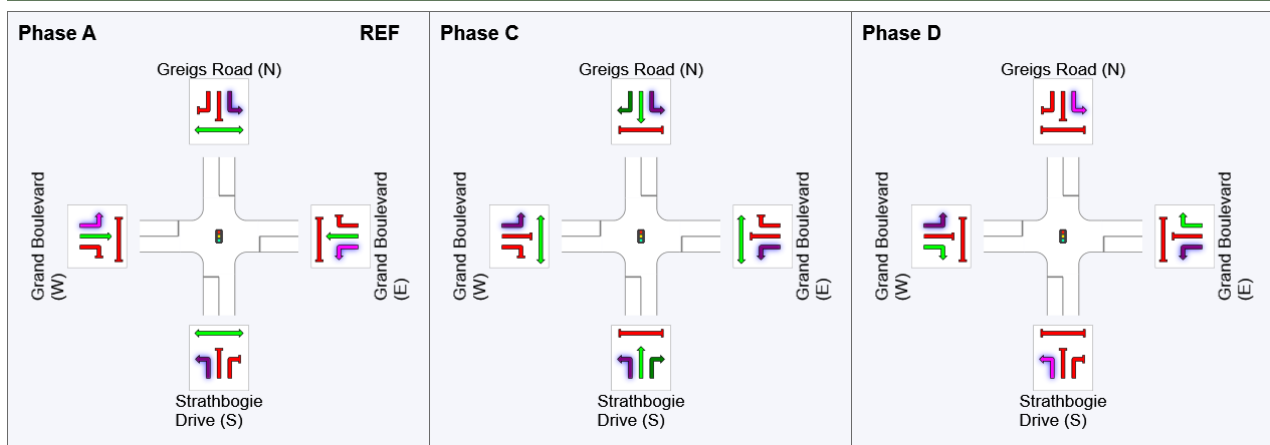
Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

- ¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	C	D
Phase Change Time (sec)	0	65	90
Green Time (sec)	59	19	24

Phase Time (sec)	65	25	30
Phase Split	54%	21%	25%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

■ **Site: 102 [02 FPD PM - Grand Blvd / Clara Ave (Int#2) - eastbound re-route (Site Folder: Future Post Development - 25% discount to eastbound flow)]**
■ **Network: 2 [FPD PM - Int#1,2,3,4 Network - eastbound re-route (Network Folder: Future Post Development - 25% discount to eastbound flow)]**

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - No B

Reference Phase: Phase A

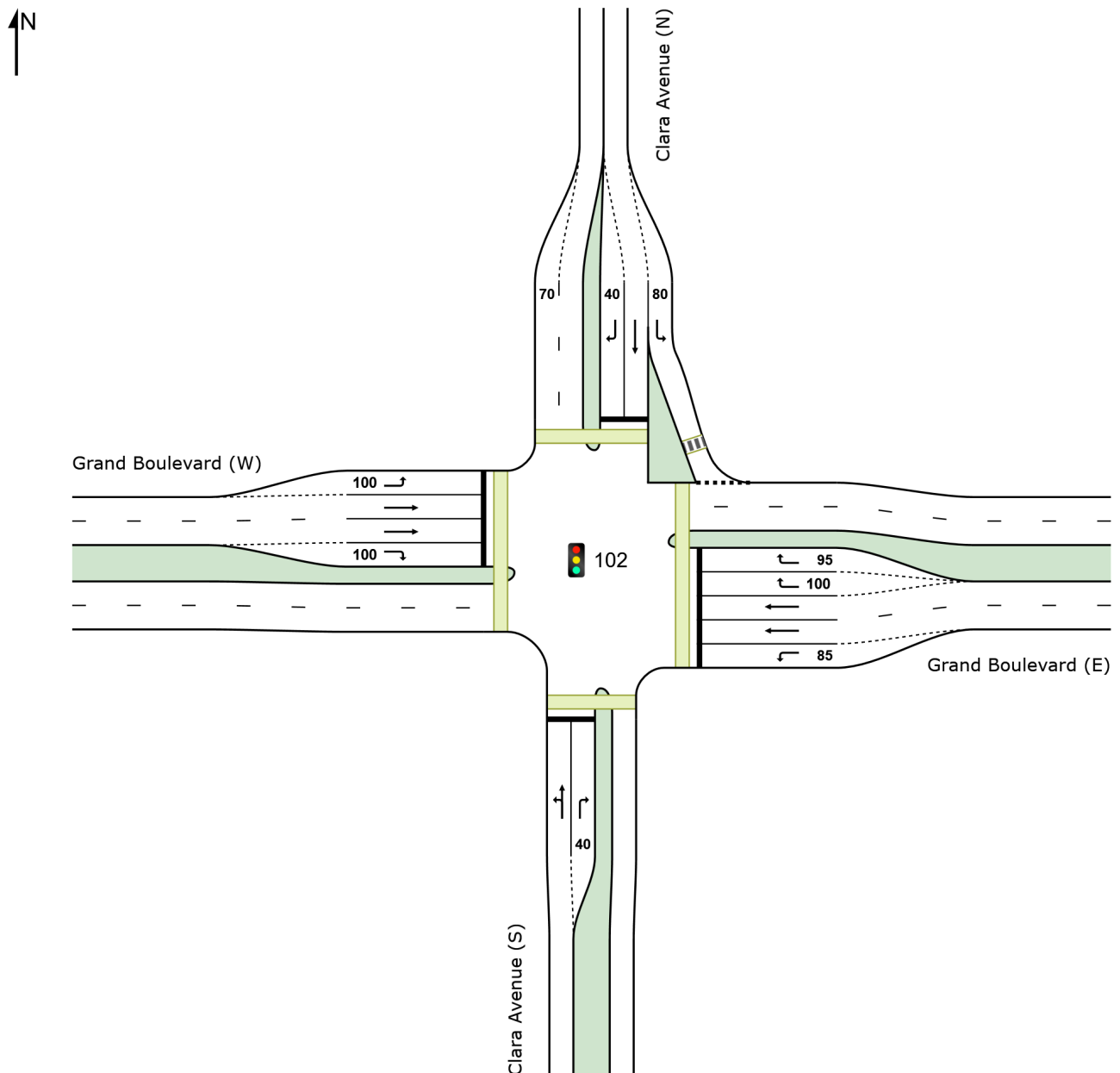
Input Phase Sequence: A, C, D, D1*, D2*

Output Phase Sequence: A, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Clara Avenue (S)															
Lane 1	54	2.0	54	2.0	373	0.144	100	45.9	LOS D	1.6	11.3	Full	500	0.0	0.0
Lane 2	6	2.0	6	2.0	229	0.028	100	51.7	LOS D	0.2	1.4	Short	40	0.0	NA
Approach	60	2.0	60	2.0		0.144		46.5	LOS D	1.6	11.3				
East: Grand Boulevard (E)															
Lane 1	8	2.0	8	2.0	802	0.011	100	26.6	LOS C	0.1	1.0	Short	85	0.0	NA
Lane 2	382	2.0	382	2.0	891	0.429	100	23.3	LOS C	8.5	60.6	Full	350	0.0	0.0
Lane 3	382	2.0	382	2.0	891	0.429	100	22.7	LOS C	9.0	63.7	Full	350	0.0	0.0
Lane 4	121	2.0	121	2.0	324	0.372	43 ⁶	54.8	LOS D	4.1	28.9	Short	100	0.0	NA
Lane 5	283	2.0	283	2.0	324	0.873	100	66.7	LOS E	11.1	79.0	Short	95	0.0	NA
Approach	1176	2.0	1176	2.0		0.873		36.8	LOS D	11.1	79.0				
North: Clara Avenue (N)															
Lane 1	424	2.0	424	2.0	828	0.512	100	22.2	LOS C	8.6	61.3	Short	80	0.0	NA
Lane 2	20	2.0	20	2.0	421	0.047	100	39.7	LOS D	0.6	4.0	Full	260	0.0	0.0
Lane 3	183	2.0	183	2.0	235 ¹	0.778	100	62.3	LOS E	6.9	48.9	Short	40	0.0	NA
Approach	627	2.0	627	2.0		0.778		34.5	LOS C	8.6	61.3				
West: Grand Boulevard (W)															
Lane 1	156	2.0	156	2.0	802	0.194	100	16.7	LOS B	1.6	11.3	Short	100	0.0	NA
Lane 2	763	2.0	763	2.0	864 ¹	0.883	100	16.6	LOS B	19.3	137.7	Full	200	0.0	15.6
Lane 3	767	2.0	767	2.0	869 ¹	0.883	100	12.8	LOS B	16.6	118.5	Full	200	0.0	2.0
Lane 4	38	2.0	38	2.0	324	0.117	100	59.2	LOS E	1.3	9.4	Short	100	0.0	NA
Approach	1723	2.0	1723	2.0		0.883		15.9	LOS B	19.3	137.7				
Intersection	3586	2.0	3586	2.0		0.883		26.5	LOS C	19.3	137.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

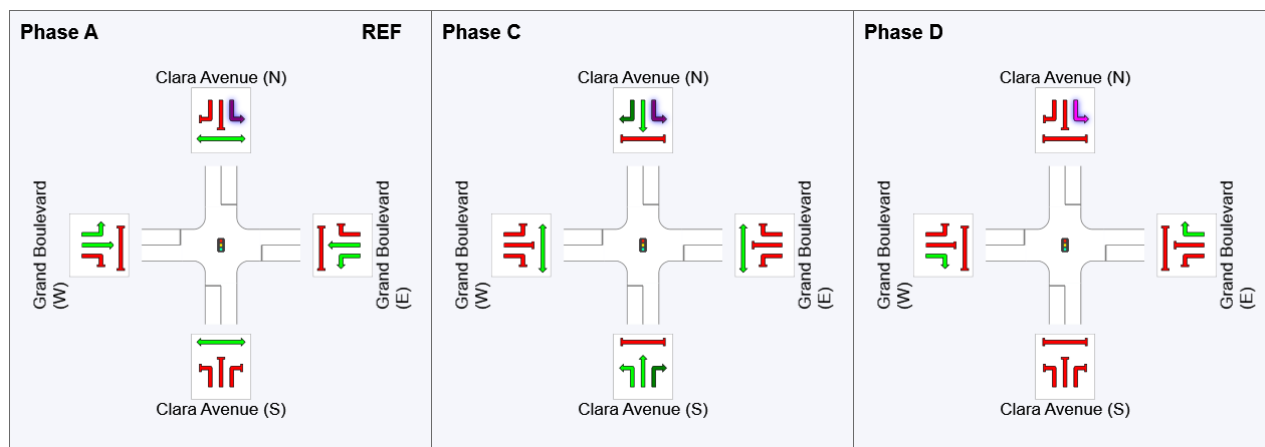
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

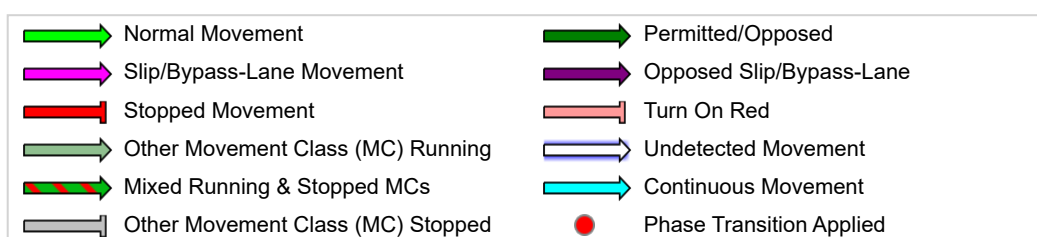
⁶ Lane under-utilisation due to downstream effects

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	C	D
Phase Change Time (sec)	103	44	76
Green Time (sec)	55	26	21
Phase Time (sec)	61	32	27
Phase Split	51%	27%	23%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 103 [03 FPD PM - Grand Blvd / TC Access (Int#3) - eastbound re-route (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Network: 2 [FPD PM - Int#1,2,3,4 Network - eastbound re-route (Network Folder: Future Post Development - 25% discount to eastbound flow)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: T intersection three phase - Import - Import

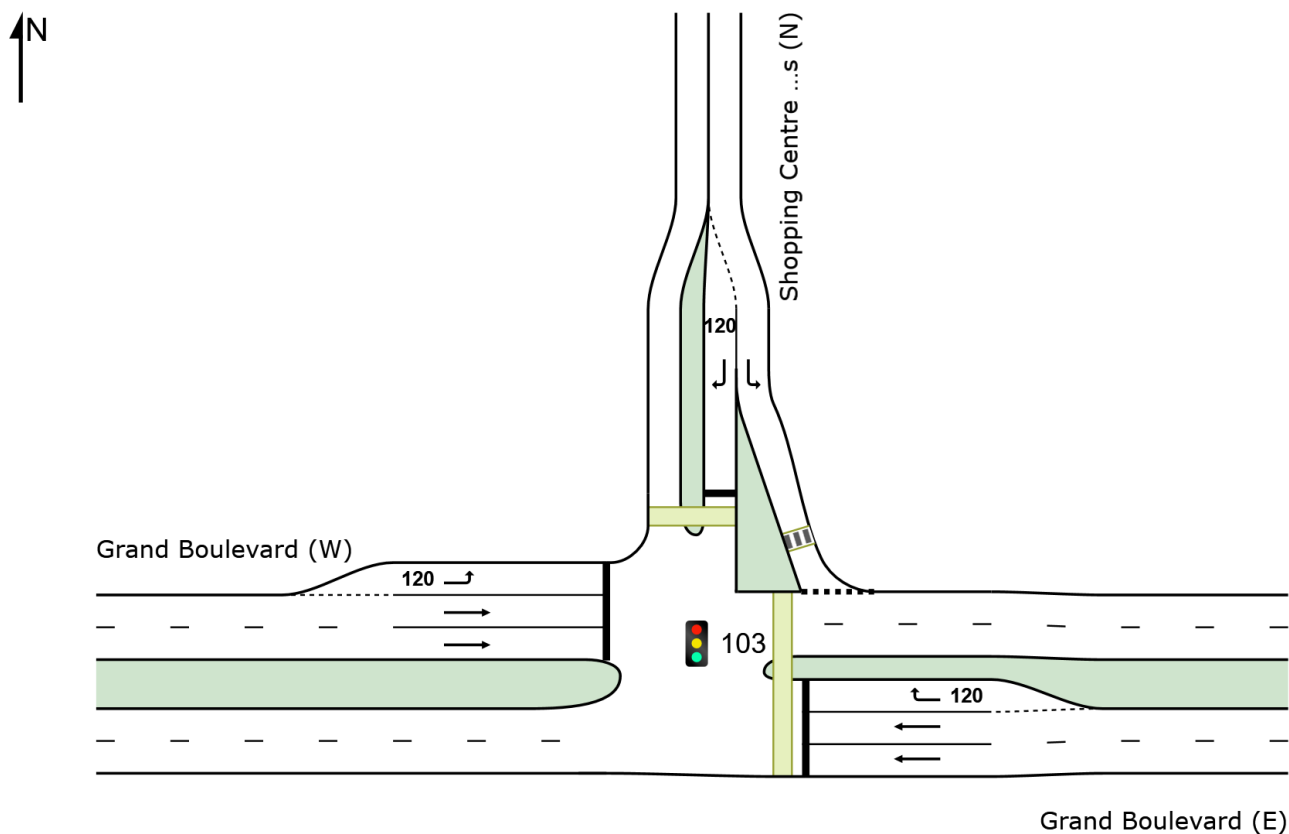
Reference Phase: Phase A

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total	HV]	[Total	HV]						[Veh	Dist]				
	veh/h	%	veh/h	%											
East: Grand Boulevard (E)															
Lane 1	333	2.0	333	2.0	1475	0.226	100	4.1	LOS A	3.1	22.3	Full	200	0.0	0.0
Lane 2	333	2.0	333	2.0	1475	0.226	100	4.1	LOS A	3.1	22.4	Full	200	0.0	0.0
Lane 3	317	2.0	317	2.0	385	0.822	100	51.5	LOS D	11.0	78.1	Short	120	0.0	NA
Approach	983	2.0	983	2.0	0.822			19.4	LOS B	11.0	78.1				

North: Shopping Centre Access (N)															
Lane 1	263	2.0	263	2.0	638	0.412	100	5.9	LOS A	3.5	24.6	Full	500	-16.3 ^{N3}	0.0
Lane 2	137	2.0	137	2.0	262	0.522	100	52.7	LOS D	4.7	33.2	Short	120	0.0	NA
Approach	400	2.0	400	2.0		0.522		21.9	LOS C	4.7	33.2				
West: Grand Boulevard (W)															
Lane 1	148	2.0	148	2.0	879	0.169	100	10.3	LOS B	0.5	3.4	Short	120	0.0	NA
Lane 2	678	2.0	678	2.0	814	0.833	100	5.4	LOS A	7.4	52.7	Full	200	-16.3 ^{N3}	0.0
Lane 3	783	2.0	783	2.0	940	0.833	100	8.0	LOS A	13.2	94.0	Full	200	-3.4 ^{N3}	0.0
Approach	1609	2.0	1609	2.0		0.833		7.1	LOS A	13.2	94.0				
Intersection	2993	2.0	2993	2.0		0.833		13.1	LOS B	13.2	94.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

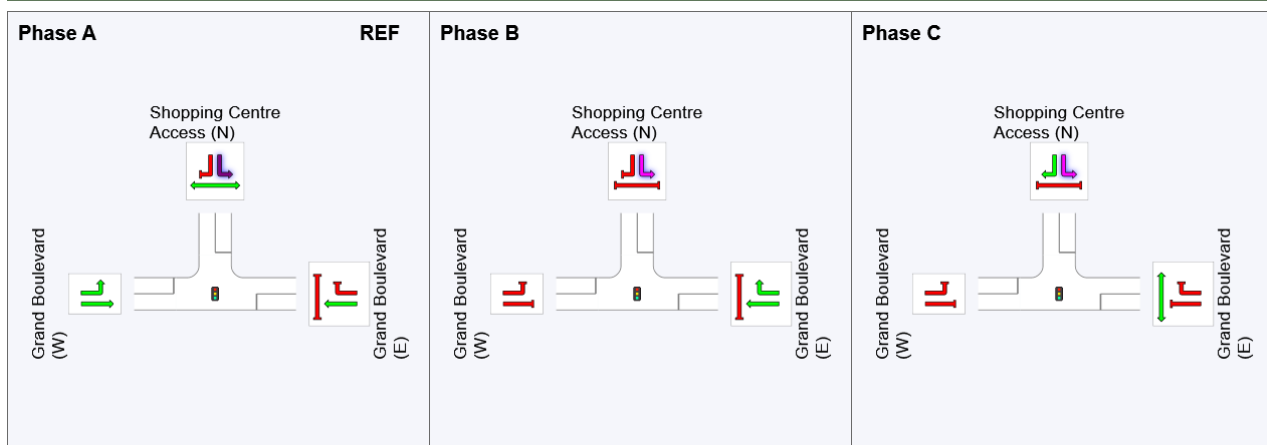
Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

^{N3} Capacity Adjustment due to downstream lane blockage determined by the program.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	85	31	62
Green Time (sec)	60	25	17
Phase Time (sec)	66	31	23
Phase Split	55%	26%	19%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time,

Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 104 [04 FPD PM - Grand Blvd / Mt Atkinson Rd (Int#4) - eastbound re-route (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Network: 2 [FPD PM - Int#1,2,3,4 Network - eastbound re-route (Network Folder: Future Post Development - 25% discount to eastbound flow)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - Copy (2)

Reference Phase: Phase A

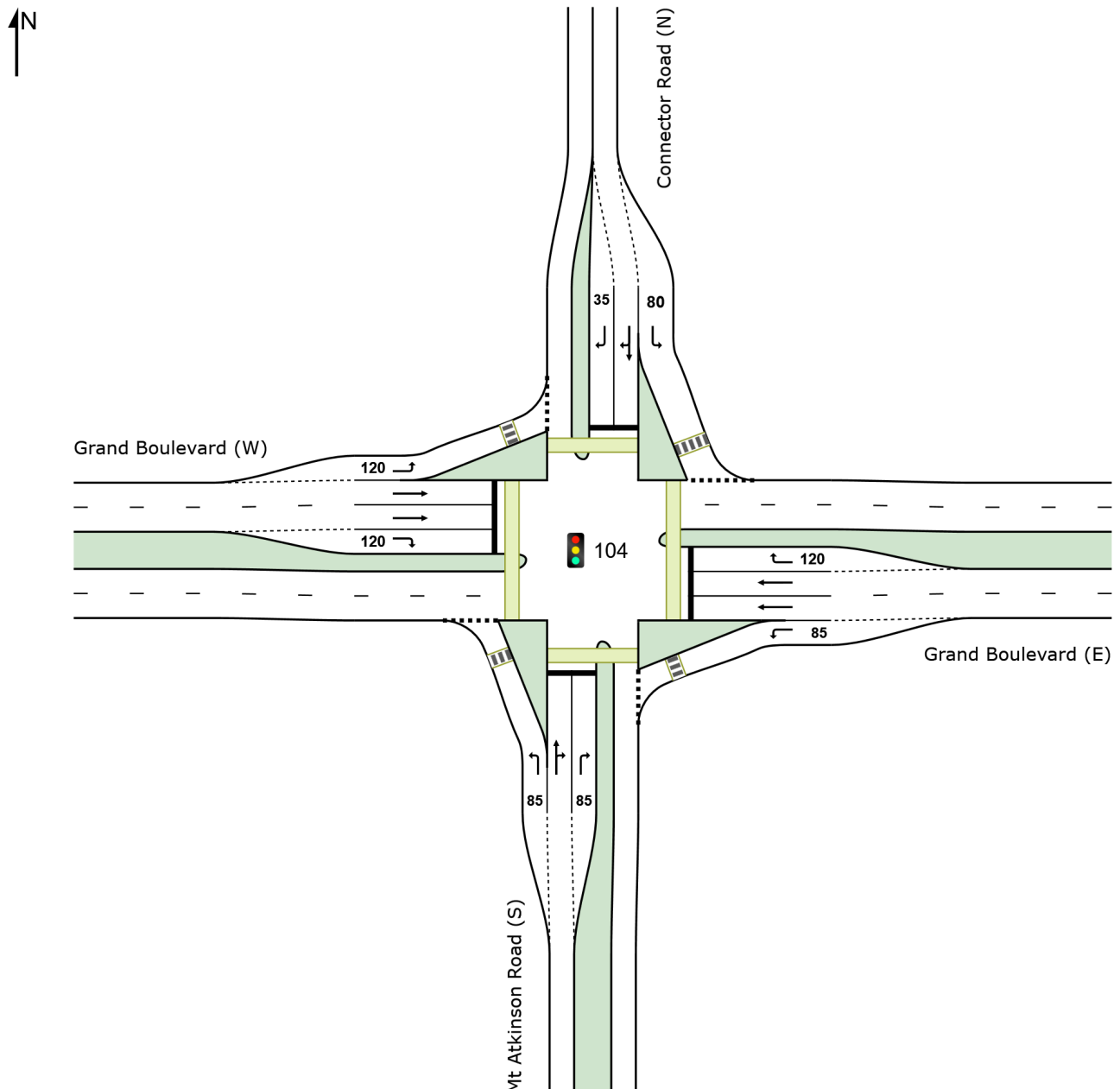
Input Phase Sequence: A, B, B2, D, D1*, D2*

Output Phase Sequence: A, B, B2, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	HV %	[Total veh/h]	HV %	veh/h	v/c	%	sec		[Veh]	Dist [m]		m	%	%
South: Mt Atkinson Road (S)															
Lane 1	1	2.0	1	2.0	1272	0.001	100	6.2	LOS A	0.0	0.0	Short	85	0.0	NA
Lane 2	90	2.0	90	2.0	272	0.331	100	51.9	LOS D	3.0	21.1	Full	500	0.0	0.0
Lane 3	87	2.0	87	2.0	262	0.331	100	55.5	LOS E	2.9	20.4	Short	85	0.0	NA
Approach	178	2.0	178	2.0		0.331		53.4	LOS D	3.0	21.1				
East: Grand Boulevard (E)															
Lane 1	138	2.0	138	2.0	1470	0.094	100	6.8	LOS A	0.1	0.9	Short	85	0.0	NA
Lane 2	306	2.0	306	2.0	908	0.337	100	17.5	LOS B	5.2	36.8	Full	200	0.0	0.0
Lane 3	306	2.0	306	2.0	908	0.337	100	15.6	LOS B	4.7	33.5	Full	200	0.0	0.0
Lane 4	55	2.0	55	2.0	201	0.272	100	27.8	LOS C	0.9	6.5	Short	120	0.0	NA
Approach	804	2.0	804	2.0		0.337		15.7	LOS B	5.2	36.8				
North: Connector Road (N)															
Lane 1	201	2.0	201	2.0	808	0.249	100	14.8	LOS B	3.1	22.0	Short	80	0.0	NA
Lane 2	55	2.0	55	2.0	274	0.202	100	50.3	LOS D	1.8	12.7	Full	165	0.0	0.0
Lane 3	53	2.0	53	2.0	262	0.202	100	54.4	LOS D	1.7	12.2	Short	35	0.0	NA
Approach	309	2.0	309	2.0		0.249		28.0	LOS C	3.1	22.0				
West: Grand Boulevard (W)															
Lane 1	68	2.0	68	2.0	1392	0.049	100	7.7	LOS A	0.2	1.7	Short	120	0.0	NA
Lane 2	651	2.0	651	2.0	904 ¹	0.720	100	27.3	LOS C	18.5	132.0	Full	500	0.0	0.0
Lane 3	652	2.0	652	2.0	905 ¹	0.720	100	27.3	LOS C	18.6	132.2	Full	500	0.0	0.0
Lane 4	18	2.0	18	2.0	420	0.043	100	20.6	LOS C	0.3	2.1	Short	120	0.0	NA
Approach	1389	2.0	1389	2.0		0.720		26.3	LOS C	18.6	132.2				
Intersection	2681	2.0	2681	2.0		0.720		25.1	LOS C	18.6	132.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

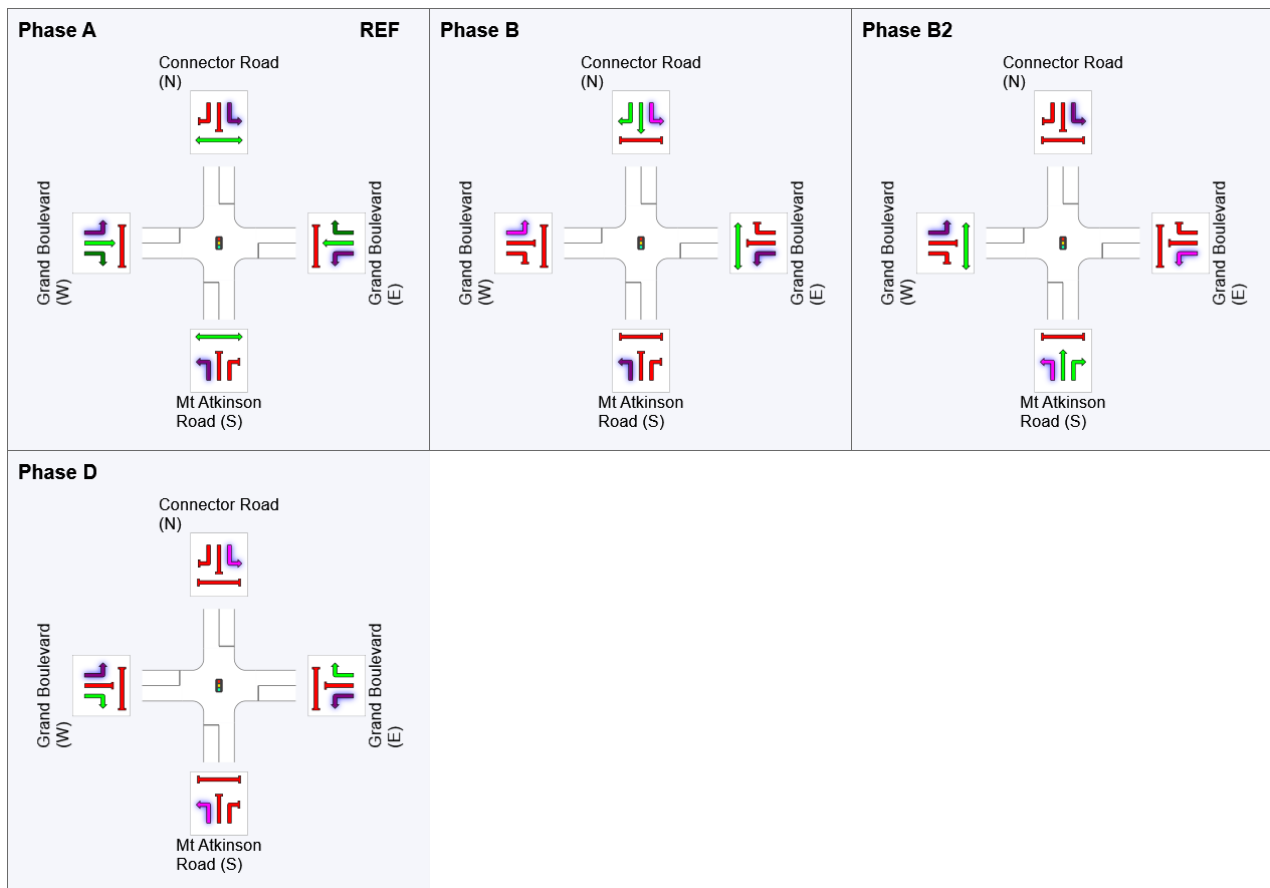
Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

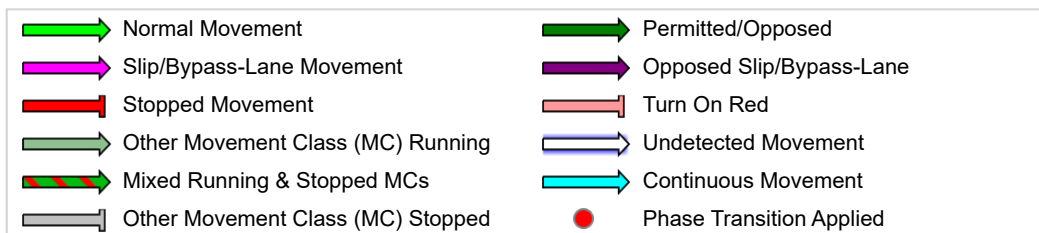
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹ Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	B	B2	D
Phase Change Time (sec)	76	18	41	64
Green Time (sec)	56	17	17	6
Phase Time (sec)	62	23	23	12
Phase Split	52%	19%	19%	10%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

USER REPORT FOR SITE

All Movement Classes



Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary

 **Site: 105 [05 FPD PM - Grand Blvd / Greigs Road (west) / Attezze Drive (Int#5) - eastbound re-route (Site Folder: Future Post Development - 25% discount to eastbound flow)]**

Note that the design for this intersection is not available and has been based on Int#4

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

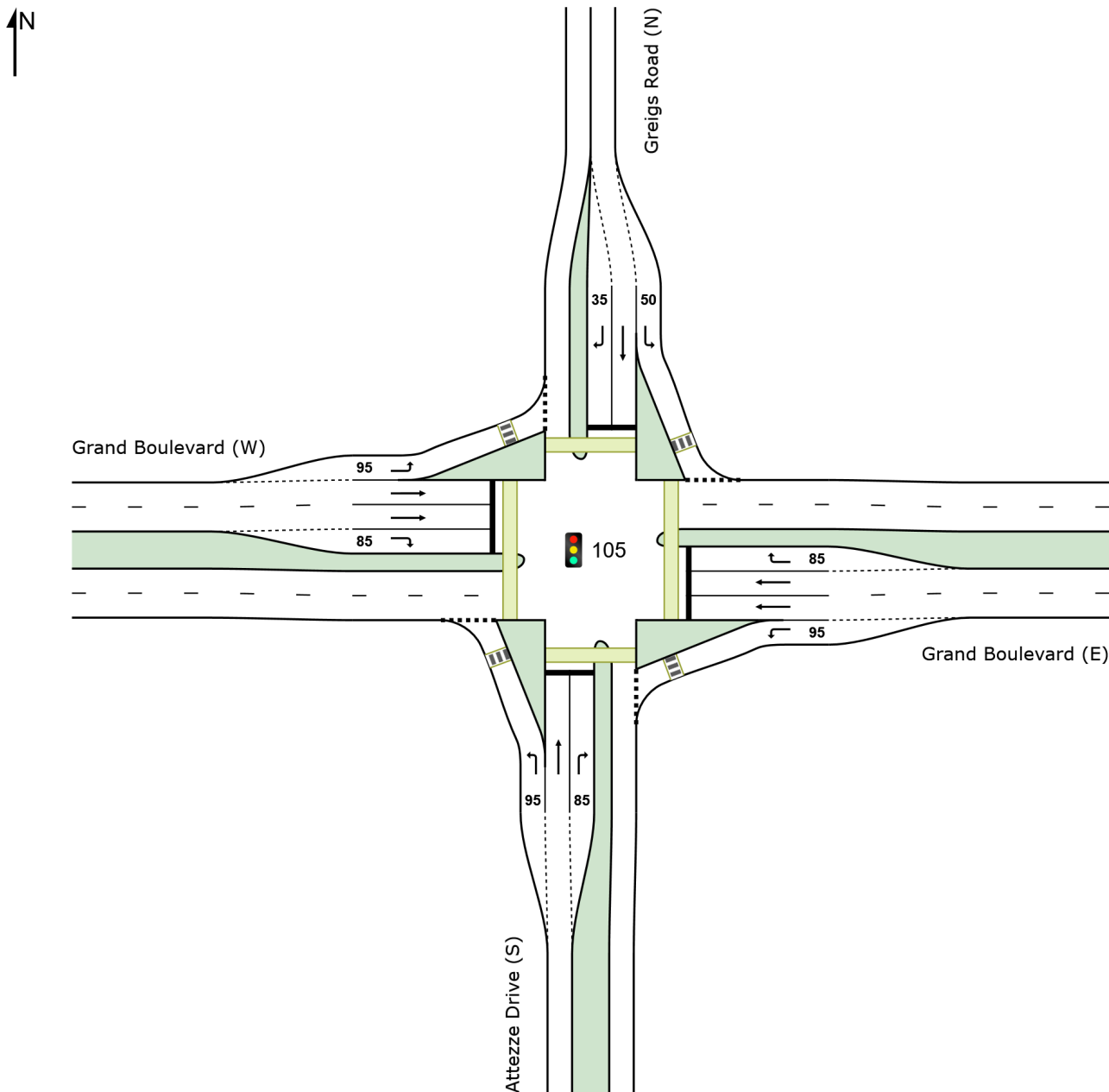
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance													
	DEMAND FLOWS		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
	[Total veh/h	HV] %						[Veh	Dist] m				
South: Attezze Drive (S)													
Lane 1	20	2.0	1110	0.018	100	6.8	LOS A	0.1	0.7	Short	95	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	15	2.0	277	0.053	100	27.5	LOS C	0.3	1.8	Short	85	0.0	NA
Approach	36	2.0		0.053		16.0	LOS B	0.3	1.8				
East: Grand Boulevard (E)													
Lane 1	23	2.0	1404	0.016	100	7.2	LOS A	0.0	0.3	Short	95	0.0	NA
Lane 2	306	2.0	754	0.406	100	19.3	LOS B	5.4	38.1	Full	500	0.0	0.0
Lane 3	306	2.0	754	0.406	100	19.3	LOS B	5.4	38.1	Full	500	0.0	0.0
Lane 4	1	2.0	260	0.004	100	21.1	LOS C	0.0	0.1	Short	85	0.0	NA
Approach	637	2.0		0.406		18.8	LOS B	5.4	38.1				

North: Greigs Road (N)													
Lane 1	1	2.0	901	0.001	100	10.1	LOS B	0.0	0.1	Short	50	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	72	2.0	277	0.259	100	28.7	LOS C	1.3	9.4	Short	35	0.0	NA
Approach	74	2.0		0.259		28.5	LOS C	1.3	9.4				
West: Grand Boulevard (W)													
Lane 1	71	2.0	1488	0.047	100	7.2	LOS A	0.1	0.9	Short	95	0.0	NA
Lane 2	600	2.0	754	0.796	100	26.6	LOS C	13.8	98.2	Full	500	0.0	0.0
Lane 3	600	2.0	754	0.796	100	26.6	LOS C	13.8	98.2	Full	500	0.0	0.0
Lane 4	32	2.0	405	0.078	100	18.2	LOS B	0.4	2.7	Short	85	0.0	NA
Approach	1302	2.0		0.796		25.3	LOS C	13.8	98.2				
Intersection	2048	2.0		0.796		23.3	LOS C	13.8	98.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

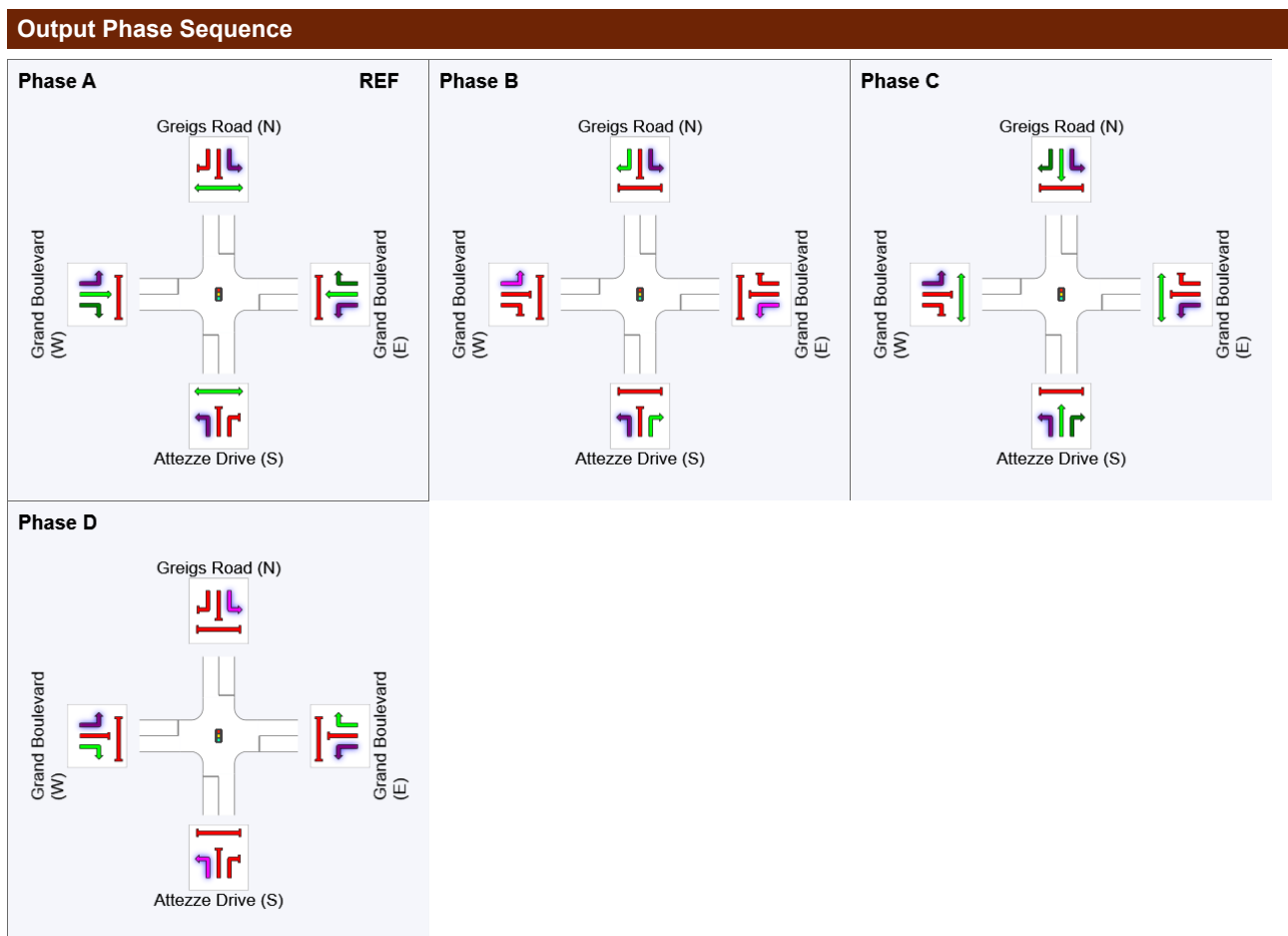
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	37	49	68
Green Time (sec)	31	6	13	6
Phase Time (sec)	37	12	19	12
Phase Split	46%	15%	24%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 101 [06 FPD PM - Clara Ave / East-West Rd (Int #6) (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Two-Phase

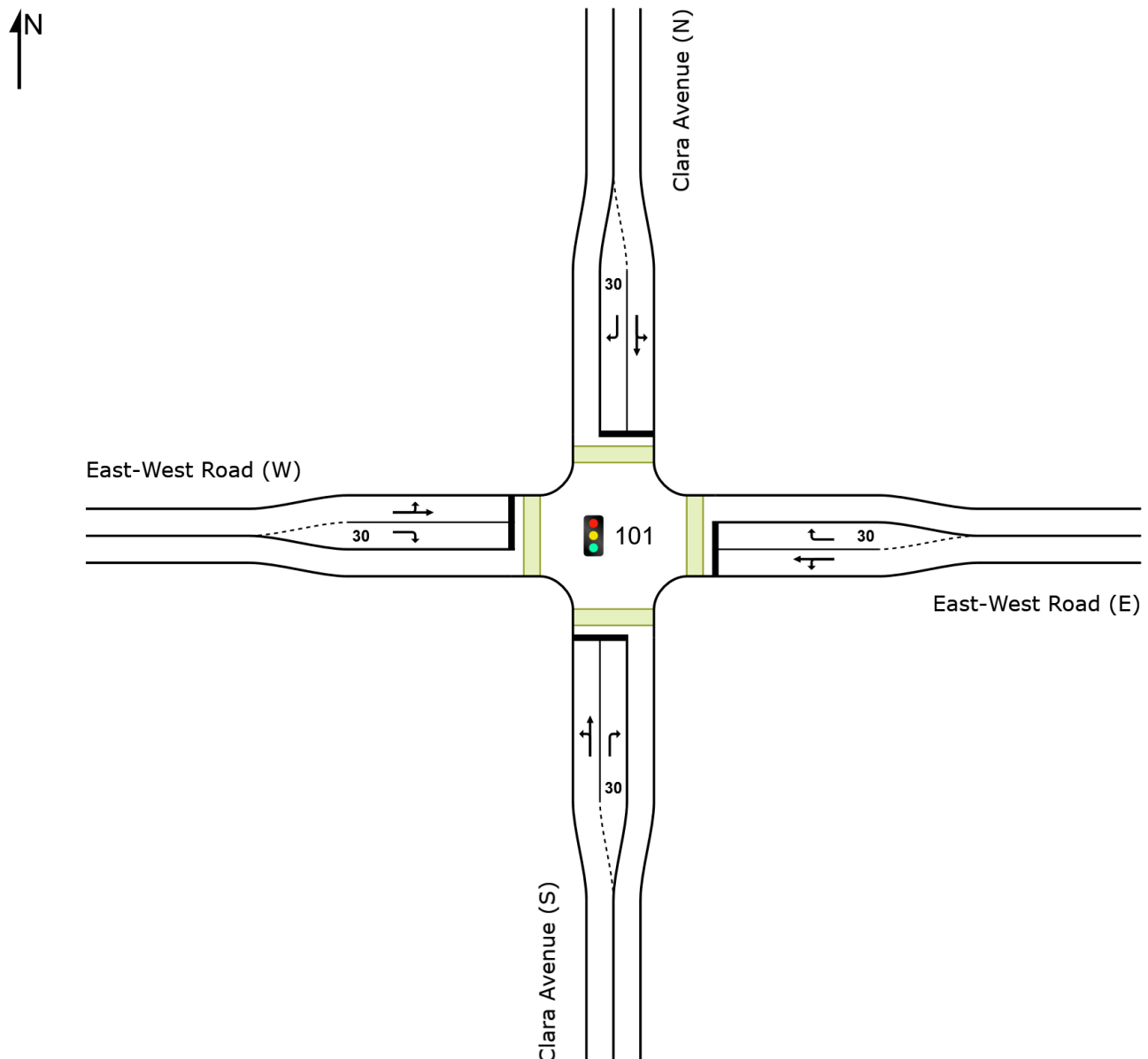
Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Site Layout

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



Lane Use and Performance

DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
[Total	HV]						[Veh	Dist]				
veh/h	%	veh/h	v/c	%	sec			m		m	%	%

South: Clara Avenue (S)													
Lane 1	474	2.0	723	0.655	100	11.4	LOS B	6.3	44.6	Full	260	0.0	0.0
Lane 2	17	2.0	491	0.034	100	12.2	LOS B	0.2	1.2	Short	30	0.0	NA
Approach	491	2.0		0.655		11.4	LOS B	6.3	44.6				
East: East-West Road (E)													
Lane 1	89	2.0	370	0.242	100	12.8	LOS B	1.2	8.5	Full	230	0.0	0.0
Lane 2	1	2.0	327	0.003	100	16.2	LOS B	0.0	0.1	Short	30	0.0	NA
Approach	91	2.0		0.242		12.8	LOS B	1.2	8.5				
North: Clara Avenue (N)													
Lane 1	243	2.0	770	0.316	100	7.0	LOS A	2.6	18.2	Full	300	0.0	0.0
Lane 2	1	2.0	332	0.003	100	15.3	LOS B	0.0	0.1	Short	30	0.0	NA
Approach	244	2.0		0.316		7.0	LOS A	2.6	18.2				
West: East-West Road (W)													
Lane 1	108	2.0	384	0.282	100	11.9	LOS B	1.5	10.4	Full	500	0.0	0.0
Lane 2	239	2.0	337	0.709	100	19.8	LOS B	3.9	27.5	Short	30	0.0	NA
Approach	347	2.0		0.709		17.3	LOS B	3.9	27.5				
Intersection	1173	2.0		0.709		12.4	LOS B	6.3	44.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

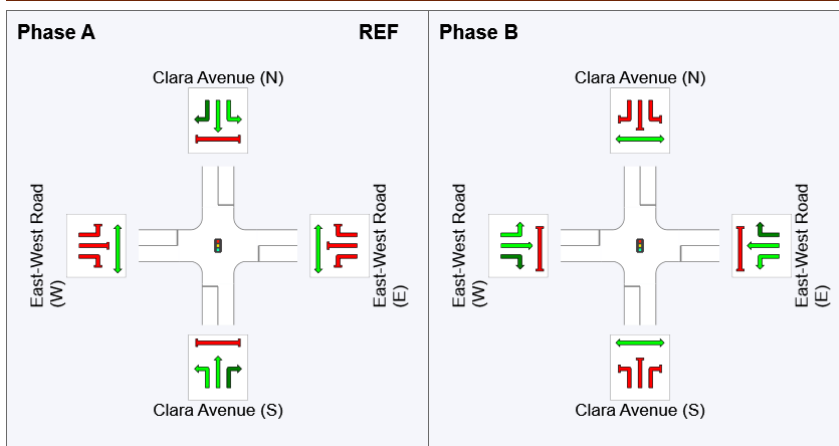
Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

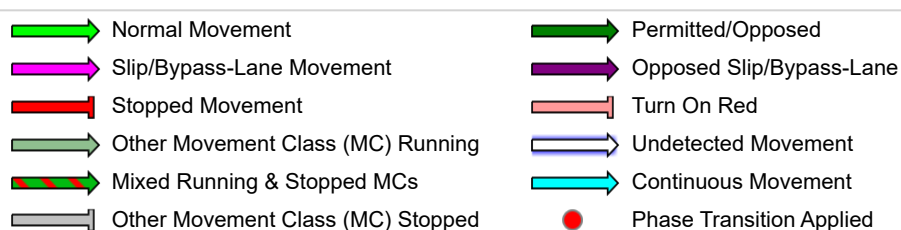
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	18
Green Time (sec)	12	6
Phase Time (sec)	18	12
Phase Split	60%	40%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 101 [07 FPD PM - Greigs Rd / East-West Rd (Int #7) (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Two-Phase

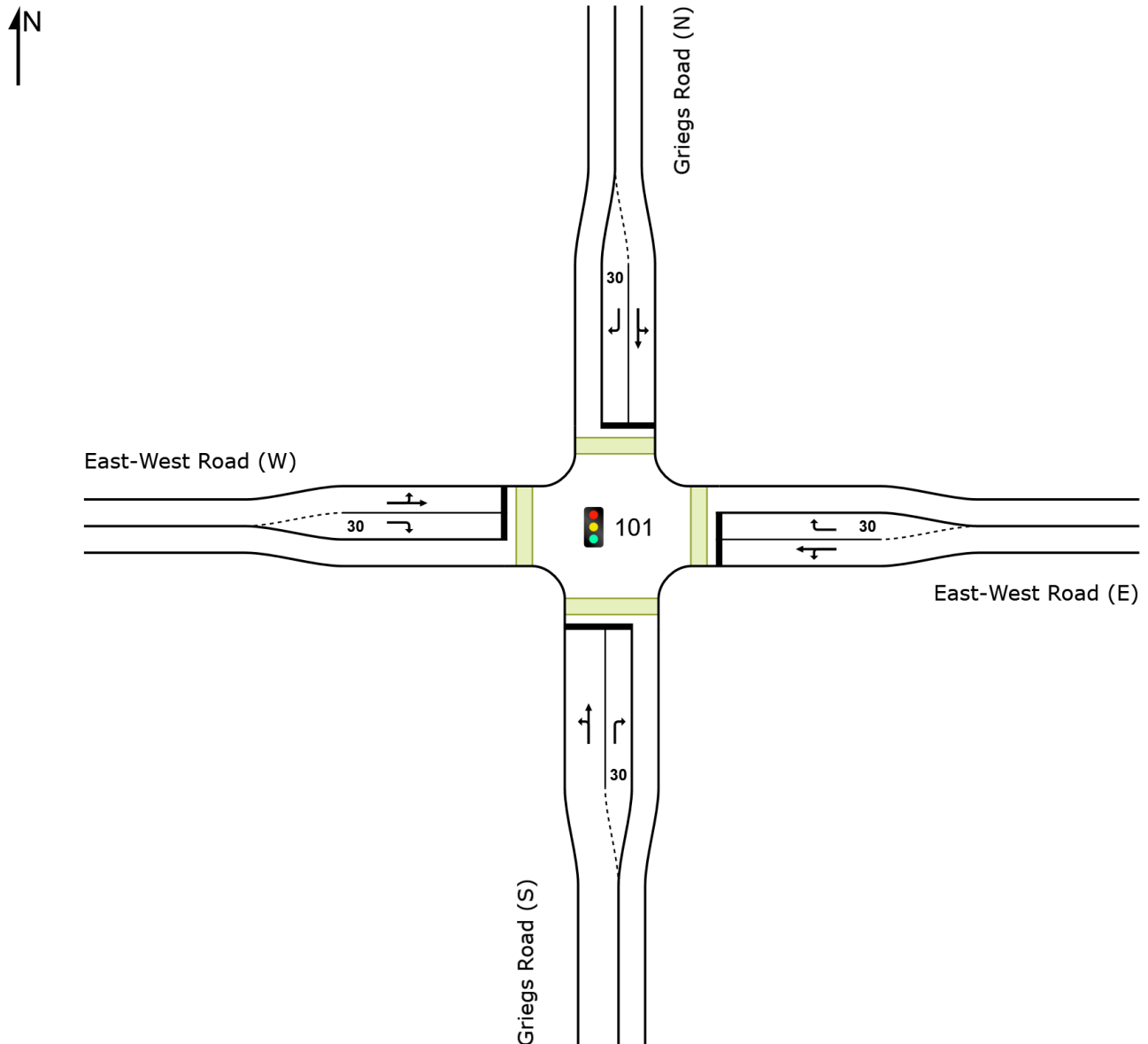
Reference Phase: Phase A

Input Phase Sequence: A, B

Output Phase Sequence: A, B

Site Layout

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



Lane Use and Performance

DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
[Total	HV]						[Veh	Dist]				
veh/h	%	veh/h	v/c	%	sec			m		m	%	%

South: Griegs Road (S)													
Lane 1	303	2.0	678	0.447	100	10.0	LOS A	3.7	26.2	Full	300	0.0	0.0
Lane 2	32	2.0	443	0.071	100	14.0	LOS B	0.4	2.6	Short	30	0.0	NA
Approach	335	2.0		0.447		10.3	LOS B	3.7	26.2				
East: East-West Road (E)													
Lane 1	55	2.0	430	0.127	100	14.1	LOS B	0.7	4.6	Full	500	0.0	0.0
Lane 2	1	2.0	428	0.002	100	14.3	LOS B	0.0	0.1	Short	30	0.0	NA
Approach	56	2.0		0.127		14.1	LOS B	0.7	4.6				
North: Griegs Road (N)													
Lane 1	192	2.0	641	0.299	100	8.4	LOS A	2.2	15.6	Full	500	0.0	0.0
Lane 2	1	2.0	379	0.003	100	14.4	LOS B	0.0	0.1	Short	30	0.0	NA
Approach	193	2.0		0.299		8.5	LOS A	2.2	15.6				
West: East-West Road (W)													
Lane 1	2	2.0	475	0.004	100	11.2	LOS B	0.0	0.2	Full	230	0.0	0.0
Lane 2	140	2.0	390	0.359	100	15.9	LOS B	1.9	13.3	Short	30	0.0	NA
Approach	142	2.0		0.359		15.8	LOS B	1.9	13.3				
Intersection	725	2.0		0.447		11.2	LOS B	3.7	26.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

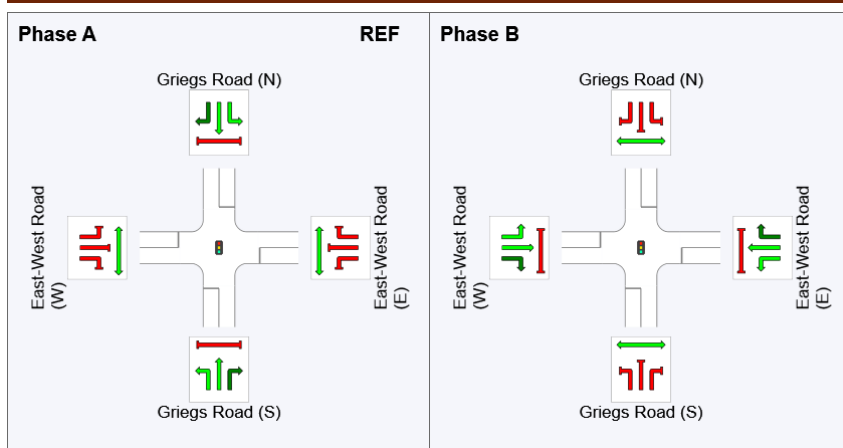
Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	16
Green Time (sec)	10	8
Phase Time (sec)	16	14
Phase Split	53%	47%

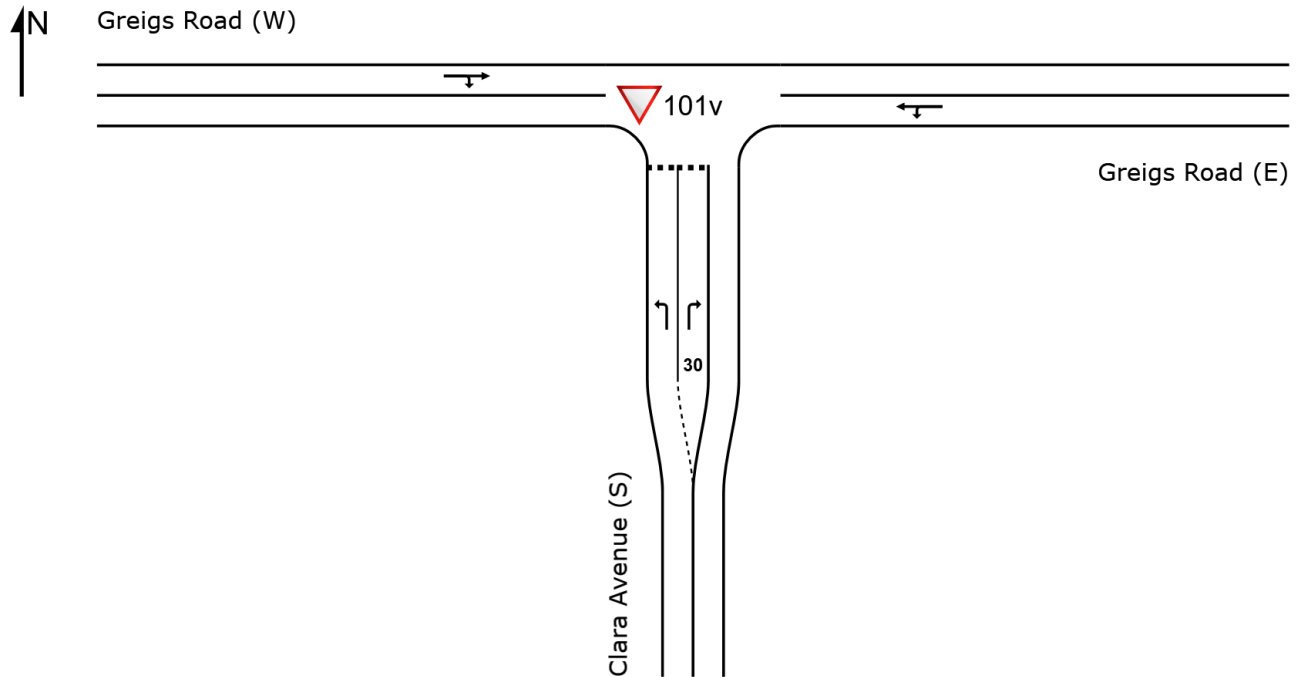
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

▽ Site: 101v [08 FPD PM - Clara Ave / Greigs Rd (Int #8) - Priority controlled (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Site Category: Base Year
Give-Way (Two-Way)

Site Layout

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



Lane Use and Performance													
	DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist]		m	%	%
South: Clara Avenue (S)													
Lane 1	139	2.0	1357	0.102	100	5.3	LOS A	0.4	3.0	Full	300	0.0	0.0
Lane 2	1	2.0	871	0.001	100	6.1	LOS A	0.0	0.0	Short	30	0.0	NA
Approach	140	2.0		0.102		5.3	LOS A	0.4	3.0				
East: Greigs Road (E)													
Lane 1	201	2.0	1924	0.104	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	201	2.0		0.104		0.1	NA	0.0	0.0				
West: Greigs Road (W)													
Lane 1	211	2.0	1631	0.129	100	3.2	LOS A	0.6	4.4	Full	350	0.0	0.0
Approach	211	2.0		0.129		3.2	NA	0.6	4.4				
Intersection	552	2.0		0.129		2.6	NA	0.6	4.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

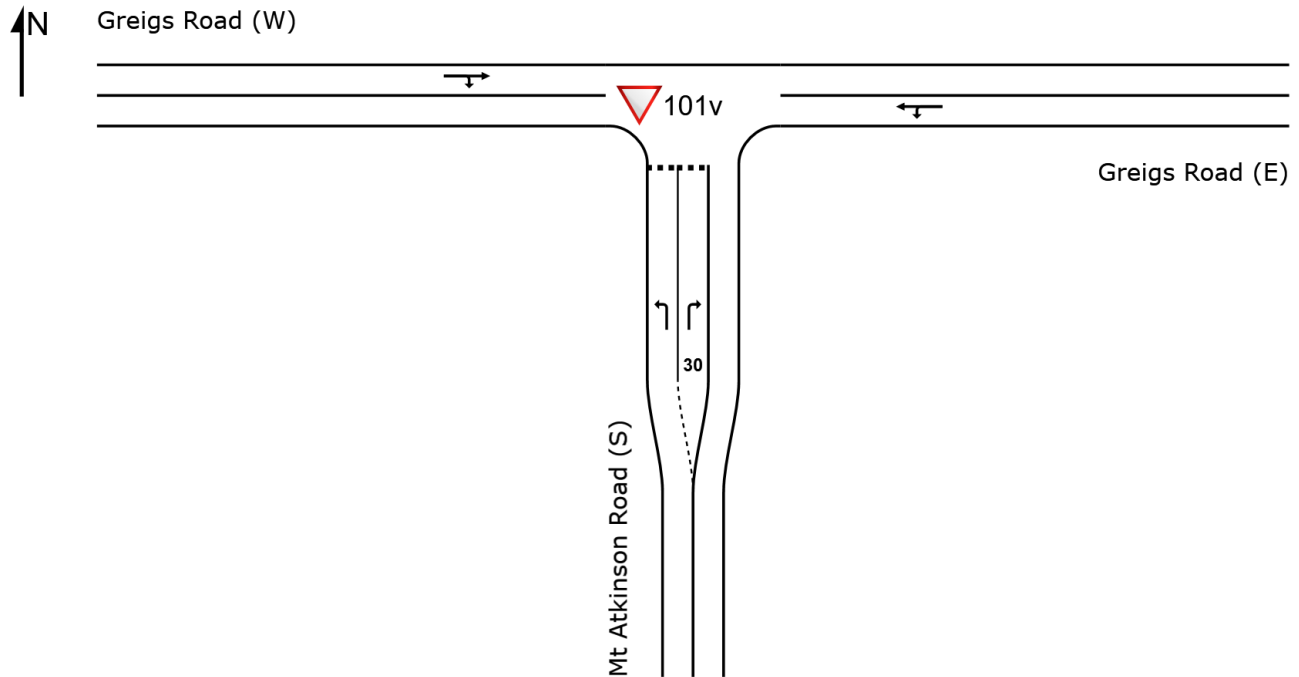
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

▽ Site: 101v [09 FPD PM - Greigs Rd / Mt Atkinson Rd (Int #9) - Priority controlled (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Site Category: -
Give-Way (Two-Way)

Site Layout

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



Lane Use and Performance													
	DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	95% BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist]		m	%	%
South: Mt Atkinson Road (S)													
Lane 1	44	2.0	1362	0.032	100	5.2	LOS A	0.1	0.9	Full	430	0.0	0.0
Lane 2	1	2.0	983	0.001	100	5.6	LOS A	0.0	0.0	Short	30	0.0	NA
Approach	45	2.0		0.032		5.2	LOS A	0.1	0.9				
East: Greigs Road (E)													
Lane 1	197	2.0	1924	0.102	100	0.0	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	197	2.0		0.102		0.0	NA	0.0	0.0				
West: Greigs Road (W)													
Lane 1	91	2.0	1660	0.055	100	2.8	LOS A	0.2	1.7	Full	500	0.0	0.0
Approach	91	2.0		0.055		2.8	NA	0.2	1.7				
Intersection	333	2.0		0.102		1.5	NA	0.2	1.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Minor Road Approach LOS values are based on average delay for all lanes.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

 Site: 101 [10 FPD PM - Mt Atkinson Rd / Shared St (Int #10) (Site Folder: Future Post Development - 25% discount to eastbound flow)]

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 40 seconds (Site Practical Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: T intersection three phase - Import

Reference Phase: Phase A

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

Site Layout

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

Lane 1	271	2.0	730	0.371	100	9.6	LOS A	3.1	21.7	Full	500	0.0	0.0
Approach	271	2.0		0.371		9.6	LOS A	3.1	21.7				
North: Mt Atkinson Road (S)													
Lane 1	46	2.0	288	0.161	100	17.2	LOS B	0.8	6.0	Full	430	0.0	0.0
Approach	46	2.0		0.161		17.2	LOS B	0.8	6.0				
Intersection	509	2.0		0.634		15.1	LOS B	3.9	27.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

Intersection and Approach LOS values are based on average delay for all lanes.

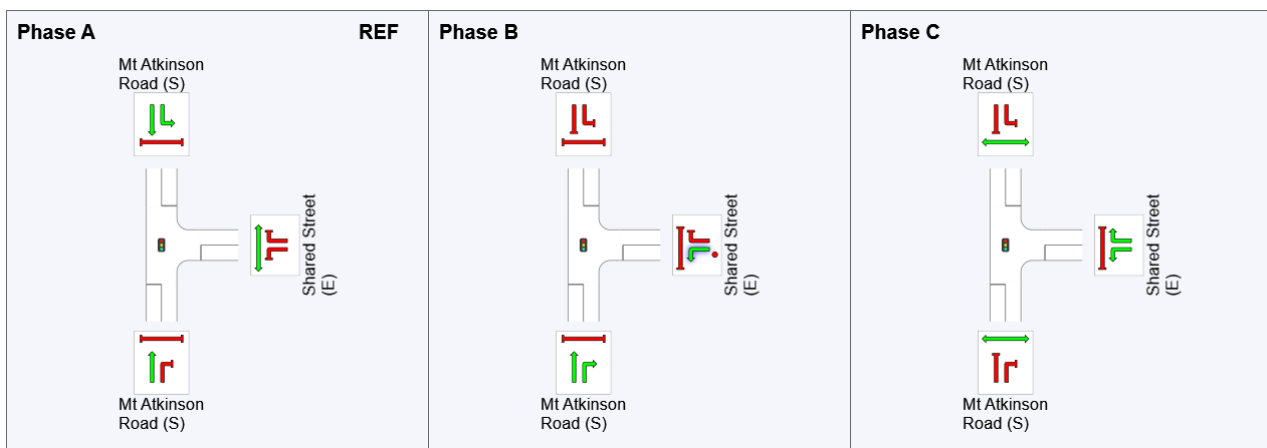
Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	12	24
Green Time (sec)	6	6	10
Phase Time (sec)	12	12	16
Phase Split	30%	30%	40%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

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Organisation: GTA CONSULTANTS | Licence: NETWORK / Enterprise | Created: Wednesday, 27 September 2023 12:46:09 PM

Project: U:\300304089\technical\modelling\sidra\230918_mt_atkinson_final.sip9

USER REPORT FOR NETWORK

All Movement Classes

Project: 230918_mt_atkinson_final

Template: Network Report

Network: N101 [FPD PM - Int#1,2,3,4 Network - w station (Network Folder: Future Post Development - w station)]

New Network

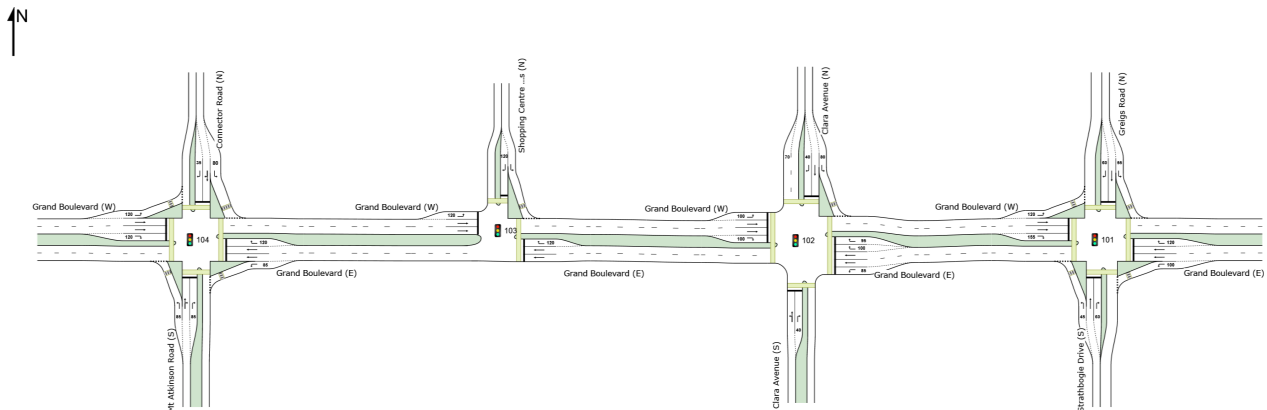
Network Category: (None)

Network Cycle Time = 90 seconds (Network Practical Cycle Time)

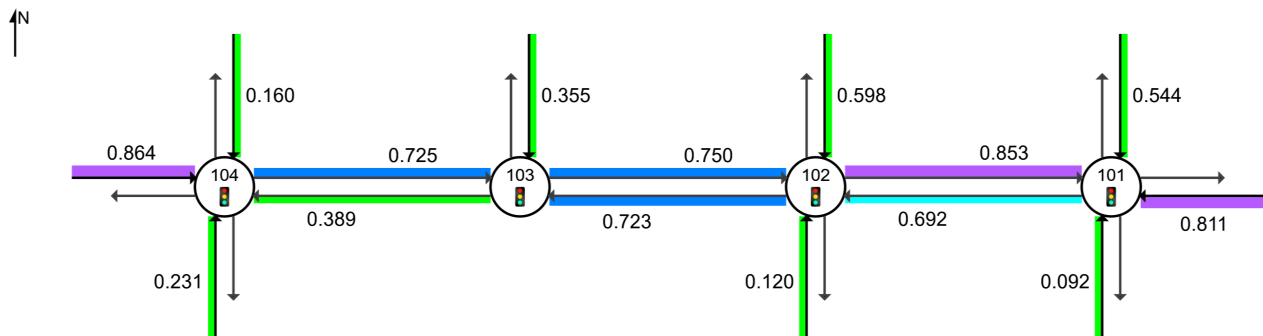
Critical Site / Common Control Group that determines the Network Cycle Time (for Coordinated Sites): 104 [04 FPD PM - Grand Blvd / Mt Atkinson Rd (Int#4) - w station]

Network Layout

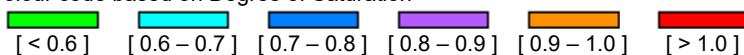
Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Degree of Saturation



Colour code based on Degree of Saturation



USER REPORT FOR NETWORK SITE

All Movement Classes

 Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary

 Site: 101 [01 FPD PM - Grand Blvd / Greigs Rd (east) / Strathbogie Drive (Int #1) - w station (Site Folder: Future Post Development - w station)]  Network: 3 [FPD PM - Int#1,2,3,4 Network - w station (Network Folder: Future Post Development - w station)]

Grand Boulevard / Greigs Road (east)

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - No B

Reference Phase: Phase A

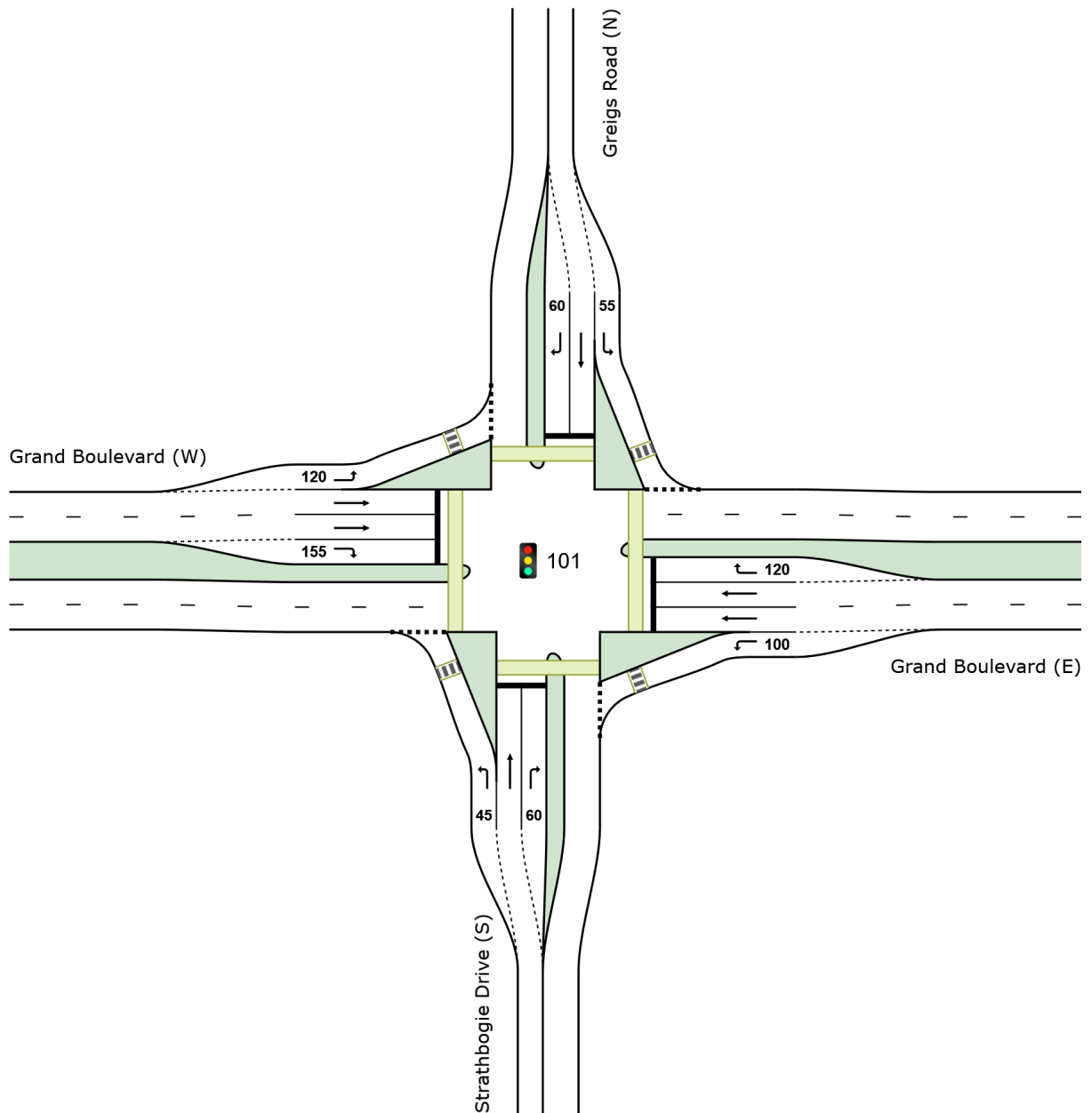
Input Phase Sequence: A, C, D, D1*, D2*

Output Phase Sequence: A, C, D, D1*

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: Strathbogie Drive (S)															
Lane 1	86	2.0	86	2.0	992	0.087	100	7.6	LOS A	0.6	4.0	Short	45	0.0	NA
Lane 2	25	2.0	25	2.0	303	0.083	100	35.6	LOS D	0.6	4.2	Full	500	0.0	0.0
Lane 3	13	2.0	13	2.0	137	0.092	100	48.2	LOS D	0.3	2.4	Short	60	0.0	NA
Approach	124	2.0	124	2.0		0.092		17.4	LOS B	0.6	4.2				
East: Grand Boulevard (E)															
Lane 1	6	2.0	6	2.0	1281	0.005	100	8.8	LOS A	0.0	0.2	Short	100	0.0	NA
Lane 2	366	2.0	366	2.0	713	0.513	100	24.0	LOS C	7.7	54.9	Full	500	0.0	0.0
Lane 3	366	2.0	366	2.0	713	0.513	100	24.0	LOS C	7.7	54.9	Full	500	0.0	0.0
Lane 4	317	2.0	317	2.0	391	0.811	100	48.4	LOS D	9.0	64.2	Short	120	0.0	NA
Approach	1055	2.0	1055	2.0		0.811		31.3	LOS C	9.0	64.2				

North: Greigs Road (N)															
Lane 1	256	2.0	256	2.0	856	0.299	100	11.6	LOS B	3.4	24.5	Short	55	0.0	NA
Lane 2	27	2.0	27	2.0	303	0.090	100	35.6	LOS D	0.6	4.6	Full	300	0.0	0.0
Lane 3	75	2.0	75	2.0	137	0.544	100	50.9	LOS D	2.1	14.9	Short	60	0.0	NA
Approach	358	2.0	358	2.0		0.544		21.7	LOS C	3.4	24.5				
West: Grand Boulevard (W)															
Lane 1	31	2.0	31	2.0	1134	0.027	100	8.0	LOS A	0.1	0.5	Short	120	0.0	NA
Lane 2	719	2.0	719	2.0	843	0.853	100	11.2	LOS B	12.8	91.3	Full	350	0.0	0.0
Lane 3	719	2.0	719	2.0	843	0.853	100	9.0	LOS A	11.0	78.1	Full	350	0.0	0.0
Lane 4	257	2.0	257	2.0	514	0.500	100	42.6	LOS D	6.5	46.6	Short	155	0.0	NA
Approach	1725	2.0	1725	2.0		0.853		14.9	LOS B	12.8	91.3				
Intersection	3262	2.0	3262	2.0		0.853		21.0	LOS C	12.8	91.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

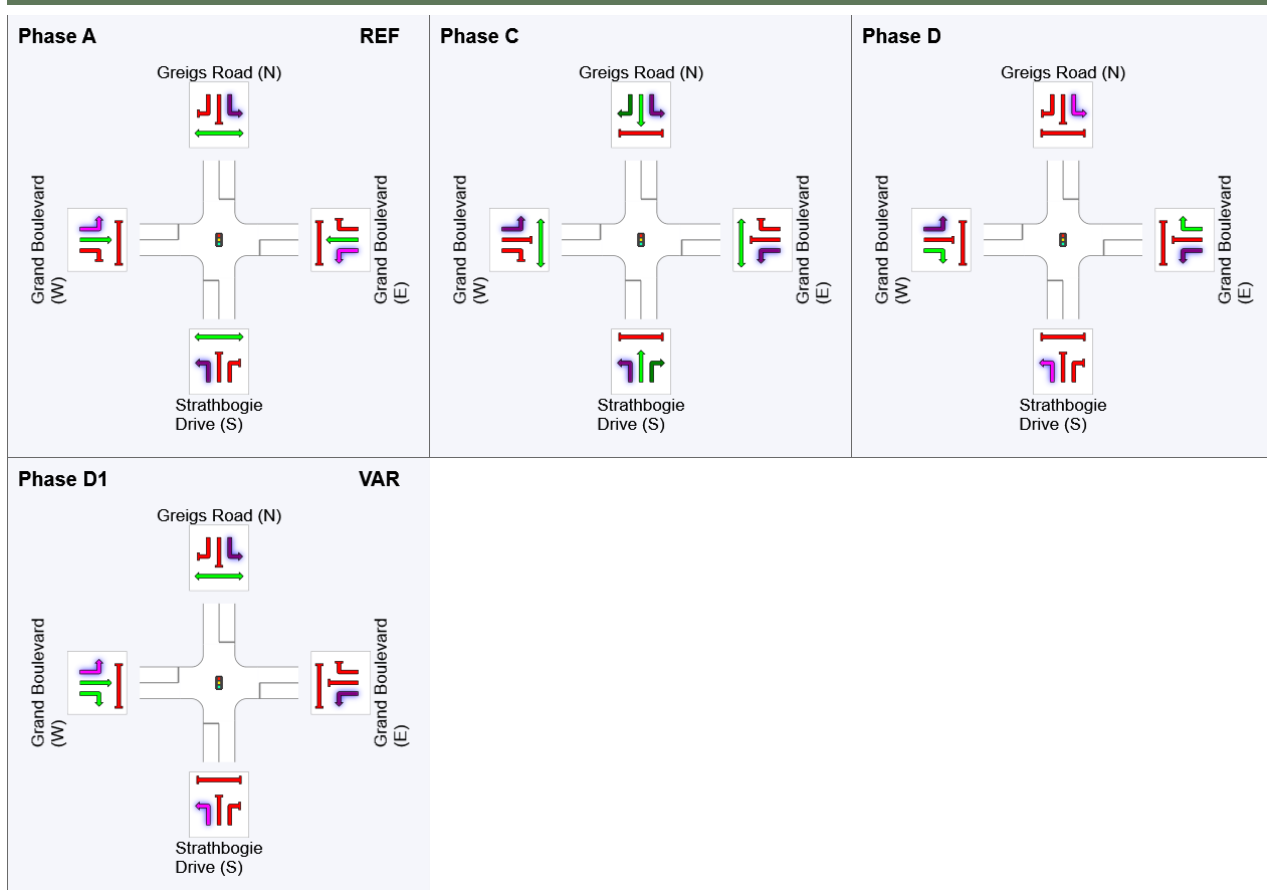
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	C	D	D1
Phase Change Time (sec)	0	39	59	84
Green Time (sec)	33	14	19	***
Phase Time (sec)	39	20	25	6
Phase Split	43%	22%	28%	7%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Site: 102 [02 FPD PM - Grand Blvd / Clara Ave (Int#2) - w station (Site Folder: Future Post Development - w station)]

Network: 3 [FPD PM - Int#1,2,3,4 Network - w station (Network Folder: Future Post Development - w station)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - No B

Reference Phase: Phase A

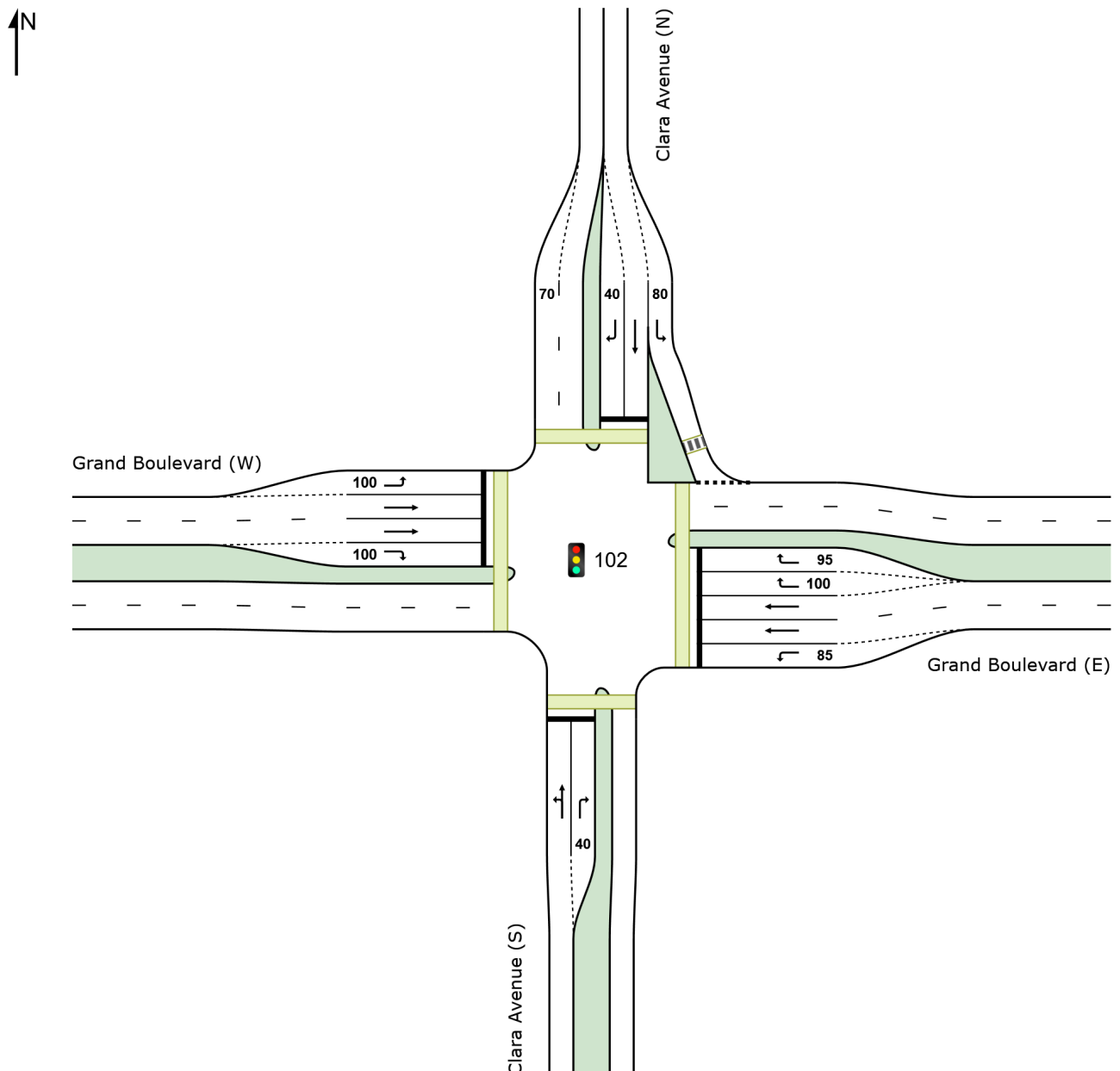
Input Phase Sequence: A, C, D, D1*, D2*

Output Phase Sequence: A, C, D, D2*

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Clara Avenue (S)															
Lane 1	44	2.0	44	2.0	368	0.120	100	35.4	LOS D	1.0	7.0	Full	500	0.0	0.0
Lane 2	5	2.0	5	2.0	217	0.024	100	41.7	LOS D	0.1	0.9	Short	40	0.0	NA
Approach	49	2.0	49	2.0		0.120		36.1	LOS D	1.0	7.0				
East: Grand Boulevard (E)															
Lane 1	6	2.0	6	2.0	925	0.007	100	27.0	LOS C	0.1	1.0	Short	85	0.0	NA
Lane 2	327	2.0	327	2.0	1016	0.322	100	24.1	LOS C	7.9	56.5	Full	350	0.0	0.0
Lane 3	327	2.0	327	2.0	1016	0.322	100	22.7	LOS C	7.6	54.2	Full	350	0.0	0.0
Lane 4	67	2.0	67	2.0	226	0.295	43 ⁶	47.1	LOS D	1.7	12.4	Short	100	0.0	NA
Lane 5	156	2.0	156	2.0	226	0.692	100	50.2	LOS D	4.4	31.0	Short	95	0.0	NA
Approach	883	2.0	883	2.0		0.692		30.0	LOS C	7.9	56.5				
North: Clara Avenue (N)															
Lane 1	318	2.0	318	2.0	856	0.371	100	9.7	LOS A	4.2	29.9	Short	80	0.0	NA
Lane 2	15	2.0	15	2.0	411	0.036	100	30.4	LOS C	0.3	2.2	Full	260	0.0	0.0
Lane 3	138	2.0	138	2.0	231	0.598	100	45.5	LOS D	3.7	26.1	Short	40	0.0	NA
Approach	471	2.0	471	2.0		0.598		20.8	LOS C	4.2	29.9				
West: Grand Boulevard (W)															
Lane 1	119	2.0	119	2.0	822	0.145	100	11.0	LOS B	0.5	3.9	Short	100	0.0	NA
Lane 2	681	2.0	681	2.0	908	0.750	100	5.4	LOS A	7.1	50.5	Full	200	0.0	0.0
Lane 3	681	2.0	681	2.0	908	0.750	100	2.6	LOS A	4.0	28.4	Full	200	0.0	0.0
Lane 4	32	2.0	32	2.0	123	0.256	100	54.6	LOS D	0.9	6.4	Short	100	0.0	NA
Approach	1512	2.0	1512	2.0		0.750		5.6	LOS A	7.1	50.5				
Intersection	2915	2.0	2915	2.0		0.750		16.0	LOS B	7.9	56.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

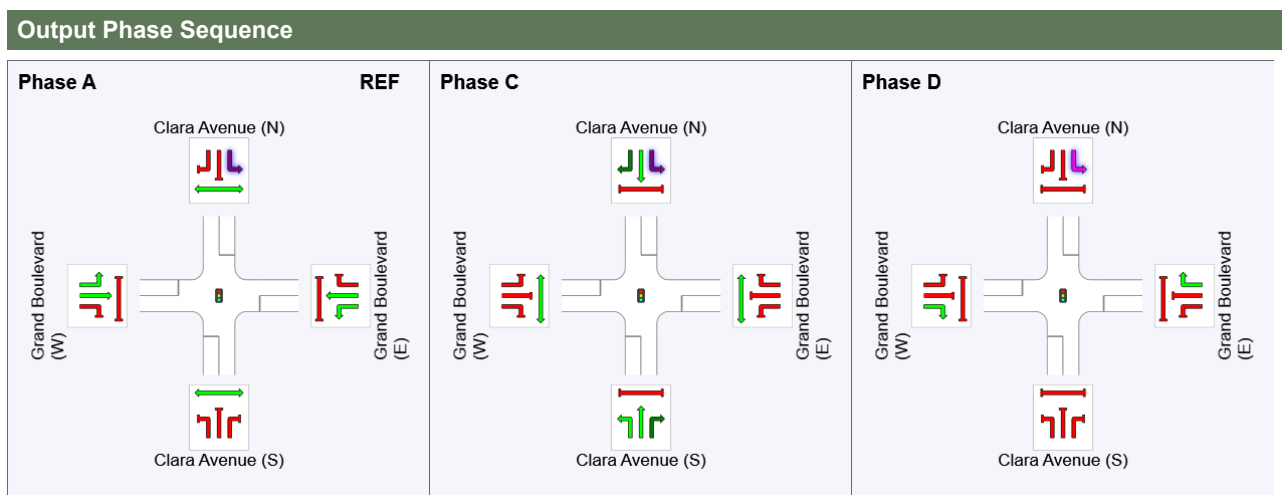
Intersection and Approach LOS values are based on average delay for all lanes.

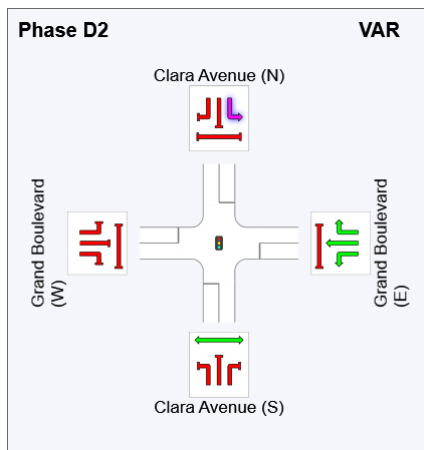
Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

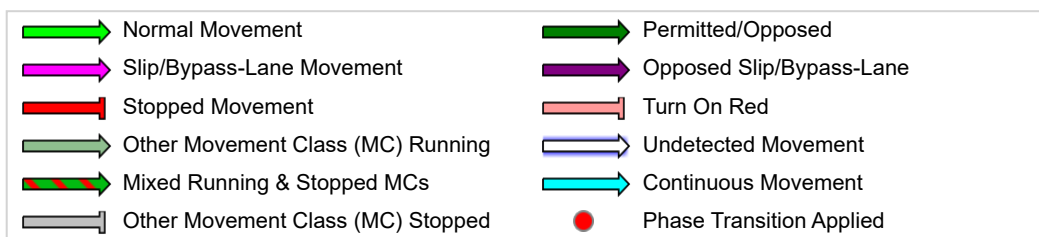
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

⁶ Lane under-utilisation due to downstream effects





REF: Reference Phase
VAR: Variable Phase



Phase Timing Summary

Phase	A	C	D	D2
Phase Change Time (sec)	60	18	43	55
Green Time (sec)	42	19	6	***
Phase Time (sec)	48	25	12	5
Phase Split	53%	28%	13%	6%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

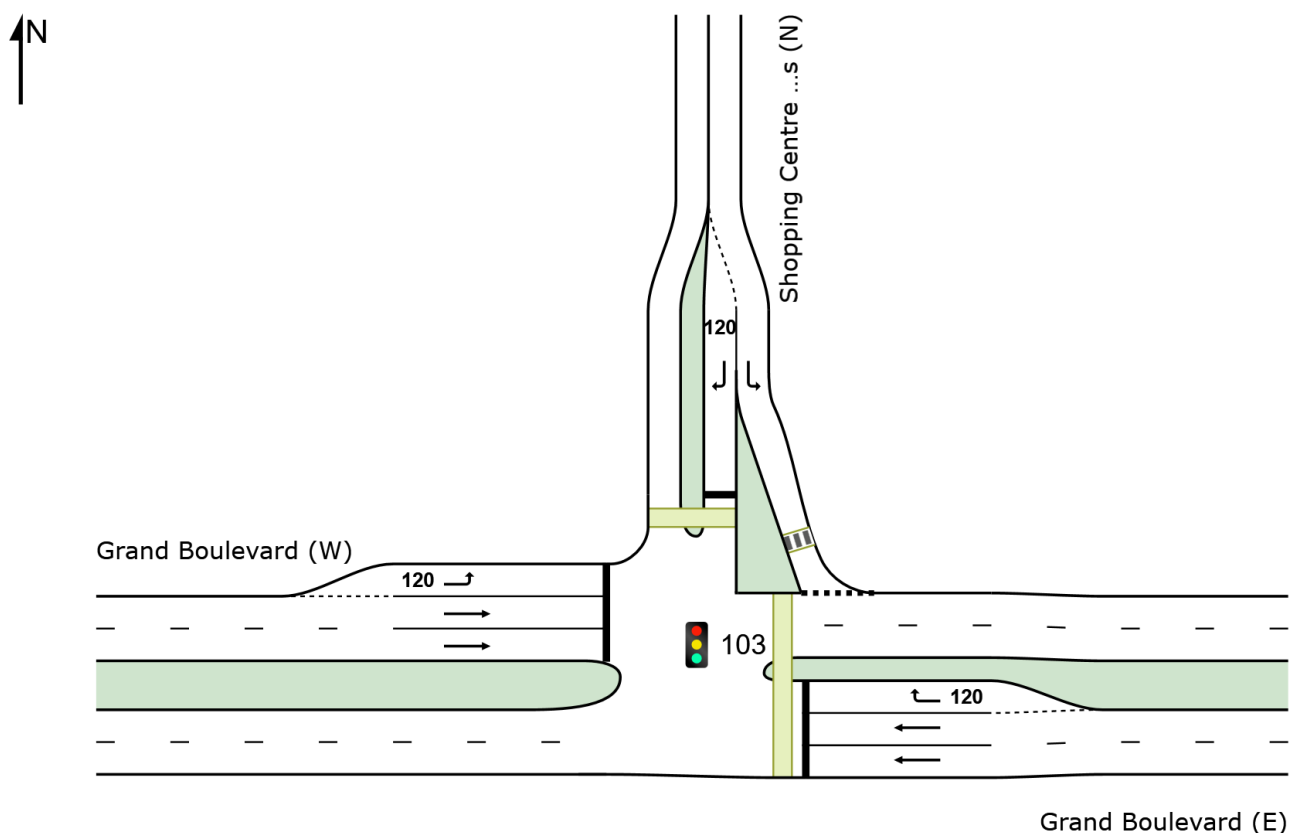
*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

■ ■ Network: 3 [FPD PM - Int#1,2,3,4 Network - w station (Network Folder: Future Post Development - w station)]

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Network Practical Cycle Time)

Output Phase Sequence: A, B, C

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %						[Veh	Dist] m				
	veh/h	%	veh/h	%	veh/h	v/c	%	sec			m		m	%	%
East: Grand Boulevard (E)															
Lane 1	292	2.0	292	2.0	1383	0.211	100	3.9	LOS A	1.9	13.7	Full	200	0.0	0.0
Lane 2	292	2.0	292	2.0	1383	0.211	100	3.7	LOS A	1.8	13.2	Full	200	0.0	0.0
Lane 3	238	2.0	238	2.0	329	0.723	100	54.8	LOS D	6.7	47.6	Short	120	0.0	NA
Approach	822	2.0	822	2.0		0.723		18.5	LOS B	6.7	47.6				
North: Shopping Centre Access (N)															

Lane 1	198	2.0	198	2.0	837	0.237	100	2.1	LOS A	1.2	8.2	Full	500	0.0	0.0
Lane 2	102	2.0	102	2.0	288	0.355	100	37.8	LOS D	2.5	18.1	Short	120	0.0	NA
Approach	300	2.0	300	2.0		0.355		14.2	LOS B	2.5	18.1				
West: Grand Boulevard (W)															
Lane 1	112	2.0	112	2.0	822	0.136	100	8.9	LOS A	0.2	1.2	Short	120	0.0	NA
Lane 2	658	2.0	658	2.0	908	0.725	100	1.9	LOS A	2.8	19.8	Full	200	0.0	0.0
Lane 3	658	2.0	658	2.0	908	0.725	100	4.1	LOS A	5.3	37.9	Full	200	0.0	0.0
Approach	1427	2.0	1427	2.0		0.725		3.5	LOS A	5.3	37.9				
Intersection	2549	2.0	2549	2.0		0.725		9.6	LOS A	6.7	47.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

Lane LOS values are based on average delay per lane.

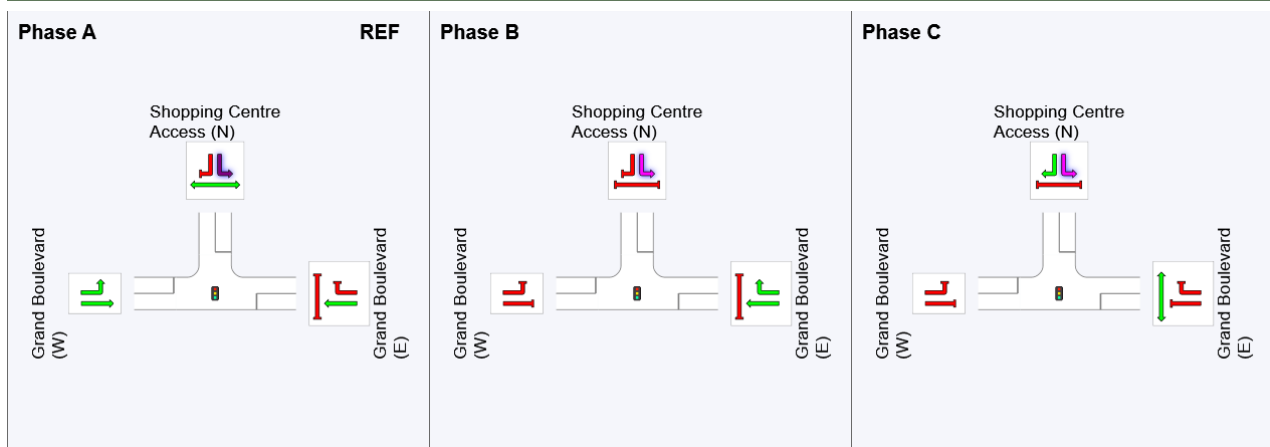
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	47	5	27
Green Time (sec)	42	16	14
Phase Time (sec)	48	22	20
Phase Split	53%	24%	22%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Site: 104 [04 FPD PM - Grand Blvd / Mt Atkinson Rd (Int#4) - w station (Site Folder: Future Post Development - w station)]

Network: 3 [FPD PM - Int#1,2,3,4 Network - w station (Network Folder: Future Post Development - w station)]

Grand Boulevard / Mt Atkinson Road

Site Category: Base Year

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 90 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing - Copy (2)

Reference Phase: Phase A

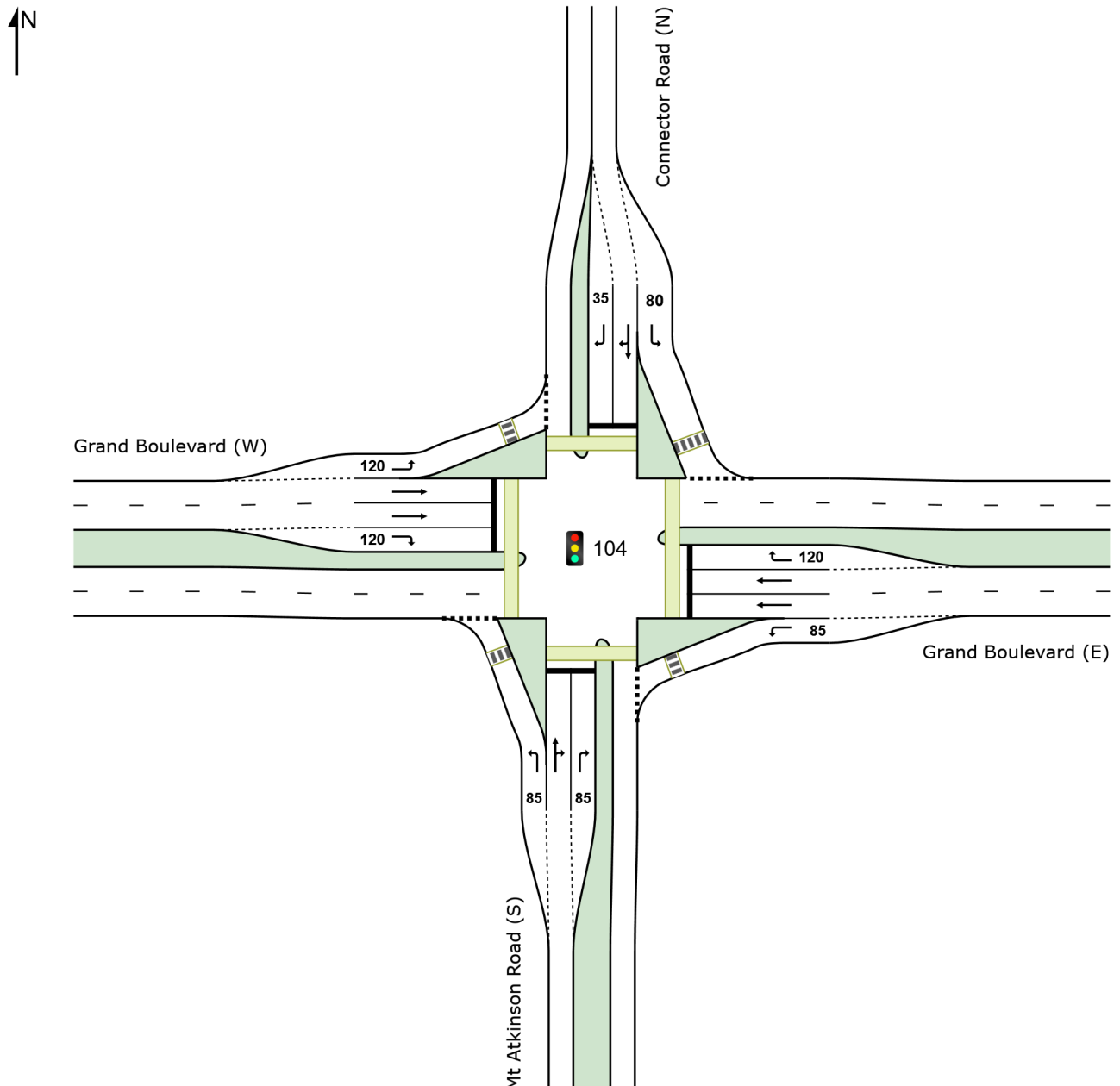
Input Phase Sequence: A, B, B2, D, D1*, D2*

Output Phase Sequence: A, B, B2, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance															
	DEMAND FLOWS		ARRIVAL FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h	HV %	[Total veh/h	HV %	veh/h	v/c	%	sec		[Veh	Dist] m		m	%	%
South: Mt Atkinson Road (S)															
Lane 1	1	2.0	1	2.0	1198	0.001	100	6.7	LOS A	0.0	0.0	Short	85	0.0	NA
Lane 2	69	2.0	69	2.0	299	0.231	100	37.8	LOS D	1.7	11.9	Full	500	0.0	0.0
Lane 3	67	2.0	67	2.0	288	0.231	100	41.4	LOS D	1.6	11.5	Short	85	0.0	NA
Approach	137	2.0	137	2.0		0.231		39.3	LOS D	1.7	11.9				
East: Grand Boulevard (E)															
Lane 1	108	2.0	108	2.0	1486	0.073	100	7.5	LOS A	0.4	2.8	Short	85	0.0	NA
Lane 2	269	2.0	269	2.0	692	0.389	100	26.8	LOS C	6.3	44.6	Full	200	0.0	0.0
Lane 3	269	2.0	269	2.0	692	0.389	100	27.7	LOS C	6.4	45.6	Full	200	0.0	0.0
Lane 4	41	2.0	41	2.0	222	0.185	100	29.9	LOS C	0.7	4.9	Short	120	0.0	NA
Approach	687	2.0	687	2.0		0.389		24.3	LOS C	6.4	45.6				
North: Connector Road (N)															
Lane 1	151	2.0	151	2.0	940	0.160	100	12.6	LOS B	1.7	12.0	Short	80	0.0	NA
Lane 2	42	2.0	42	2.0	301	0.140	100	36.6	LOS D	1.0	7.1	Full	165	0.0	0.0
Lane 3	40	2.0	40	2.0	288	0.140	100	40.7	LOS D	1.0	6.8	Short	35	0.0	NA
Approach	233	2.0	233	2.0		0.160		21.8	LOS C	1.7	12.0				
West: Grand Boulevard (W)															
Lane 1	52	2.0	52	2.0	1426	0.036	100	7.5	LOS A	0.1	1.0	Short	120	0.0	NA
Lane 2	597	2.0	597	2.0	692	0.864	100	37.3	LOS D	17.4	123.7	Full	500	0.0	0.0
Lane 3	597	2.0	597	2.0	692	0.864	100	37.3	LOS D	17.4	123.7	Full	500	0.0	0.0
Lane 4	14	2.0	14	2.0	369	0.037	100	21.6	LOS C	0.2	1.4	Short	120	0.0	NA
Approach	1260	2.0	1260	2.0		0.864		35.9	LOS D	17.4	123.7				
Intersection	2317	2.0	2317	2.0		0.864		31.3	LOS C	17.4	123.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).

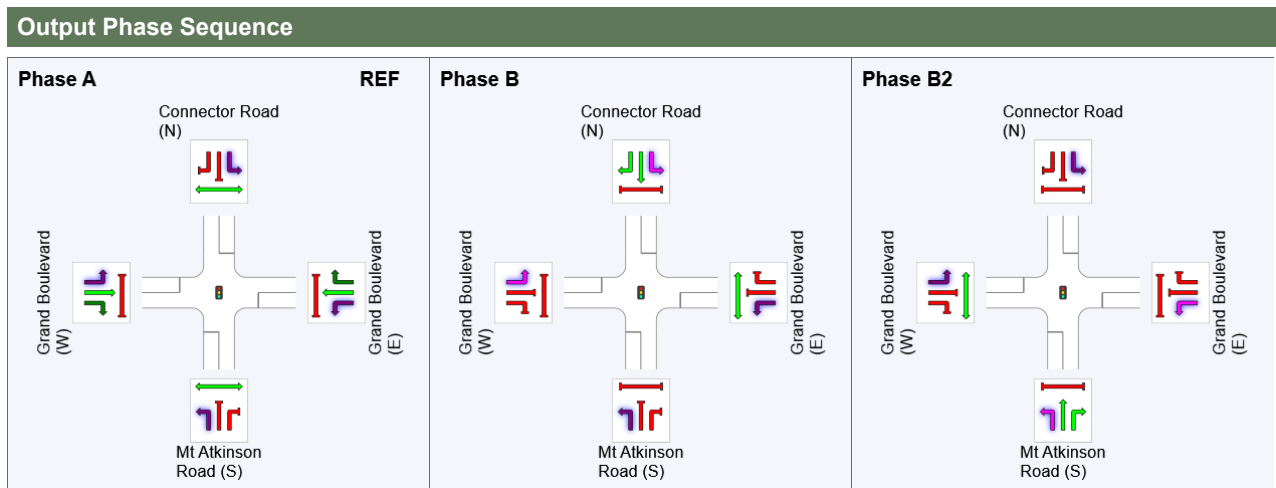
Lane LOS values are based on average delay per lane.

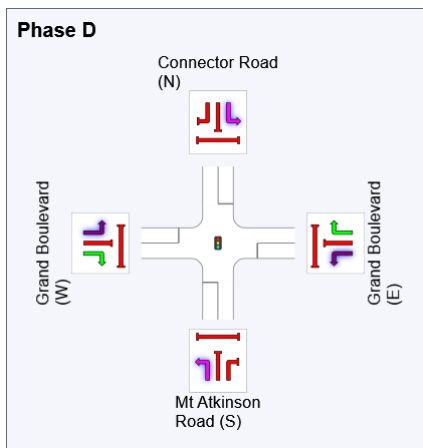
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

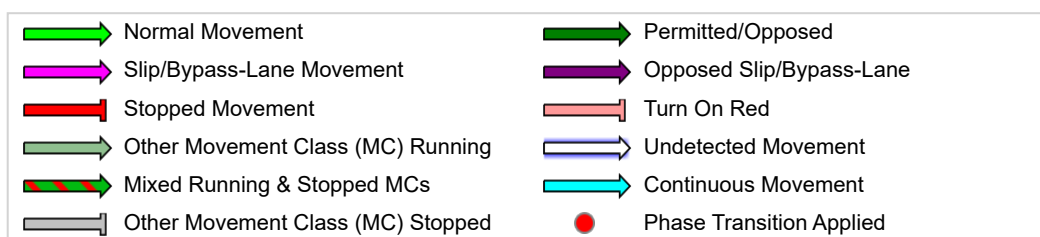
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.





REF: Reference Phase

VAR: Variable Phase



Phase Timing Summary

Phase	A	B	B2	D
Phase Change Time (sec)	44	82	12	32
Green Time (sec)	32	14	14	6
Phase Time (sec)	38	20	20	12
Phase Split	42%	22%	22%	13%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

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Project: U:\300304089\technical\modelling\sindra\230918_mt_atkinson_final.sip9

USER REPORT FOR SITE

All Movement Classes



Project: 230918_mt_atkinson_final

Template: Layout, Lane &
Phase Summary

 **Site: 105 [05 FPD PM - Grand Blvd / Greigs Road (west) / Attezze Drive (Int#5) - w station (Site Folder: Future Post Development - w station)]**

Note that the design for this intersection is not available and has been based on Int#4

Site Category: -

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

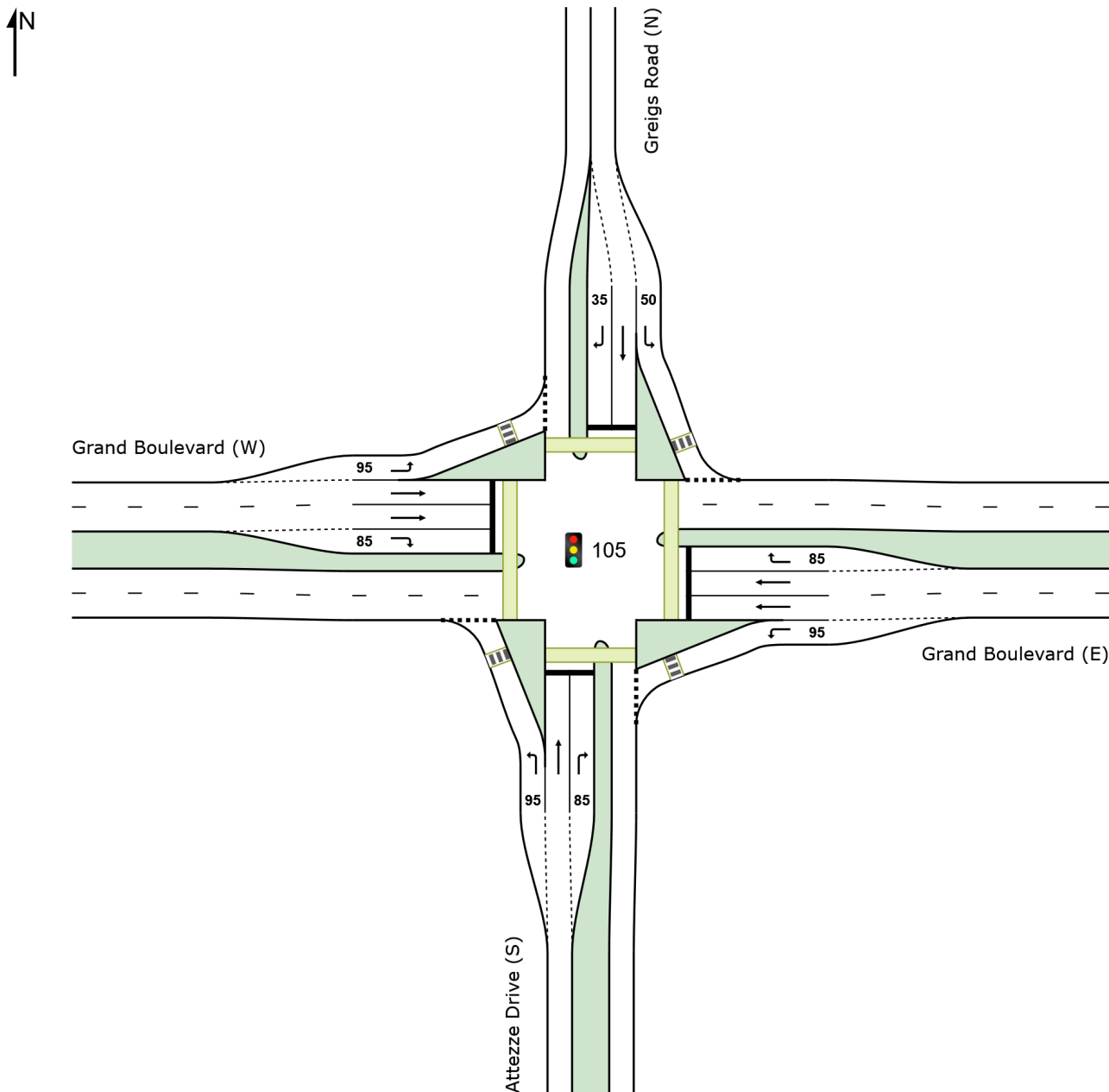
Input Phase Sequence: A, B, B1*, B2*, C, D, D1*, D2*

Output Phase Sequence: A, B, C, D

(* Variable Phase)

Site Layout

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



Lane Use and Performance													
	DEMAND FLOWS		Cap.	Deg. Satn	Lane Util.	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	[Total veh/h]	[HV %]	veh/h	v/c	%	sec		[Veh]	[Dist m]		m	%	%
South: Atteze Drive (S)													
Lane 1	20	2.0	1160	0.017	100	6.4	LOS A	0.1	0.6	Short	95	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	15	2.0	277	0.053	100	27.5	LOS C	0.3	1.8	Short	85	0.0	NA
Approach	36	2.0		0.053		15.8	LOS B	0.3	1.8				
East: Grand Boulevard (E)													
Lane 1	23	2.0	1396	0.017	100	7.2	LOS A	0.0	0.3	Short	95	0.0	NA
Lane 2	262	2.0	754	0.348	100	18.7	LOS B	4.5	31.7	Full	500	0.0	0.0
Lane 3	262	2.0	754	0.348	100	18.7	LOS B	4.5	31.7	Full	500	0.0	0.0
Lane 4	1	2.0	274	0.004	100	20.4	LOS C	0.0	0.1	Short	85	0.0	NA
Approach	548	2.0		0.348		18.2	LOS B	4.5	31.7				

North: Greigs Road (N)													
Lane 1	1	2.0	923	0.001	100	9.0	LOS A	0.0	0.1	Short	50	0.0	NA
Lane 2	1	2.0	316	0.003	100	30.1	LOS C	0.0	0.1	Full	500	0.0	0.0
Lane 3	54	2.0	277	0.194	100	28.4	LOS C	1.0	7.0	Short	35	0.0	NA
Approach	56	2.0		0.194		28.1	LOS C	1.0	7.0				
West: Grand Boulevard (W)													
Lane 1	54	2.0	1479	0.036	100	7.2	LOS A	0.1	0.7	Short	95	0.0	NA
Lane 2	554	2.0	754	0.735	100	23.5	LOS C	11.7	83.2	Full	500	0.0	0.0
Lane 3	554	2.0	754	0.735	100	23.5	LOS C	11.7	83.2	Full	500	0.0	0.0
Lane 4	32	2.0	439	0.072	100	17.8	LOS B	0.4	2.7	Short	85	0.0	NA
Approach	1193	2.0		0.735		22.6	LOS C	11.7	83.2				
Intersection	1833	2.0		0.735		21.4	LOS C	11.7	83.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Lane LOS values are based on average delay per lane.

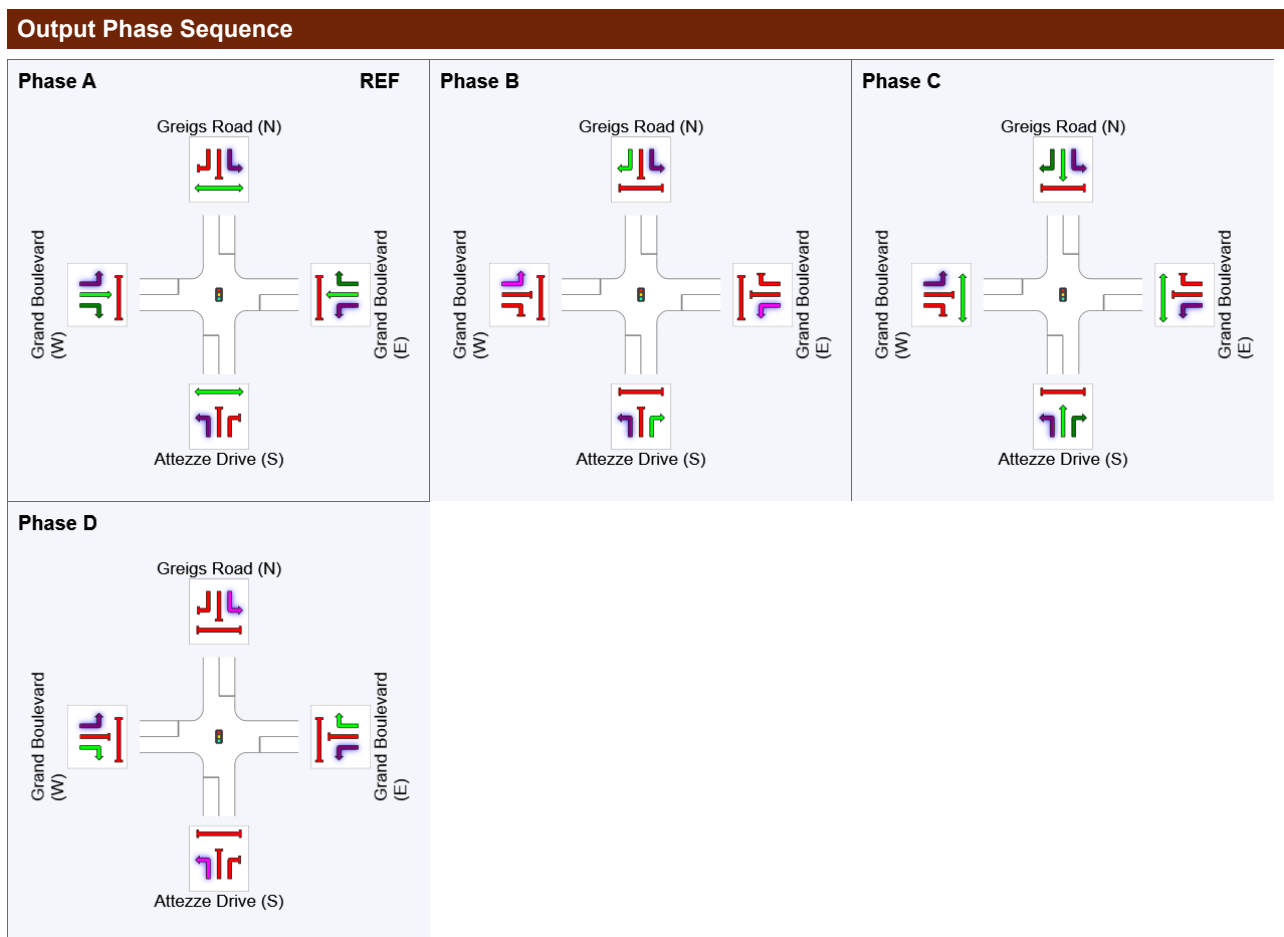
Intersection and Approach LOS values are based on average delay for all lanes.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	37	49	68
Green Time (sec)	31	6	13	6
Phase Time (sec)	37	12	19	12
Phase Split	46%	15%	24%	15%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

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